

Chapter 3

Potential User Groups of Mobility as a Service in Finland

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ABSTRACT

With a mobility as a service (MaaS) offering, the transport needs of the end customer may be fulfilled in a way, which may challenge the car dominant mobility practices of today. Up to now, there has been few studies focusing on the interest of end users towards MaaS. This chapter presents results from a survey in Finland (N=1,176) and focuses on the interest towards MaaS services among 18-64 year olds and especially the potential of MaaS in different user groups. The authors found that particularly the respondents who currently use public transport, the respondents living in households without a car, the respondents aged 25-34, and the respondents with higher education were more interested to adopt MaaS services. They also found that people living in urban areas and in apartment houses indicated a higher interest towards MaaS. The same groups had also more often no need or will for car ownership if a competitive MaaS service would be available. Continuing urbanisation offers increasing potential for MaaS as there are many mobility services, which can be bundled into a MaaS offerings in cities.

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INTRODUCTION

In the developed countries, automobiles have grown to be the dominant mode of transport since their launch in late 1800s. During the 20th century, the number of passenger cars as well as passenger car mileage grew to support the lifestyles of the modern society. Together with increasing number of cars and kilometres travelled, problems associated with cars have increased to a state where options for this mode are asked for more and more. Could we own and use cars less, yet still fulfil our daily mobility needs? As one suggested model, Mobility as a Service, MaaS, offers an option by aiming to make travelling with different modes easy and fluent. This way MaaS could compete with the current car-based system. As Heikkilä (2014) in one of the first studies on MaaS described, Mobility as a Service can be seen as a system, where mobility operators provide a comprehensive range of mobility services to customers. MaaS can also be considered as a solution for more sustainable mobility, especially as it could replace car-based mobility. König et al. (2016) defined MaaS as “multimodal and sustainable mobility services addressing customers’ transport needs by integrating planning and payment on a one-stop-shop principle”.

The aim of this chapter is to analyse people’s interest towards MaaS, and which user groups find MaaS offerings tempting and are the most potential MaaS customers. The potential is analysed based on a survey with a representative sample of 6,000 Finns. By combining the findings from this survey with previous studies and Finnish data on demographics and mobility patterns, the potential is further analysed. This chapter aims to answer the following questions: what is the interest towards MaaS among ordinary people, which are the most potential user groups of MaaS, and how do current trends in demographics and mobility affect the potential of MaaS. This paper strives to contribute to recognising current attitudes of ordinary people towards MaaS and the potential user groups of MaaS. Current attitudes towards MaaS and the potential user groups are in the interests of different stakeholders working on mobility services and MaaS related issues from companies to scientific community as well as authorities from local level to national level.

Since Mobility as a Service is a new concept, the number of studies on MaaS and its potential is still low. Kamargianni et al. (2015) analysed the potential of MaaS in the context of a large city as they identified supply and demand of transport services London, UK, and presented a MaaS-London concept for the future. Additionally, related to MaaS-London concept, Matyas & Kamargianni (2017) carried out stated preference study to understand people’s mobility choices under MaaS, and Kamargianni et al. (2018) studied Londoners’ attitudes towards car ownership and MaaS. Li & Voegelé (2017) studied the challenges of MaaS from the point of view of conditions in the city (availability of different modes, e-tickets, open data, and e-payment options).

Reflecting different aspects of MaaS potential, Giesecke et al. (2016) presented four key conceptual issues of MaaS, namely 1) nature of travel (e.g. trip purpose, trip length, mode, and means), 2) interoperability, 3) end-user behaviour related to e.g. different user groups, gender issues, and aging, and 4) sustainability. In this chapter, we will mostly focus on the end-users, but also discuss the nature of travel and sustainability related to MaaS. Giesecke et al. (2016) emphasised a strong focus on the end-user perspective, in which user group segments as well as user acceptance criteria, based on user attitudes and behaviour, are particularly important.

Next, in section 2, previous research findings are discussed related to the potential users and user groups of MaaS. In section 3, the original survey is presented, by which end-user perspectives on MaaS were asked. Thereafter, section 4 presents the findings of this survey, and in section 5, these findings will then be discussed in relation to previous studies and other data. Section 6 discusses the reliability of the results. Finally, section 7 presents the conclusions.

PREVIOUS RESEARCH ON THE POTENTIAL USER GROUPS OF MAAS

There are only a few publications in which the potential of MaaS has been studied from end-user perspective. We have not found similar MaaS-related studies as analysed in this paper with a large survey sample. Kamargianni et al. (2018) studied Londoners' attitudes towards MaaS and found that some demographic groups were more interested in MaaS. They also found that the characteristics of MaaS had an impact on people's willingness to adopt these services. Based on the survey responses of about 1,200 Londoners, 55% of the participants who were under 30 years old would utilise MaaS if it lowered mobility costs due to bundled mobility services, whereas 35% of over 49 years old would utilise MaaS for the same reason.

The study by Kamargianni et al. (2018) also found that MaaS could strengthen use of sustainable transport modes as 28% of regular public transport users would use more public transport. In addition, 35% of regular car users would use more public transport and 17% of car users would bicycle more. In conclusion, MaaS was expected to affect mostly people under 30 years old, while the effects on mobility patterns of older than 50 years old were expected to be the lowest.

ITS Australia (2018) also found out based on a MaaS-related survey with 4,000 Australian participants that younger people and especially men and educated people were most likely to become MaaS users. People living in rural areas, not college educated and rarely using public transport were the most likely people not to utilise MaaS.

Transport Systems Catapult (2016) stated that there will be no one MaaS model that fits all. This holds both from the business perspective, as there is a great number of different stakeholders, which make the models probably different, as well as from the user perspective as the service should align with the lifestyles of different customers. It may be challenging for the MaaS operators to introduce attractive value offerings for a significant proportion of the consumer market. However, the size of the mobility market and the diversified mobility needs offer potential for MaaS model. As the early adopters, new millennials are likely MaaS consumers.

A MaaS package can be a solution for household's mobility, and fulfil not only adults', but also children's mobility needs. Another important point in the MaaS business model is that the MaaS operator helps the transport operators improve their service by sharing the data on customers' mobility needs (Transport Systems Catapult 2016).

Men and high-income groups are estimated to have a positive attitude towards new technology (El Zarwi et al. 2017), which could also be a supporting issue for MaaS. Becker et al. (2017a, 2017b) studied car-sharing schemes in Switzerland and found that the most potential user group in car-sharing was young and highly educated people.

MaaS trials and commercial schemes are also a way to assess the potential of MaaS. Strömberg et al. (2016) found that trials provide a safe space for experimenting new behaviour, and this may lead to participants engaging behaviour that they would probably not do without the trial. Karlsson et al. (2016) studied how a MaaS trial, UbiGo, in Gothenburg, Sweden responded to user needs, and found that the customers were more satisfied during the trial compared with their previous travel solution. Up to now, the number of MaaS pilots has been low, and the findings related to commercial MaaS schemes have not yet been widely published.

In a survey carried out in April 2017, only 16 per cent of Finns had heard of MaaS. However, in the same survey, 80 per cent of respondents saw it necessary to be able to travel the whole trip chain with the same ticket, which indicates a need for MaaS solutions. Over half of respondents under 30 years of age were willing to give up car ownership if transport services would be adequate. The willingness to pay for a monthly package covering all the mobility needs was relatively low as the respondents were willing to pay less than 150 euros a month on the average, although 10% of the respondents were willing to pay more than 400 euros (Solita 2017). From MaaS provider's perspective, this 10% is a very lucrative market segment. Additionally, the young willing to abstain from car ownership, is a highly potential customer group for MaaS services.

DATA AND METHODS

In April - June 2018, a survey was conducted in Finland on the attitudes of 18-64-year-old towards transport system and people's readiness and will to use new transport services like MaaS. The survey was conducted in Finnish. English translation of the questionnaire is presented in appendix A.

The questionnaire consisted of five parts. Total number of questions was 23 and it took about 10-15 minutes to complete the survey. The questions consisted of propositions with Likert scale 1 to 5, multiple choice, and open-ended questions. The survey also mapped the respondent's background information, such as age, gender, and whether the respondent had a driving licence, to help categorise the respondents.

In this study, survey's questions number 7 and 11c are used to identify the most potential user groups of MaaS services by cross tabulating answers to these questions with data related to questions 5, 12, 13, 14, 15, 16, 18, 19 and 21 on user background (age, gender, driving licence, education, car ownership, household size, type of house, the use of car and public transport). In question 7, an assumption was presented that a suitable mobility package (basically a MaaS offering) would be able to fulfil respondent's all transport needs, and related to this assumption, the respondents were asked to state a suitable price to start using such a package. The respondents had the option to answer 'I do not know' and 'I would not adopt the package'. In question 11c, the respondents were asked whether the respondent had the need or will to own an own private car in future, if the annual costs of the mobility package (including e.g. public transport, shared taxis, and shared cars) would be markedly lower and one could fulfil all mobility needs with the mobility package.

Additionally, we will present and analyse responses to question 1, which asked whether the respondent had heard or read of the concept 'Mobility as a service' before answering the survey. This question was only to gather interest, whether the term MaaS is widely known or not, or whether it has an effect to the interest of adoption of the packages. The actual questions about the person's willingness to use mobility offerings were formulated in a way that they could provide answer without prior knowledge about MaaS.

The sample group for the survey was randomly selected from the population register by age and gender group in proportion to population's age and gender distribution. Population Register Centre of Finland extracted the sample per procuration. For study purposes, the names, addresses, ages and gender of the people were available in the sample data. Throughout our study, we followed Population Register Centre's terms and conditions related to data use, and in analysing the survey responses, we followed Finnish legislation and good academic practices.

Table 1. Sample group, number of respondents and response rate by age and gender

Age Groups	Men			Women		
	Sample Size	Number of Respondents	Response Rate	Sample Size	Number of Respondents	Response Rate
18-24	415	50	12.0%	397	59	14.9%
25-34	666	86	12.9%	632	138	21.8%
35-44	662	107	16.2%	626	115	18.4%
45-54	635	111	17.5%	621	131	21.1%
55-64	663	176	26.5%	683	186	27.2%
In total	3,041	530	17.4%	2,959	629	21.3%

The population of the sample consisted of 18-64-year-olds living in Finland. The size of the population was 3,263,361 people, based on the population projection of 2018 (Statistics Finland 2015). The sampling fraction was 0.2%, and the size of the sample was 6,000 people. Table 1 presents the sample, number of respondents, and response rate in terms of the various age and gender groups.

All people, who were selected for the sample, were sent a postal questionnaire with a cover letter in April 2018. People had the option either to respond on the internet with an identification code or to send the questionnaire back by mail (postage paid). The last answers were received in June 2018. A total of 1,176 respondents participated in the survey, resulting to a total response rate of 19.6%. The mean age of all respondents was 45 years, for women 44 and men 45 years, respectively.

We present the survey results as the number of respondents and frequency percentages of different responses. We do not present the results with sampling factors, which would make the results representative of the Finnish 18-64-year-old population as our focus in the analysis is in the differences between user groups, and the parameters usually deployed in sampling factors (age and gender) are analysed separately.

Regarding the background information gathered with the survey, we found the respondents to represent the Finnish population relatively well e.g. in terms of driving licences. 94% of the respondents held a driving licence, which is slightly more than Finnish population of 18–64 years old in general, of which 89% held a driving licence on 1.1.2018, based on statistics from Finnish Transport Safety Agency (2018) and Statistics Finland (2018). 16% of the respondents stated to be from a household without a car, whereas 43% had one car, 33% two cars, 6% three cars, and 2% four or more cars in their household. These figures can be compared to average Finnish households, of which 26% were without a car, 54% had one car, 17% two cars, and 3% three or more cars in 2016 (Statistics Finland 2016b). It must

be noted that the respondents of our survey did not include over 65 years old people, who typically live in small households with less cars.

The respondents' place of residence is also a key piece of background information. The respondents' addresses' postal codes were connected through Statistics Finland's (2016a) database with the seven-level urban-rural classification by Finland's environmental administration (2017). To better facilitate our analysis, the places of residence were divided into three categories, which are I) densely populated urban area (includes inner city and outer city areas of the original classification), II) sparsely populated urban area (includes exurbs, local rural centres areas, and countryside near cities), and III) sparsely populated area (includes rural heartland and sparsely populated countryside).

The survey results were analysed by using IBM SPSS Statistics software. Cross tabulations were used in the statistical analysis of the responses. These provided information on which factors affected the answers and how. Statistical significance of the cross tabulations was tested with the Chi-Square test, which is suitable for testing statistically significant differences of categorical variables (Taanila 2017).

RESULTS

20.6% of the survey respondents had heard or read about the concept Mobility as a service before the survey (N=1,169). Men were clearly more often familiar with MaaS compared to women, as 27.2% of men and 14.6% of women stated having heard or read about MaaS. Correspondingly, the respondents with higher level of education compared to respondents with lower level of education stated more often that MaaS concept was familiar to them. 34.3% of respondents with master's degree and 6.3% of the respondents with primary school education had heard or read about MaaS before the survey. From the different age groups, 24.4% of the respondents of the 25-54-year-old respondents had heard or read about MaaS before, whereas the share was 13.9% among the 18-24-year-old and 15.5% among the 55-64-year-old. As mentioned in the data and methods section, the survey was designed so that answering was not limited to prior knowledge of MaaS, and the term MaaS was not used in other survey questions.

There were two questions in the questionnaire, which depict the respondents' attitudes towards adopting MaaS in the form of a mobility package. In the first question, we found that 43.3% of the respondents were willing to adopt the mobility package, which would fulfil all mobility needs, at a price they themselves stated. The respondents, who informed a price, were willing to pay on average 139 euros a month for the package. The median value was 100 euros, and standard deviation was 114 euros. The highest price a respondent informed to pay was 700 euros and

the lowest was 10 euros. 31.2% of the respondents did not know at which price they would adopt the mobility package, and 25.5% would not adopt the package. As the share of the respondents, who did not know was relatively high, and these respondents might be unsure not only of the price they would pay but also whether they would adopt the package at all, at any price, we will next refer to interest to adopt MaaS based on the respondents, who stated a price for the MaaS package.

To analyse the potential of MaaS among different user groups, the interest to adopt the mobility package was analysed against respondents' background information. We present the survey data (number of respondents in each analysed group and the share of answers in each option) and the statistical test results in appendix B. Results are statistically significant or very significant unless otherwise stated.

58.2% of the respondents living in households without a car were willing to adopt the mobility package, whereas the corresponding figure was only 24.0% for the respondents in households with four or more cars (appendix B, table 1). In households with cars, we found that the less cars there are, the more interested the respondents were to adopt the mobility package. Regarding different age groups, the 25 to 34 years old were more often willing to adopt the mobility package compared to other age groups (appendix B, table 2). We also found that the respondents with a higher educational level compared to lower level were more interested in adopting the mobility package (appendix B, table 3).

We also found that the respondents dwelling in densely-populated areas seemed to be more interested to adopt the mobility package, but the differences between areas were not statistically significant (appendix B, table 4). However, we found statistically significant differences regarding respondents' type of house. The respondents living in apartment houses were more interested in adopting the mobility package compared to others (appendix B, table 5). We found that there was a moderate correlation ($r = 0.599$) between respondents' type of house and number of cars in a household, which can somewhat explain the higher interest in MaaS among dwellers in apartment houses, as the ones living in apartment houses usually own less cars compared to ones living in detached houses or row houses.

The respondents, who do not use passenger cars or use them only a little, were more willing to adopt the mobility package compared to the respondents, who use cars more (appendix B, table 6). We also found that the respondents, who use public transport more often, were more interested in adopting the mobility package compared to the ones using less public transport (appendix B, tables 7 and 8).

The respondents, who had heard or read about MaaS concept before the survey, were more often willing to adopt MaaS services compared to other respondents in general (appendix B, table 9). However, there is a correlation with educational level; the ones, who have a higher level of education, had more often heard or read

about MaaS before the survey and they were also more interested in adopting the mobility package compared to other respondents.

The other question in the questionnaire related to the interest towards MaaS and MaaS potential asked whether the respondents needed or wanted to own a private car if the costs of a mobility package, including e.g. public transport, shared taxis and shared cars, were markedly lower than owning a private car. Additionally, it was assumed that the respondent could fulfil all one's mobility needs with the mobility package. In this hypothetical setting, 57.9% of the respondents (N=1,168) did not need or want to own a car. In households currently without a car, 76.8% of the respondents would not need or want to own private car, whereas the corresponding figure of respondents from one car households was 59.6%, and among respondents from households with two cars or more, the figure was 48.4% (appendix B, table 10).

We found that there is a correlation between current car usage and the need and will to own a car in future. Those who drove car less were not that eager to own a car, if a competitive mobility package would be available, compared with the ones using car more (appendix B, table 11).

The respondents, who dwell in densely-populated areas, do not express a need or will to own a car to a similar degree as to those who live in sparsely populated areas (appendix B, table 12). Similarly, the respondents living in apartment houses are not as eager to own a car as other respondents (appendix B, table 13). Regarding the different age groups, 25-34-year-olds stated more seldomly the need or will to car ownership compared to other age groups. Overall, younger age groups express less need or will to car ownership, if a competitive mobility package would be available, compared to older respondents (appendix B, table 14).

Respondents with a lower educational level express more often the need or will for car ownership compared to those with higher education (appendix B, table 15). Additionally, on average women express less need or will for car ownership, if a competitive mobility package would be available, compared to men (appendix B, table 16). Public transport usage correlates with the willingness to own a car, and the ones currently often using public transport express less need or will for car ownership compared to respondents who use public transport less often (appendix B, tables 17 and 18).

DISCUSSION

In this section, we will discuss the potential user groups of MaaS services in Finland by combining findings from previous studies and data on demographics and mobility patterns with survey's results presented in the previous section. This will further highlight the issues related to MaaS potential from end-user perspective and provide

insight to how current trends in demographics and mobility affect the potential of MaaS. As different countries as well as areas within one country differ considerably from each other, the characteristics related to each area need to be considered in the analysis. Therefore, we start this discussion with a short introduction of Finland to put the results into context.

Finland is an EU member state and a Nordic country with a relatively small population, 5.5 million in 2017, especially compared to the large land area, resulting in a population density of 18.1 inhabitants per square kilometre (Statistics Finland 2017a). Most of Finland is sparsely populated. There is only one larger metropolitan area, Helsinki with 1.5 million inhabitants, and additionally six cities with above hundred thousand inhabitants in Finland (Statistics Finland 2017d). In these cities and the other urban areas, the population density is naturally significantly higher than the Finnish average.

Finnish people have typically a positive attitude towards digitalisation, and Finnish people considered themselves to have sufficient skills for digital technologies in everyday life more often than on average in EU countries. Yet, the majority of respondents in the survey in each EU member state in 2017 agreed they are sufficiently skilled in the use of digital technologies in their daily life, which indicates that despite differences among people's skills in different countries, most people consider themselves to be digitally competent (European Commission 2017). The level of digital skills should not therefore generally limit the use of MaaS solutions.

The available mobility services (e.g. public transport, city bike and electric scooter services, taxis, rental cars, etc.) and their quality differ around Finland. This reflects to the possible MaaS schemes, in which differences can be expected between urban and rural areas, between cities of different sizes, and between location in the urban structure, e.g. city centre vs. suburban area. There are great differences between cities in Europe and the USA in terms of population density and the non-auto and automobile dependent planning which reflect to the viable modes in different cities (Klinger et al. 2013). From this point of view, it is expected that the greatest MaaS potential is in the biggest cities offering widest selection of different transport modes and services whereas MaaS schemes in rural areas can be very limited in terms of different services bundled. However, in the survey, the same assumption regarding the availability of MaaS service and the mobility package's ability to fulfil all respondent's mobility needs, was presented.

The services in rural areas may need more public support whereas the areas with large transport demand can support commercial MaaS schemes. A MaaS pilot in Gothenburg, Sweden, proved that public support is vital for a successful and sustained service (Karlsson et al. 2016). In less populated rural areas MaaS can contribute to the livelihood of the area with lower costs with the help of more responsive transport services (Rantasila 2016).

Potential User Groups of Mobility as a Service in Finland

In Finland, the first commercial MaaS scheme Whim was fully launched by MaaS Global in Helsinki in November 2017. With Whim, under one subscription and within a single app, the user is able to combine, plan, and pay for public transport, taxi, car rental, car sharing and city bike trips in Helsinki. Based on data set from Whim users in 2018, the results show that the early adopters have been younger generations compared to the population in Finland in general. Whim users have also used more public transport compared to the Helsinki Metropolitan Area in general, and they also combine taxis to public transport trips three times more often than typical Helsinki residents. Overall, the Whim users use taxis 2.1 times more often than a Helsinki resident in general. The overall number of trips per day for a Whim user is about the same as for typical Helsinki residents. The results related to Whim users should be interpreted with caution as the service has been developing during the analysed year (2018) and the number of Whim users and trips has increased considerable during the year. The early adopters may also be more adventurous, more experimental, and less fixed in their ways than public at large (Ramboll 2019).

Based on our survey responses, people living in cities are more interested in using MaaS services than people in general. We also found differences related to respondents' types of houses as those living in apartment houses were more willing to use MaaS services. We can state that in addition to cities providing more mobility options and more options for bundling services to mobility packages, people in cities are more interested to adopt MaaS services compared to others. Yet, it is noteworthy that the differences in attitudes between urban and rural dwellers are not that great. From this point of view, there is solid ground to offer MaaS services also in areas with sparser population if the service can be tailored according to the local circumstances. As an example, the MaaS pilot in Ylläs, a tourist attraction in Kolari with 3,800 inhabitants (Statistics Finland 2017d) in Lapland, Finland, included journey planning and payment using an app from train station and airport to Ylläs, and a skibus or taxi to travel with to ski slopes (Tekes 2017).

In Finland, the densely populated urban areas are very small portions of the land area, but together with the peri-urban areas, larger areas and transport corridors can be seen to offer a larger potential for MaaS in terms of geographical area. Considering future demographic development in Finland, the urban areas and especially the largest urban regions are expected to grow whereas the population in rural areas is expected to decrease because of internal migration, i.e. continuing urbanisation, and differences in birth and mortality rates.

In addition to the total amount of people and their residential areas, population's age distribution is important when considering the mobility practices and MaaS potential. From general mobility point of view and by using age group division, we can distinguish children and senior citizens that are outside the labour markets, young adults studying and entering the working life, and the working-age population.

Considering differences in mobility, even more detailed groups could be recognised, such as children before and in school age as well as younger and older adults and senior citizens.

The challenge of MaaS related to adults, which present the greatest group in terms of population, is that the adults are likely to be relatively locked to their mobility practices. As a contrast to this group, the young are especially interesting from MaaS point of view as they don't own cars to a high degree. Especially in the capital city, Helsinki, the 18-years-olds are getting driving licences much less than before and compared to other areas in Finland. In Helsinki, only 33% acquired the driving license when turning 18 whereas the share was 75% in rural areas in 2012 (Löytty 2014). Every year about 60,000 Finns reach the age of 18 and make decisions on whether to get a driving licence and a private car or not. Of these youngsters, two thirds live in urban areas and one third in rural areas (Statistics Finland 2017c). As the travel behaviour and patterns of younger generations are not fixed, the interest in MaaS services among youngsters could be strengthened by addressing knowledge enhancement and MaaS communication especially to this group.

The survey results clearly presented the 25-34-year-olds as the most potential age group to adopt MaaS services. In terms of MaaS potential, the second age group was the 18-24-year-olds, but the difference to 24-35-year-olds was very clear. This can be due to several factors, such as level of education. The 24-35-year-old have typically finished their studies and have more experience in mobility and different kinds of mobility services as well as life in general, whereas the 18-24-year-olds may still be benefiting from student discounts and their parents in terms of mobility, e.g. paying reduced charges and using parents' car. Also, in the study on attitudes towards automated vehicles in Finland, the 25-34-year-olds were found to be clearly more often expressing a positive attitude towards automated vehicles than other age groups (Liljamo et al. 2018). The 25-34-year-olds may have more comprehension of transport transformation than younger generations, which links with a more positive attitude towards new technologies and services.

From future point of view, it is worth to note that the greatest shift in population in Europe is forecasted to be in the number of senior citizens (European Commission 2014). In Finland, the relative share of senior population is especially high in rural areas. By 2030, the amount of people over 75 years of age will increase from 500,000 to over 800,000 (Statistics Finland 2017b). In all the other age groups, the population is expected to stay roughly at the same level. From MaaS point of view, it would be very interesting to consider this demographic development by thinking how a MaaS scheme could best serve this growing population. As people get older, they may prefer services in many occasions, e.g. as driving a car may get more difficult. Easy to use and access services, both physically and virtually, and perhaps also assisted, would benefit especially this group.

Potential User Groups of Mobility as a Service in Finland

Table 2. The share of trips done by different transport modes in different age groups in Finland in 2016

	Age Groups								
	under 11	12-17	18-24	25-34	35-44	45-54	55-64	Over 65	All
Walking	27.4%	23.4%	21.1%	21.2%	16.1%	15.8%	18.7%	25.2%	20.4%
Cycling	16.5%	17.1%	6.9%	6.1%	5.3%	4.3%	5.0%	4.8%	6.8%
Passenger car as driver	0.2%	0.3%	37.9%	42.6%	54.5%	55.2%	50.9%	42.9%	41.5%
Passenger car as passenger	44.5%	35.9%	14.7%	12.9%	10.3%	9.7%	11.5%	16.3%	16.3%
Public transport	5.1%	14.4%	15.7%	13.4%	8.5%	8.0%	7.6%	5.8%	9.3%
Taxi	1.8%	1.0%	0.5%	0.7%	0.6%	0.6%	0.6%	0.8%	0.8%
Other	4.4%	7.8%	3.1%	3.0%	4.8%	6.3%	5.7%	4.2%	4.8%
N/A	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Grand Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: (Data from Finnish Transport Agency 2018)

The modal shares in different age groups in Finland are presented in table 2. Under 18 years old do most of their trips as car passengers, pedestrians and cyclists. The relatively high share of children's taxi use is explained by school rides, especially typical in rural areas with long distances. It's worth to note that many of children's trips are done together with their parents. The MaaS solution should acknowledge this and for instance offer a mobility package including services for the whole family. For children under 18 years of age, over 40% of the trips is done by walking and cycling, and considering this especially from sustainability point of view, the MaaS scheme could include bikes (e.g. shared bikes, city bikes or rental bikes), and encourage children to cycle even more, maybe replacing some the current car trips by biking.

As can be seen in table 2, the 18-24-year-olds are in a transition phase where the main mode is already passenger car as a driver (38%), but not as clearly as for the 35-64-year-olds, who do more than 50% of their trips as car drivers. Walking has an important role in every age group, but it is worth to note that these trips are short, thus representing only a small portion of the passenger mileage. In cycling, we can recognise a diminishing role the older generations are. Like walking trips, cycling trips are short in general, and they are not very likely replaced by mobility services. The share of public transport is the highest in age group 18-24, which also indicates high potential from MaaS perspective as the youngsters are already more familiar to using mobility services compared to other age groups.

Based on national travel survey data from Finnish Transport Agency (2018), we can find that most of the trips are done by single transport mode in Finland. In 2016, multimodal trips accounted for 16% of all trips. Most typical travel chains are passenger car and walking (6,5% of all trips) and public transport (without changes between public transport means) and walking (5,6%). Other combinations, e.g. public transport, cycling and walking, are clearly much rarer (Pastinen 2018). With a currently low share of all trips being multimodal, this offers simultaneously a challenge and potential for MaaS as MaaS solutions are aiming to offer competitive multimodal trip chains.

Compared to the share of trips in Finland, the passenger mileage is even more car dominant reflecting longer trips done by car than on foot or by bike. Clearly the smallest passenger car mileage is in the inner urban area. The mileage grows in the outer and peri-urban areas likely as a result of sparser population density and longer distances to attractions such as workplaces and commercial activities. The highest mileage is in the sparsely populated rural areas where the distances are usually long and therefore passenger car is the most viable option for travelling (Finnish Transport Agency 2018). From MaaS perspective, the difference between passenger car driver and passenger is that drivers are less eager to change mode and give up driving compared to passengers who are already more familiar to the role of passenger. It has been explicitly noted, that drivers are very attached to using their vehicles (Tertoolen et al. 1998). Based on the responses to the survey, we can state that the ones currently using passenger car to great extent were not as ready to alter their travel behaviour and adopt MaaS services as the respondents, who use cars less or not at all. The ones driving a lot are used to using their own car and thus giving up car ownership and adopting mobility services is considered difficult.

Looking at mobility from a household perspective, it is usual that the passengers in passenger cars are from the same household as the driver. This presents at the same time a challenge and a potential for MaaS as a MaaS scheme for a household could change the mobility practices for the whole household to other modes than passenger cars, or at least the person(s) usually being the car passenger(s) could adopt different mobility services in the role of a passenger. Yet, it requires a big shift, and is a major challenge to overcome for MaaS. Based on the survey results, the type of household and number of household members are not essential when considering the MaaS potential. Instead, other issues influence the interestedness towards MaaS services. However, the survey was directed to individuals, and the situations, where MaaS services could fulfil the mobility needs of the entire household, were not considered.

In Finland, there is a clear difference in the number of cars in use in households of different sizes. Almost half of the one-person households have not a car in use, whereas over half of four+-person households have more than one car in use

(Statistics Finland 2012). Considering this from MaaS point of view, there is clear potential related to the households not owning a car. The challenge is to make the MaaS scheme tempting for the households with one or more cars. For multicar-households, MaaS can offer the possibility to give up car ownership, and even if not totally, mobility services could replace the second or third car. The survey results indicate that people in households without a car are considerably more often interested in MaaS services compared to people in households with a car. We also found that the respondents living in households with one car are more often interested in adopting MaaS services compared to respondents in households with two or more cars. In the survey, MaaS was considered as the primary transport option and as the alternative to passenger car. If the MaaS service would have been considered as a secondary mobility option, replacing the possible second car in the household, the results would have probably been different.

In addition to positive outcomes from transport policy point of view, MaaS could also lead to a mode-shift away from public transport and increasing number of journeys (Transport Systems Catapult 2016). If MaaS offers improved individual mobility, this could mean more traffic and eventually more congestion (Rantasila 2016). People could e.g. replace conventional timetabled public transport with flexible car-sharing services during the peak hours (Henscher 2017).

Based on the survey results, the respondents who use public transport are more interested in adopting MaaS services. Additionally, the respondents, who currently drove less, were more interested in MaaS services. These results indicate that MaaS may increase traffic and may lead to a shift towards car-oriented mobility, if MaaS offerings include e.g. shared cars and taxi services. In this case, the share of sustainable modes, i.e. walking, cycling, and public transport, may decrease as trips are done more often by car. The current public transport users as well as the ones, who currently travel less by car, live mostly in urban areas. Therefore, the increasing traffic may lead to notable problems e.g. due to congestion in cities.

THE RELIABILITY OF THE RESULTS

This study is based on findings from previous research and analysing the results of an original survey on the potential user groups of MaaS. The survey with a large sample size of 6,000, was carried out as a postal questionnaire with the option for the respondent to answer on the internet. The response rate of the survey was rather low, 19.6%. Compared to a somewhat similar, recent Finnish survey on the attitudes towards automated vehicles, we can find the response rate to be nearly the same, as the percentage in that study (Liljamo et al. 2018) was 20.4%. Low response rate makes it possible that the respondents do not present the actual view

of the whole population. The low response rate can be partly a result of people not being interested in the topic, and the ones responding may then be more interested than people in general.

Generally, older generations had a higher response rate compared to younger generations, and women compared to men. We found that these groups, which were more active to respond to the survey, were less interested in adopting MaaS. It can be speculated that if we had had more men or young to respond to the survey, and a higher response rate among these respondent groups, would the results have been different.

In the survey, we tried to be as clear as possible with the questions and statements. Still, it can be that the respondents have had difficulties to comprehend some of the issues in the questionnaire as most respondents were not that familiar with integrated mobility services. Additionally, some might have experienced it to be difficult to answer the hypothetical questions, e.g. if there is service available that can fulfil all mobility needs, and with a competitive price, is there a need or will for car ownership. We found that about 30% of the respondents chose “I do not know” to survey’s question 7, which might be a result of experienced difficulties. In the survey feedback, the questionnaire was mostly considered explicit, but some questions were found difficult to answer. The greatest concern of the respondents was related to the feasibility of MaaS in rural context, and some of the rural respondents found the survey somewhat irrelevant. The difficulties in grasping the issues of the survey may also have an influence on the low response rate.

Related to the validity of the study, we next discuss the connections between the research questions and the questions in the survey. Three research questions presented in this chapter were 1) what is the interest towards MaaS among ordinary people, 2) which are the most potential user groups of MaaS, and 3) how do current trends in demographics and mobility affect the potential of MaaS. The first and second research question is mostly approached through analysing responses to the survey’s questions 7 and 11c. Of these question 7 (would the respondent adopt the mobility package at a price the respondent was asked to define) was focusing merely on the willingness to adopt MaaS, whereas question 11c questioned the need and will to own a private car if there was a competitive mobility package available. It’s noteworthy that both these survey questions were hypothetical and presented assumptions of a high quality and price competitive MaaS solution, which might be difficult to realise in real life setting (in question 7 the mobility package is stated to be able to fulfil all transport needs, and in question 11c the mobility package has additionally markedly lower annual costs compared to private car). The research question 3 was approached in section 5 by discussing the findings related to the survey in connection with previous studies and data related to Finnish demographics and mobility.

Related to reliability, the statistical significance of survey results was analysed. Even though the response rate was rather low, the differences between the analysed user groups were usually statistically significant or very significant. As the response rate and the number of responses in different groups was relatively low (e.g. 50 responses from 18-24-year-old males), we chose to analyse the findings related to different background information separately (not e.g. analysing specific age groups in densely-populated areas or related to educational level).

As there is currently only a small number of previous studies, and especially research published in peer-reviewed scientific journals, on potential user groups of MaaS that are based on end-user surveys, a direct comparison cannot be made between previous studies and the results of this study. However, there are some MaaS-related reports presenting survey results. In the survey by ITS Australia (2018), same groups (young, men, highly educated, urban dwellers, using public transport more often) were identified as the most potential MaaS users. The Finnish survey by Solita (2017) found similar low recognition of MaaS concept among the respondents, as well as similar level of willingness to pay. The reliability of this paper is also supported by the findings from MaaS-London project (Kamargianni et al. 2018), in which especially the young have been identified as potential utiliser of MaaS. Also, some of the services which are expected to be bundled to MaaS offering, e.g. car-sharing, are found to attract especially young and highly educated people (Becker et al. 2017a, 2017b), which again highlight these groups as especially potential user groups.

CONCLUSION

MaaS is still a new concept, and to ordinary people MaaS as a term and concept remains to be generally unknown. In Finland, 20.4% of the survey respondents in April - June 2018 had heard or read about Mobility as a Service before the survey. This is about 4 percentage points higher than in the survey by Solita (2017) a year earlier in Finland. This low awareness of MaaS is notable and may also affect the results as higher awareness of MaaS could lead to better recognition of MaaS potential. In the design of survey, it was recognised the MaaS is a new concept and likely unfamiliar to most respondents and therefore the survey questions were formulated in a way that the respondents could answer without prior knowledge about MaaS.

MaaS has potential to change the mobility practices of people. The potential varies anyhow in different geographical areas and for different population groups. To be able to assess and address the potential and challenges of MaaS it is important to recognise the differences between user groups. In this paper, we found many differences in the interest towards MaaS adoption. We found that particularly the

ones who currently use public transport, live in households without a car, are aged 25-34, and are highly educated were more interested to adopt MaaS services. We also found that people living in urban areas and in apartment houses indicated a higher interest towards MaaS adoption. In general, we found that MaaS has the greatest potential on urban areas and the younger people are especially interesting from MaaS point of view. Based on the results, the MaaS offerings can be targeted to the areas and user groups with the greatest potential. This is especially recommended for commercial MaaS operators who seek to gather enough users to operate a commercially successful MaaS scheme. For authorities, this means that if they want to support MaaS, most support is needed outside these areas with highest potential. The interests of business and authorities can also be aligned especially in urban areas, where public transport could attract more users when being offered also as a part of a MaaS scheme.

For all stakeholders, it is recommended to invest in making MaaS a concept which would be generally recognised. Even if the term MaaS would not become familiar to average Joe, people should be aware of systems, which integrate mobility services and offer an option for private car ownership and use. Additionally for MaaS operators, this study highlights that the MaaS offerings should be reasonably priced as people in the survey were generally willing to pay on average 139 euros a month for a mobility package, which would fulfil all mobility needs. For authorities, if they see MaaS as a sensible medium for more sustainable transport, it should be considered to increase the costs related to car ownership and use in order to make MaaS a more tempting option especially for those, who currently use car to a high degree.

Even though this chapter draws especially on the findings from a Finnish survey, we can note that the potential user groups are similar to those found in other countries, e.g. Australia. In future research, it would be interesting to undertake comparisons between countries, and to analyse, e.g., to which extent the people in general are interested in MaaS and especially what type of MaaS offerings are of interest to different users, e.g. what are the mobility services people want to include in the mobility package. In addition to focusing on the individual user's point of view, also the household perspective of MaaS should be addressed, e.g. by a MaaS survey focusing on the mobility needs of entire households, including children, too. Also, the MaaS potential among senior citizens should be studied in future.

There are also many other important MaaS related issues, which require further research. Since there is not much data of current MaaS users available as MaaS services have just recently been launched and the companies providing MaaS services have not openly shared the data, the research in this chapter is based on alternative sources. In future, if the data of current users can be used for research, it should be studied whether the identified user groups match results of this study. The

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findings from different MaaS pilots and commercial schemes are very interesting as these may be combined to reveal on the potential user groups (e.g., who are using the services, how are the services used) and the potential of MaaS overall. Additionally, specific user groups such as the elderly, who were not surveyed in this study, or people in living rural areas should be studied more precisely in the future. It should be also studied, how people without smartphones or with lacking skills to use mobile applications could benefit from MaaS. Finally, the willingness to adopt MaaS services, e.g. willingness to pay for different types of services and in different user groups, is of great research interest.

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APPENDIX A: QUESTIONNAIRE

Figure 1.

PART I

1. Have you ever heard or read about the concept of MaaS (Mobility as a Service)?

Yes No

2. What are your views on the following mobility pricing options?

a) **Package pricing:** a fixed monthly fee is paid for mobility. Mobility package can include for example unlimited local public transport and a certain amount of taxi rides or use of a rental car.

Very positive Somewhat positive Neutral Somewhat negative Very negative

b) **Current form mixed pricing:** both fixed fees and taxes (e.g. vehicle insurance and vehicle tax) and fees based on use (e.g. fuels and single tickets in public transport)

Very positive Somewhat positive Neutral Somewhat negative Very negative

c) **Usage based travel or kilometer-based pricing:** fee is solely based on the amount of use of mobility service or private car

Very positive Somewhat positive Neutral Somewhat negative Very negative

3. What do you think of the following statements?

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
It should be possible to combine all mobility services and use them with single ticket and application (e.g. taxi, train and bus with the same ticket).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would like to have all costs of my travelling to be included in a single monthly payment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I think that the cost of my mobility is currently low enough so I can fulfil my daily mobility needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I think that it is difficult or cumbersome to use public transport (including long-distance public transport)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I think that personal space, time and peace in private car are important criteria for me when choosing the mode of transport.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I think that I can fulfil my daily mobility needs by using other modes of transport than private car.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transport transformation from using private cars towards mobility services would be a desirable trend.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 2.

PART II

4. How interested would you be in the following mobility services if they were available for use in your daily life or on holiday/business trips?

<p>Shared taxi Works like a conventional taxi, but there may also be strangers as passengers so travel time can be slightly longer but the cost of travel is reduced</p> <p style="text-align: center;"> <input type="checkbox"/> Very interested <input type="checkbox"/> Somewhat interested <input type="checkbox"/> Not at all interested </p>	<p>Shared car Shared cars would be available nearby to be booked and claimed with a mobile device. The cost would be approximately 1 € / km</p> <p style="text-align: center;"> <input type="checkbox"/> Very interested <input type="checkbox"/> Somewhat interested <input type="checkbox"/> Not at all interested </p>
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5. Which of the following describes the best your current mobility habits and mobility costs? **Choose one option for each row** that best describes your current mobility habits. In the parenthesis is the estimate of average monthly cost of each option (see the cover letter for more instructions).

Owning a car (incl. taxes, insurances, decrease in value, parking)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	No car (0 €/mo.)	Car, value less than 10 000 € (150 €/mo.)	Car, value 10 000 – 25 000 € (300 €/mo.)	Car, value more than 25 000 € (450 €/mo.)
Use of a car as a driver or passenger (incl. fuel, maintenance, tires, washes etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	No usage (0 €/mo.)	Less than 10 000 km per year (50 €/mo.)	10 000 – 25 000 km per year (150 €/mo.)	Over 25 000 km per year (300 €/mo.)
Use of local public transport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	No usage (0 €/mo.)	Low usage (10 €/mo.)	Weekly usage (30 €/mo.)	Almost daily usage (50 €/mo.)
Use of long-distance public transport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	No usage (0 €/mo.)	Usage a few times a year (20 €/mo.)	Monthly usage (50 €/mo.)	Weekly usage (100 €/mo.)
Use of other mobility services (taxi, rental car)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	No usage (0 €/mo.)	Usage a few times a year (20 €/mo.)	Monthly usage (50 €/mo.)	Weekly usage (100 €/mo.)

6. Using the table above, you can calculate an estimate of the monthly cost of your mobility. Do you think that this sum corresponds to the real costs of your mobility?

- Yes
 No, the real costs of my mobility are approximately _____ euros per month.
 I do not know much money I use for my mobility

7. **Assume** that a suitable mobility package could cover all your mobility needs. What price should the mobility package have so that you would buy it?

The mobility package would include e.g. public transport, taxi and shared or rented cars.

- _____ euros per month
- I do not know
 I would not adopt the package

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Figure 3.

PART III					
8. Assume that you would buy a mobility package and you would not own a car at all. How much would you use the following mobility services? Choose one option for each row!					
Shared or rented car	<input type="checkbox"/> Over 15 d/mo. (over 20 000 km per year)	<input type="checkbox"/> Approx. 10 d/mo. (10 000–20 000 km per year)	<input type="checkbox"/> Approx. 5 d/mo. (5 000–10 000 km per year)	<input type="checkbox"/> Less than 2 d/mo. (less than 5 000 km per year)	
Use of local public transport	<input type="checkbox"/> Usage almost daily	<input type="checkbox"/> Weekly usage	<input type="checkbox"/> Monthly usage	<input type="checkbox"/> Usage a few times a year	
Use of long-distance public transport	<input type="checkbox"/> Usage almost daily	<input type="checkbox"/> Weekly usage	<input type="checkbox"/> Monthly usage	<input type="checkbox"/> Usage a few times a year	
Use of other mobility services (e.g. taxi, city bikes)	<input type="checkbox"/> Usage almost daily	<input type="checkbox"/> Weekly usage	<input type="checkbox"/> Monthly usage	<input type="checkbox"/> Usage a few times a year	
9. Would you travel more often or longer trips, if					
a) The mobility costs were cheaper than currently?				<input type="checkbox"/> Yes	<input type="checkbox"/> No
b) You had a fixed price monthly package that included an unlimited number of trips?				<input type="checkbox"/> Yes	<input type="checkbox"/> No
<i>The national energy and climate strategy of Finland aims to promote mobility services so that travelling alone by a car reduces and the growth of car traffic in urban areas stops despite population growth.</i>					
10. What do you think of the following statements regarding the climate strategy?	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
Private car traffic should be limited to reduce emissions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public transport should be funded more with tax revenues to decrease headways	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transport investments should be allocated more to the construction of railways and tramways instead of road and street construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The obligation of building parking spaces should be waived when building new apartments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In city centres, there should be more pedestrian and public transport streets and limited private car traffic.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shared cars should be exempt from car taxes and parking fees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Congestion charges should be implemented in the metropolitan area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The amount of the tax deductibility of commuting should be same for all mode of transport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 4.

PART IV

11. Would you want or need to own a private car, if

- a) Public transport connections were good enough to fulfil your daily mobility needs ?
 Yes No
- b) Rental or shared car were always available within 500 meters and the annual cost of using it was less than the annual cost of an own car?
 Yes No
- c) The annual cost of the mobility service (incl. e.g. public transport, shared taxis and shared cars) was significantly lower than your own car and you could fulfil all your mobility needs with it.
 Yes No

Background information and open feedback

12. How old are you?

_____ years

13. What is your gender?

Woman Man Other

14. Do you have a driver's license?

Yes No

15. How many people are in your household, yourself included?

_____ person(s)

16. What kind of house do you live in?

Apartment house Row house
 Detached house Other

17. Do you have any permanent injuries or illnesses that affect your driving?

Yes No

18. What is your household gross income per month?

Less than 2 000 € 4 000–6 000 €
 2 000–4 000 € Over 6 000 €

19. How many cars do you have in your household?

_____ car(s)

20. Have you registered for one of the following mobility services: Whim, Kyyti, Kätevä Seinäjoki, DriveNow tai OP Kulku? (MaaS operators in Finland)

Yes No

21. What is your highest level of education you have graduated or studying at the moment?

Primary school High school
 Bachelor's degree Master's degree

22. Open feedback regarding mobility services

23. Open feedback regarding this survey

THANK YOU FOR THE PARTICIPATION!

APPENDIX B” RESULT TABLES

Question 7: Assume that a suitable mobility package could cover all your mobility needs. What price should the mobility package have so that you would buy it?

Table 3. Question 7 cross tabulated with cars in a household (N=1,155, Chi-Square $p<0.001$)

	0 (N=184)	1 (N=504)	2 (N=378)	3 (N=64)	4 or More (N=25)
Could buy	58.2%	43.7%	37.6%	35.9%	24.0%
Can not say	29.9%	31.0%	33.9%	26.6%	20.0%
Would not buy	12.0%	25.4%	28.6%	37.5%	56.0%

Table 4. Question 7 cross tabulated with age group (N=1,171, Chi-Square $p<0.001$)

	18-24 (N=109)	25-34 (N=225)	35-44 (N=224)	45-54 (N=244)	55-64 (N=369)
Could buy	45.9%	55.1%	46.9%	43.9%	32.8%
Can not say	33.0%	27.6%	29.5%	25.4%	37.7%
Would not buy	21.1%	17.3%	23.7%	30.7%	29.5%

Table 5. Question 7 cross tabulated with level of education (N=1,167, Chi-Square $p=0.001$)

	Primary School (N=80)	High School (N=377)	Bachelor’s Degree (N=444)	Master’s or PhD Degree (N=266)
Could buy	26.3%	39.5%	44.4%	52.6%
Can not say	37.5%	34.5%	30.6%	25.9%
Would not buy	36.3%	26.0%	25.0%	21.4%

Potential User Groups of Mobility as a Service in Finland

Table 6. Question 7 cross tabulated with place of residence in (N=1,171, Chi-Square $p=0.119$)

	Densely Populated Urban Area (N=592)	Sparsely Populated Urban Area (N=368)	Sparsely Populated Area (N=211)
Could buy	47.0%	39.4%	39.8%
Can not say	30.1%	32.1%	32.7%
Would not buy	23.0%	28.5%	27.5%

Table 7. Question 7 cross tabulated with type of the house (N=1,167, Chi-Square $p<0.001$)

	Apartment House (N=409)	Row House (N=192)	Detached House (N=557)
Could buy	49.4%	42.7%	39.5%
Can not say	32.8%	31.3%	29.8%
Would not buy	17.8%	26.0%	30.7%

Table 8. Question 7 cross tabulated with use of a car as a driver or passenger per year (N=1,167, Chi-Square $p<0.001$)

	No Usage (N=117)	Less Than 10,000 km (N=398)	10,000–25,000 km (N=467)	Over 25,000 km (N=185)
Could buy	47.0%	50.0%	37.5%	40.5%
Can not say	39.3%	30.7%	33.4%	22.7%
Would not buy	13.7%	19.3%	29.1%	36.8%

Table 9. Question 7 cross tabulated with use of local public transport (N=1,168, Chi-Square $p<0.001$)

	No Usage (N=519)	Low Usage (N=394)	Weekly Usage (N=121)	Almost Daily (N=134)
Could buy	36.4%	43.4%	50.4%	64.2%
Can not say	28.5%	36.0%	33.1%	25.4%
Would not buy	35.1%	20.6%	16.5%	10.4%

Potential User Groups of Mobility as a Service in Finland

Table 10. Question 7 cross tabulated with use of long-distance public transport (N=1,168, Chi-Square $p<0.001$)

	No usage (N=472)	Usage a Few Times a Year (N=574)	Monthly Use (N=88)	Weekly Use (N=34)
Could buy	32.2%	47.0%	67.0%	76.5%
Can not say	32.8%	33.1%	19.3%	5.9%
Would not buy	35.0%	19.9%	13.6%	17.6%

Table 11. Question 7 cross tabulated with heard or read about concept of MaaS before (N=1,166, Chi-Square $p<0.001$)

	Yes (N=241)	No (N=925)
Could buy	52.7%	41.0%
Can not say	18.7%	34.2%
Would not buy	28.6%	24.9%

Question 11c: Would you want or need to own a private car, if the annual cost of the mobility service (incl. e.g. public transport, shared taxis and shared cars) was significantly lower than your own car and you could fulfil all your mobility needs with it.

Table 12. Question 11c cross tabulated with cars in a household (N=1,151, Chi-Square $p<0.001$)

	0 (N=185)	1 (N=503)	2 (N=376)	3 (N=63)	4 or More (N=24)
Yes	23.2%	40.4%	50.5%	49.2%	75.0%
No	76.8%	59.6%	49.5%	50.8%	25.0%

Potential User Groups of Mobility as a Service in Finland

Table 13. Question 11c cross tabulated with use of car as a driver or passenger per year (N=1,163, Chi-Square $p<0.001$)

	No usage (N=117)	Less Than 10,000 km (N=397)	10,000–25,000 km (N=465)	Over 25,000 km (N=184)
Yes	20.5%	35.3%	50.1%	50.0%
No	79.5%	64.7%	49.9%	50.0%

Table 14. Question 11c cross tabulated with place of residence in (N=1,167, Chi-Square $p=0.004$)

	Densely Populated Urban Area (N=590)	Sparsely Populated Urban Area (N=366)	Sparsely Populated Area (N=211)
Yes	38.1%	43.2%	51.2%
No	61.9%	56.8%	48.8%

Table 15. Question 11c cross tabulated with type of the house (N=1,163, Chi-Square $p<0.001$)

	Apartment House (N=409)	Row House (N=191)	Detached House (N=554)
Yes	32.3%	41.9%	49.1%
No	67.7%	58.1%	50.9%

Table 16. Question 11c cross tabulated with age group (N=1,167, Chi-Square $p<0.001$)

	18-24 (N=108)	25-34 (N=222)	35-44 (N=223)	45-54 (N=245)	55-64 (N=369)
Yes	35.2%	29.7%	39.0%	47.3%	50.1%
No	64.8%	70.3%	61.0%	52.7%	49.9%

Potential User Groups of Mobility as a Service in Finland

Table 17. Question 11c cross tabulated with level of education (N=1,163, Chi-Square $p<0.001$)

	Primary School (N=80)	High School (N= 374)	Bachelor's Degree (N=444)	Master's or PhD Degree (N=266)
Yes	53.8%	47.3%	43.0%	29.1%
No	46.3%	52.7%	57.0%	70.9%

Table 18. Question 11c cross tabulated with gender (N=1,168, Chi-Square $p<0.001$)

	Woman (N=630)	Man (N=539)
Yes	34.6%	51.0%
No	65.4%	49.0%

Table 19. Question 11c cross tabulated with use of local public transport (N=1,164, Chi-Square $p<0.001$)

	No Usage (N=517)	Low Usage (N=393)	Weekly Usage (N=121)	Almost Daily (N=133)
Yes	52.4%	41.2%	22.3%	22.6%
No	47.6%	58.8%	77.7%	77.4%

Table 20. Question 11c cross tabulated with use of long-distance public transport (N=1,164, Chi-Square $p<0.001$)

	No Usage (N=471)	Usage a Few Times a Year (N=571)	Monthly Use (N=88)	Weekly Use (N=34)
Yes	52.4%	37.1%	28.4%	17.6%
No	47.6%	62.9%	71.6%	82.4%