

# BSC THESIS SPATIAL PLANNING

AN EXPLORATIVE STUDY ON MOTIVATIONS FOR OLDER AGE  
GROUPS IN RURAL AREAS TO USE MOBILITY AS A SERVICE



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May 5<sup>th</sup>, 2020

BSc thesis LUP8081

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Date: May 5<sup>th</sup>, 2020

## ABSTRACT

The province of Noord-Brabant, the Netherlands will face an overrepresentation of older age groups in rural areas in 2040. As mobility is a crucial part of the quality of life for both older age groups and inhabitants of rural areas, it is important to maintain and improve the ability to move of this growing part of the population. Mobility as a Service is an emerging transport concept that is recognized by the province as part of the future and seems to have potential for older age groups in rural areas. However, the adoption of this concept by older age groups is doubted. Schikofsky et al. (2020) proposed a research model that presents motivational factors for using MaaS. As this model did not represent older age groups in rural areas, this thesis will both use this model as a guideline to explore the motivations for this target group, as well as suggest whether the model is usable for the target group. The overarching research question is therefore formulated as: *What are the motivations for older age groups in rural areas of Noord-Brabant, the Netherlands, to use Mobility as a Service?* Gaining knowledge on this contributes to science, as it suggests whether a proposed research model is usable. It also shows spatial planning and societal relevance, as it explores the adoption of a new transport concept that could possibly enhance inclusion of the transport system and the mobility for an important part of the population. For this thesis, five semi-structured interviews were conducted and analysed using a hybrid thematic analysis. Results show that all motivational factors included in the proposed research model by Schikofsky et al. (2020) are present for older age groups in rural areas. Additionally, results suggest two motivations to be present for the target group that were not proposed in the model: perceived comfort and clear communication. Subsequently, not all relationships presented in the proposed research model correspond with the visible relationships in the collected data. Due to the limitations of this thesis, a relatively small and homogeneous sample is used, which has complications for the validity of the research. This thesis suggests that the motivations for older age groups in rural areas to use MaaS are perceived usefulness, perceived ease of use, hedonic motives, habit congruence, perceived comfort, clear communication, autonomy/competence and relatedness. This thesis also suggests that the proposed research model by Schikofsky et al. (2020) is elaborated, but not exhaustive enough to be usable for the target group. This thesis therefore recognizes the importance of exploring motivations for a specific target group. Three recommendations are made for future research concerning; validating the degree to which the motivations influence the actual behaviour; considering rural areas outside the Netherlands; extending knowledge on motivations for other specific target groups to use MaaS.

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# 1. INTRODUCTION

The age distribution in Noord-Brabant will change in the coming years. According to the population prospects, more than a quarter of the inhabitants of the province will have the age of 65 years and above (Provincie Noord-Brabant, 2017). This trend will be especially present in rural areas of Noord-Brabant, where 31.5% of the population is expected to be at least 65 years of age by 2040 (Provincie Noord-Brabant, 2017). As older age groups will be overrepresented in these areas, it is important to preserve their quality of life. Mobility is part of the quality of life of older age groups (Banister & Bowling, 2004), therefore, it is crucial to maintain and improve the mobility of this growing part of the population.

An important development in transportation is the emerging of Mobility as a Service (MaaS), a concept that has been recognized by the province of Noord-Brabant as part of the future in their *Omgevingsvisie* (Provincie Noord-Brabant, 2018). MaaS offers access to multiple transport modes through one service and helps individuals to meet their personal needs (MaaS Alliance, n.d.). The latter is especially important for quality of life, as Kolodinsky et al. (2013) found that unmet individual transportation needs affect the quality of life of inhabitants of rural areas. Because of the nature of MaaS, this concept seems to offer a solution when individual transportation needs in rural areas are unmet. According to Barreto, Amaral and Baltazar (2018), MaaS indeed could benefit the lives of rural inhabitants. A problem for transportation of older people in rural areas is the unavailability of rural public transport services, sometimes even leading to a feeling of inequity when comparing the services to similar age groups in urban areas (Ahern & Hine, 2012). So, especially for older age groups who live in these areas, MaaS seems to have potential, as having accessible public transport services in rural areas could increase the mobility of older age groups in rural areas (Ahern & Hine, 2012).

Although MaaS seems to have potential in increasing the mobility of older age groups in rural areas, the adoption of the concept has been questioned, especially the adoption by elderly (Pangbourne, Mladenović, Stead & Milakis, 2020). Therefore, it is important to examine the adoption of the concept by this exact group. More specifically, the objective of this thesis is to explore the motivation to use MaaS by older age groups in rural areas of Noord-Brabant, the Netherlands.

The next chapter will continue explaining the main topic, working towards a specific research problem and corresponding questions. It will also point out the contribution and relevance of this thesis. Chapter 3 presents the theoretical framework that is used throughout the research. The methods of data collection and analysis are described in chapters 4 and 5. The results are presented in chapter 6, followed by a discussion and conclusion in the chapters 7 and 8.

## 2. RESEARCH PROBLEM AND QUESTIONS

This chapter will firstly introduce current knowledge on the concept of MaaS. With this, the specific research problem can be described. This chapter will also explain the contribution and relevance of this thesis relating to the fields of science, society and spatial planning. Lastly, the specific research questions are formulated.

### 2.1 Current knowledge on MaaS

According to a literature review on current definitions of MaaS, three main components are used to describe the concept: user centricity paradigm, intermodality/multimodality support and integration

(Schikofsky, Dannewald & Kowald, 2020). This means that MaaS centres individual needs and preferences, offers access to (a combination of) different transport modes and is usable through one provider. Besides benefits for the individual, it is also said that MaaS could benefit the environment by exposing people to more environment-friendly transport modes such as shared cars and bikes (Matyas & Kamargianni, 2018) and by reducing private car use (Karlsson, Sochor & Strömberg, 2016). The latter could be due to the fact that users of the concept can make use of transport modes that are accessible through one provider, rather than owning transport modes, potentially leading to less private car use (Karlsson et al., 2016).

MaaS is a relatively new topic in the scientific world. Research that has been done so far has focused on a variety of topics, including for example shifting roles of different transport modes in MaaS (Utriainen & Pöllänen, 2018), its implementation in policies (Jittrapirom, Marchau, Van der Heijden & Meurs, 2018) and the adoption of the concept (Alonso-González, Hoogendoorn-Lanser, Van Oort, Cats & Hoogendoorn, 2020). Promising potential outcomes that have resulted from a large number of scientific researches on this concept in the last few years, indicate that further research is interesting (Utriainen & Pöllänen, 2018). Despite these potential outcomes, questions about possible implications of MaaS are raised by Pangbourne et al. (2020). One of the implications they mention is related to the social inclusion of MaaS. For instance, the fact that MaaS will make use of digital platforms could cause older age groups that often have difficulties using technology to deter from using MaaS (Pangbourne et al., 2020).

While the number of scientific researches on MaaS is increasing, the knowledge on MaaS related to rural areas is limited, even though MaaS could benefit the quality of life of inhabitants of these regions by stimulating their mobility (Barreto et al., 2018). To my knowledge, there are no studies focused on researching the adoption of MaaS specifically by older age groups, while the potential of investigating adoption of MaaS by specific target groups has been recognized (Fioreze, De Gruijter & Geurs, 2019; Schikofsky et al., 2020).

## 2.2 Specific research problem

Schikofsky et al. (2020) recently proposed a research model for the acceptance of MaaS. Their research consists of two parts: firstly, a qualitative research to derive motivational factors to adopt MaaS, secondly, a quantitative research to investigate the degree to which these motivational factors influence the intention to use MaaS. The qualitative research consisted of 24 interviews. However, looking at the characteristics of this sample, the respondents were aged only up to 71 years and situated in urban environments. Also, their quantitative study to validate the model was targeted at people aged up to 60 years of age and for 78.4% situated in urban environments (Schikofsky et al., 2020). Nevertheless, mobility is an important part of older age group's quality of life (Banister & Bowling, 2004) and their adoption of MaaS is still questioned (Pangbourne et al., 2020). This is where I would like to contribute with my study.

### SCIENTIFIC RELEVANCE

The scientific relevance firstly relates to the broader topic of MaaS and the fact that the importance of researching its adoption by specific target groups is recognized (Fioreze et al., 2019; Schikofsky et al., 2020), especially for older age groups (Pangbourne et al., 2020). By targeting older age groups in rural areas and exploring their motivations to use MaaS, this thesis will suggest whether the research model as proposed by Schikofsky et al. (2020) is usable for this target group. If the results correspond completely the proposed research model, the contribution of this thesis would be that the research

model also includes a specific target group that was not represented in their research, namely older age groups in rural areas. If my results reveal that the motivations for the target group do not correspond with the proposed research model, my contribution would be that improvements of the proposed research model are suggested in order to include older age groups in rural areas. Also, results from this thesis could be helpful to researchers that want to explore other specific target groups and customize the research model to their exact context.

### **SOCIETAL RELEVANCE**

As stated earlier, it is prognosed that in 2040 almost a third of the inhabitants of rural areas in Noord-Brabant will be at least 65 years of age (Provincie Noord-Brabant, 2017). Mobility is an important part of older age group's quality of life (Banister & Bowling, 2004), especially for rural inhabitants when individual transport needs are met (Kolodisnky et al., 2013). MaaS could have potential here as it centres individual needs (Schikofsky et al., 2020). MaaS could also benefit the mobility of the target group as having accessible public transport services could increase rural elderly's mobility according to Ahern and Hine (2012). The emerging concept of MaaS is therefore relevant to enhance the ability to move for older age groups in rural areas, especially since they form a growing part of the population in Noord-Brabant. As the adoption of the concept by elderly has been doubted (Pangbourne et al., 2020), it is particularly interesting to examine the motivations of the target group to use MaaS, as it does show potential for improving their quality of life. Gaining knowledge on this could contribute to policies improving the adoption of MaaS by this target group, and therefore help maintain and improve their mobility and thus the quality of life of this growing part of the population in Noord-Brabant.

### **SPATIAL PLANNING RELEVANCE**

Transportation is a very relevant topic in the field of spatial planning as it should be integrated well, in such a way that it contributes to people's ability to move. This study will gain knowledge on the motivations to use MaaS by older age groups in rural areas. As the province of Noord-Brabant has recognized MaaS to be part of the future transportation system (Provincie Noord-Brabant, 2018), this knowledge could be of great relevance for the implementation of the emerging transport concept in smaller villages in the rural areas of the province. When motivations for older age groups in this area are explored, spatial planning policies can steer the implementation of MaaS in a way that it seems attractive for the target group to use. For example, if a certain aspect is perceived as important by the target group, spatial planning organisations can adapt their policies to meet the needs of this particular group. This may influence the way spatial planning organisations work to implement the MaaS concept in the future, with a focus more directed towards inclusion of older age groups in rural areas, and therefore contributes to their ability to move.

## **2.3 Research questions**

The objective of this study is to explore the motivations to use MaaS by older age groups in rural areas of Noord-Brabant, the Netherlands. The overarching research question (Q) that arises from this is as following:

Q      What are the motivations for older age groups in rural areas of Noord-Brabant, the Netherlands, to use Mobility as a Service?

In order to be able to answer the abovementioned question, it is necessary to define the different parts that need to be investigated. The proposed research model by Schikofsky et al. (2020) will function as a



guideline to explore motivational factors and will additionally be examined whether it is usable for older age groups in rural areas. In line with this, three sub-questions can be formulated:

- SQ1 What motivations for older age groups in rural areas to use MaaS correspond with the proposed research model by Schikofsky et al. (2020)?
- SQ2 What motivations for older age groups in rural areas to use MaaS are not present in the proposed research model by Schikofsky et al. (2020)?
- SQ3 What relationships between motivations for older age groups in rural areas to use MaaS are visible?

The first sub-question SQ1 explores what motivations for older age group in rural areas to use MaaS are present. The proposed research model will function as a guideline for exploring these motivations within the target group. Answering SQ1 will demonstrate what motivations for the target group correspond with the proposed research model. SQ2 focusses on exploring whether there are other motivations present for older age groups in rural areas that are not shown in the proposed research model. In line with the different levels of relationships between the motivational factors, SQ3 relates to exploring what relationships between the motivations for the target group are visible. Combining these sub-questions will give insight into the motivations for older age groups in rural areas to use MaaS and by comparison suggest whether the proposed research model by Schikofsky et al. (2020) is usable for this specific target group.

## 2.4 Study area

The study area of this research is located in Noord-Brabant, a province in the Netherlands. This thesis will focus on villages outside urban environments with less than 15.000 inhabitants. The number of inhabitants in the villages belonging to the sample range from 3.500 to 14.200 inhabitants.

# 3. THEORETICAL FRAMEWORK

Even though MaaS provides access to a combination of different transport modes, public transport is seen as the backbone of MaaS (Matyas & Kamargianni, 2018). In relation to older age groups, Shrestha, Millonig, Hounsell and McDonald (2017) describe acceptability to be one of the main requirements for this group to use public transport modes. They present multiple issues that need to be considered for including older age groups in public transport, among which aspects concerning willingness or acceptability of using public transportation (Shrestha et al., 2017). As public transport is the backbone of MaaS, acceptability of the concept seems to be a major aspect for older age groups in adopting MaaS as well. The acceptability of MaaS has been researched by Schikofsky et al. (2020). They found motivational factors that are important for adopting MaaS and presented these in a research model.

This thesis will predominantly make use of the proposed research model by Schikofsky et al. (2020). This model provides multiple motivational factors for the intention to use MaaS, derived from a qualitative inductive study. The motivational factors they found to be of importance for the intention to adopt MaaS are the following: perceived usefulness, perceived ease of use, hedonic motives, habit congruence, autonomy, competence and relatedness (see Table 1). It is important to recognize the presence of different relationships between the factors and the intention to use MaaS (Figure 1). Perceived usefulness, perceived ease of use and hedonic motivation have a direct relationship towards the

intention to use MaaS, while the factors autonomy, competence and relatedness have indirect relationships towards the intention to use MaaS. This indirect relationship means that the factor has a relationship towards the intention to use MaaS via another factor. The factor habit congruence has both direct and indirect relationships towards the intention to use MaaS. This proposed research model will function as the theoretical framework for the data collection and analysis.

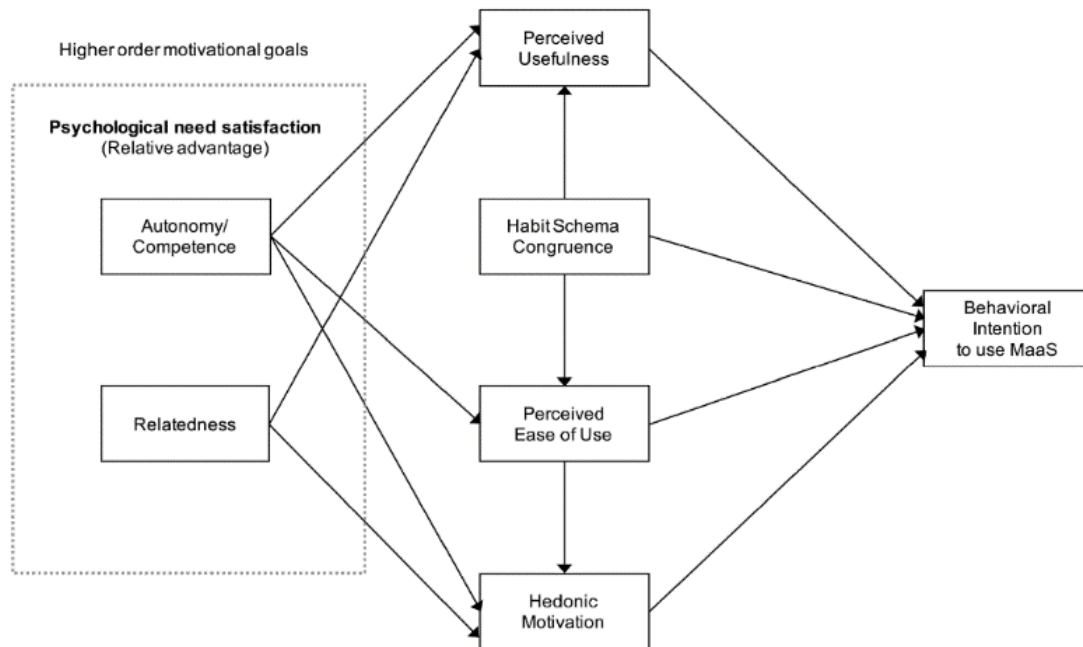


Figure 1: The proposed research model by Schikofsky et al. (2020)

These motivational factors are derived from their qualitative research. However, some anticipated motivational factors were not supported in their qualitative research and therefore not present in the proposed research model and quantitative validating research. These concern environment-related motives, data practices and perceived personal privacy and were found not to have a relationship towards the intention to use MaaS (Schikofsky et al., 2020). Since older age groups in rural areas did not contribute to the results from which the motivational factors are derived, it is important to include the unsupported factors in the data collection as well to ensure whether they are present or absent in the motivation to use MaaS by this target group.

The following table (Table 1) presents the motivational factors of the proposed research model and topics that belong to them. These factors were supported by the qualitative research by Schikofsky et al. (2020) and therefore included in their proposed research model.

Table 1: Motivational factors included in the proposed research model by Schikofsky et al. (2020)

Motivational factor	Topics
<b>Perceived usefulness</b>	Perceived efficiency and performance of using MaaS Perceived rational and functional benefit Expected economic benefit
<b>Perceived ease of use</b>	Easy access to mobility Easy operation of the MaaS platform/app
<b>Hedonic motives</b>	Anticipated enjoyment associated with the use of MaaS Emotional benefit

	Fun Pleasure
<b>Habit congruence</b>	Mental transfer from associated habits (in other consumption domains) Typical usage patterns Abstract familiarity
<b>Autonomy/Competence</b>	Individual choices based on preferences Associated freedom to choose individual mobility Shaping daily mobility Feeling of confidence Feeling of control Self-perceived competence and skills Personal facilities Confidence
<b>Relatedness</b>	Feeling of being connected to likeminded people Feeling near to a social peer group

The factors that were mentioned by the researchers but not supported by the qualitative research by Schikofsky et al. (2020) and therefore excluded from their proposed research model are environment-related motives, data practices and perceived personal privacy.

According to Davis (1989), perceived usefulness and perceived ease of use are part of the acceptance of technology. Perceived usefulness relates to “the degree to which a person believes that using a particular system would enhance his or her job performance”, whereas perceived ease of use relates to “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989, p. 320). Hedonic motivation is defined by Kaczmarek (2017) as the “willingness to initiate behaviours that enhance positives experiences (pleasant or good) and behaviours that decrease negative experiences” (Kaczmarek, 2017, p. 1). Besides topics as fun and pleasure, relaxation is also a hedonic motivation according to Huta and Ryan (2010), however, this is not incorporated in the proposed research model by Schikofsky et al. (2020). Habit-related motives refer to the fact that respondents compare MaaS to their own habits in mobility or even other consumption areas, which influences their acceptance of the concept (Schikofsky et al., 2020). Autonomy, competence and relatedness are part of the self-determination theory that helps understanding motivations, and they describe the basic psychological needs for individuals (Legault, 2017).

## 4. DATA COLLECTION

To be able to suggest whether the proposed research model by Schikofsky et al. (2020) is usable for older age groups in rural areas as well, it is crucial to explore the motivations of this target group to use MaaS. This will be done using a qualitative data collection method, namely semi-structured interviews. This chapter will describe the target group sample, the data collection method and the interview guide.

### 4.1 Target group sample

The participants belong to the target group, namely older age groups in rural areas. Older age groups in this thesis are people of at least 60 years of age. Rural areas in this thesis are villages outside urban environments with no more than 15.000 inhabitants in the rural areas of Noord-Brabant, the Netherlands. The sample consists of five participants, all male and car-owners. Their ages vary from the age categories 60-69 to 80+ years old. The following table (Table 2) describes the participants and their relevant characteristics.

Table 2: Overview of the participants

	Age group	Gender	Car-ownership	Size village in inhabitants (rounded)
<b>P1</b>	60-69	Male	Yes	14.200
<b>P2</b>	70-79	Male	Yes	4.700
<b>P3</b>	80+	Male	Yes	12.500
<b>P4</b>	60-69	Male	Yes	3.500
<b>P5</b>	60-69	Male	Yes	5.700

## 4.2 Primary data collection method

For collecting the primary data, semi-structured interviews are used. This data collection method is chosen because there is a clear set of concepts I aim to collect information about in order to answer the research questions, but also a desire to allow the respondent to mention any information that goes beyond the research model, in order to potentially discover unrevealed factors that are of importance to them.

For a semi-structured interview, an interview guide is often used that could consist of suggested questions and topics that the researcher wants to gain information about, but the degree to which the interview guide is fixed can vary among different studies and their purposes (Kvale, 2007). For this thesis, an interview guide is used that contains a list of factors that I aim to cover and suggested questions that can be used in order to gain information that is usable for answering the research questions. The use of follow-up and probing questions during the interview helps to elaborate the response and to give insight in the context (Kvale, 2007), and should therefore be present in the interviews for this thesis in order to discover motivational factors. Additionally, a well-considered introduction is also essential to create a setting in which the respondent is able to provide the information that the interviewer wants to derive (Rabionet, 2011).

This thesis contains a total of five interviews. The interviews have a duration between 24'06" and 29'28" minutes, with an average of 26'58" minutes. They were completed in the period from 7-4-2020 and 17-4-2020 by phone, making use of the Dutch language.

## 4.3 Interview guide

By means of an interview guide, I am able to ensure that the interview covers all relevant topics so that the data and results are usable in answering all research questions. This specific interview guide contains of an introduction of the interview, topics that need to be covered and suggested questions to help gathering the information. The topics that need to be covered are referring to the proposed research model by Schikofsky et al. (2020), as well as motivational factors that were not shown in their qualitative research.

The introduction should contain a clear and understandable explanation of the concept MaaS. This is necessary for the respondents to imagine using the concept and develop thoughts and opinions about it. Furthermore, it is important to mention that the interview is confidential, in what way the results will be used and to ensure if the respondent agrees with being interviewed and recorded (Rabionet, 2011). The introduction is as following:

*"First of all, thank you for participating in this interview. My name is Rosa and I am a student at Wageningen University. I am writing my thesis about a new transport concept and I would like to discover your own*

thoughts and opinions about it. More specifically, I would like to know your own reasons for considering using this concept. This is completely confidential, and you will remain anonymous. Your answers will only be used for my thesis. Quotes could be used in the thesis, but, of course, without using your name. Because of the difficulty of making notes, I would like to record the audio of this interview. Do you agree with recording the audio of this interview?"

"Thank you for letting me record the audio. To start the interview, I will explain the new transport concept so that you are able to imagine it better. We will be talking about Mobility as a Service (MaaS). This means that through one provider, you will have access to a combination of transport modes to arrive at a destination. You will only need to pay this one provider, via a subscription or you can pay for every trip separately. With one app on your phone, tablet or laptop you can access all transport modes of your choice, at any time of your choice. Transport modes that could be included are public transport like the train and the bus, but also taxis, sharing bikes or sharing cars. This could mean that you do not have to own a private vehicle but can make use of all other transport modes. It is not fully implemented yet, but there have been some pilots. In this interview I will ask about your thoughts about using MaaS and what you would find important. I will probably ask many times 'why', but that is in order to discover your underlying reasons."

After the introduction, it is important to ensure that the respondent understands the concept of MaaS. The first question (see Table 3) will confirm this. When the respondents understand the concept, I started with asking about their initial thoughts, reasons for them to use MaaS and features that are important for them. Follow-up and probing questions are used here to extract as much information and underlying motivations from them as possible, without directing towards certain motivational factors. If some motivational factors are not mentioned yet, questions directed to these motivational factors are used as guidelines to extract information that can confirm whether these are present for them or not. Therefore, it could happen that not all questions directed to motivational factors will be used in the interview. Note that some of the directing questions are used to start a certain conversation, rather than to find an answer to that specific question. For example, the question "Do you think public transport is easy to use?" is formulated to start a conversation about the ease of use of MaaS, rather than to seek for an answer about public transport. The table (Table 3) below presents the possible interview questions.

Table 3: Possible interview questions

<b>Understanding the concept</b>	
	<ul style="list-style-type: none"> <li>· Do you have any questions regarding the concept of MaaS?</li> </ul>
<b>Asking for motivations</b>	
	<ul style="list-style-type: none"> <li>· What are your initial thoughts of the concept?</li> <li>· Would you imagine using MaaS?               <ul style="list-style-type: none"> <li>- Why?</li> </ul> </li> <li>· What would be reasons for you to use MaaS?</li> </ul>
<b>Possible questions directed to motivational factors</b>	
Perceived usefulness	<ul style="list-style-type: none"> <li>· What kind of transport modes do you use?</li> <li>· In comparison to other transport modes you are currently using, do you think MaaS is more useful?</li> </ul>

	<ul style="list-style-type: none"> <li>- In what way could MaaS benefit you?</li> <li>· Would this influence your choice to use MaaS? <ul style="list-style-type: none"> <li>- How do you think this would influence your choice and why?</li> </ul> </li> </ul>
Perceived ease of use	<ul style="list-style-type: none"> <li>-</li> <li>· Do you think public transport is easy to use?</li> <li>· What do you think of using an app?</li> <li>· What do you think of combining different transport modes?</li> <li>· What are your thoughts on the ease of using MaaS?</li> <li>· Does MaaS sound like something you would be able to use? <ul style="list-style-type: none"> <li>- Why?</li> </ul> </li> <li>· Would this influence your choice to use MaaS? <ul style="list-style-type: none"> <li>- How do you think this would influence your choice and why?</li> </ul> </li> </ul>
Hedonic motives	<ul style="list-style-type: none"> <li>-</li> <li>· What do you think of traveling with public transport?</li> <li>· How do you feel when you are traveling?</li> <li>· How do you think you would feel when using MaaS?</li> <li>· Would this influence your choice to use MaaS? <ul style="list-style-type: none"> <li>- How do you think this would influence your choice and why?</li> </ul> </li> </ul>
Habit congruence	<ul style="list-style-type: none"> <li>·</li> <li>· Do you use a smartphone/tablet/laptop with apps?</li> <li>· Do you think MaaS is similar to what you use on your smartphone/tablet/laptop?</li> <li>· What does the concept of MaaS reminds you of?</li> <li>· Would this influence your choice to use MaaS? <ul style="list-style-type: none"> <li>- How do you think this would influence your choice and why?</li> </ul> </li> </ul>
Environment-related motives	<ul style="list-style-type: none"> <li>-</li> <li>· What do you think about the positive effects MaaS could have on the environment? <ul style="list-style-type: none"> <li>- Why?</li> </ul> </li> <li>· Would these effects of MaaS influence your choice to use MaaS? <ul style="list-style-type: none"> <li>- How do you think this would influence your choice and why?</li> </ul> </li> </ul>
Data practices	<ul style="list-style-type: none"> <li>-</li> <li>· By using the app for MaaS, data will be saved. For example, the app could have access to your location or your preferences for transport modes. Do you have any concerns about this? <ul style="list-style-type: none"> <li>- What are your concerns exactly?</li> </ul> </li> <li>· Would this influence your choice to use MaaS? <ul style="list-style-type: none"> <li>- How do you think this would influence your choice and why?</li> </ul> </li> </ul>
Perceived personal privacy	<ul style="list-style-type: none"> <li>-</li> <li>· Do you think personal privacy is important when traveling?</li> <li>· What do you think of your personal privacy when using MaaS?</li> <li>· Would this influence your choice to use MaaS? <ul style="list-style-type: none"> <li>- How do you think this would influence your choice and why?</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>-</li> </ul>

Autonomy/ Competence	<ul style="list-style-type: none"> <li>· What is important for you when planning a trip?</li> <li>· Would this influence your choice to use MaaS? <ul style="list-style-type: none"> <li>- How do you think this would influence your choice and why?</li> </ul> </li> </ul>
Relatedness	<ul style="list-style-type: none"> <li>· Do you think people you know (family or friends) would use MaaS?</li> <li>· Would this influence your choice to use MaaS? <ul style="list-style-type: none"> <li>- How do you think this would influence your choice and why?</li> </ul> </li> <li>· What would you think of others using MaaS?</li> </ul>

## 5. DATA ANALYSIS

After collecting the primary data, an analysis is needed. The audio of the interviews is recorded and transcribed. Thematic analysis is used to derive motivations from the raw data. This type of analysis is often used for qualitative data because of its flexibility, and it consists of multiple phases in order to achieve a trustworthy data analysis (Braun & Clarke, 2006; Nowell, Norris, White & Moules, 2017). The precise order of different steps within these stages can vary depending of the specific study and the aim of the researcher (Swain, 2018). Thematic analysis has been used multiple times in transport-related researches (Hafner, Walker & Verplanken, 2017; Nikitas, Wang & Knamiller, 2019). It is also said that this type of analysis is specifically usable for people who just started with doing qualitative research (Braun & Clarke, 2006).

Thematic analysis could be done either deductive or inductive (Braun & Clarke, 2006), but also by a hybrid of these two as explained by Fereday and Muir-Cochrane (2006) and Swain (2018). Because of the aim of this study, a hybrid of deductive and inductive approaches of thematic analysis will be used. To be able to suggest whether the research model by Schikofsky et al. (2020) for the adoption of MaaS can be applied to older age groups in rural areas, two approaches are needed. The first is to explore which motivational factors given in the proposed research model by Schikofsky et al. (2020) are present for older age groups in rural areas. A deductive approach will be used as the data will be analysed driven by the theory. The second is to explore whether the proposed research model by Schikofsky et al. (2020) covers all motivations for older age groups in rural areas to use MaaS. An inductive approach will be used for this because factors that are not present in the proposed research model could be revealed by the data.

### 5.1 Coding

The process of this thematic analysis will correspond predominantly with the hybrid thematic analysis as explained by Swain (2018). Firstly, a code manual will be made consisting of predefined codes derived from the theoretical framework, which I will call theory-driven codes. A code manual is useful for a deductive approach according to Nowell et al. (2017). The theory-driven codes follow from topics that belong to motivational factors. The motivational factors are the overarching themes. After the code manual is created, the raw data will be coded according to the code manual with predefined codes. During analysing the data with the theory-driven codes, it could occur that interesting phrases in the data cannot fit within a predefined theory-driven code. This is where also the inductive approach comes into play. In this case, a new code will be generated from the data, which I will call a data-driven code. Whereas the theory-driven codes can fit into a predefined theme (i.e. the motivational factors in the

proposed research model by Schikofsky et al., 2020), the data-driven codes could be fitted into a new generated theme, which then represents a new generated motivational factor for older age groups in rural areas to adopt MaaS. It could also be the case that new data-driven codes do fit within a predefined theme. This could be the case when the predefined theory-driven codes do not cover all possible topics belonging to a certain predefined theme. However, as this does not generate a new theme, it does not reveal a new motivational factor.

Predefined theory-driven themes and codes are shown in the table below (Table 4). The codes are mostly derived from the proposed research model by Schikofsky et al. (2020), but also from other theory if they are complimentary to the codes that belong to the predefined themes. The code ‘relaxation’ has been added to the predefined code manual, complementing the codes for hedonic motives as ‘relaxation’ is also a hedonic motive according to Huta and Ryan (2010). Coding is done by using the commenting function in Microsoft Word.

Table 4: Predefined theory-driven themes and codes

<b>Themes</b>	<b>Codes</b>
<b>Perceived usefulness</b>	Perceived efficiency and performance of using MaaS Perceived rational and functional benefit Expected economic benefit
<b>Perceived ease of use</b>	Easy access to mobility Easy operation of the MaaS platform/app
<b>Hedonic motives</b>	Anticipated enjoyment associated with the use of MaaS Emotional benefit Fun Pleasure Relaxation
<b>Habit congruence</b>	Mental transfer from associated habits (in other consumption domains) Typical usage patterns Abstract familiarity
<b>Autonomy/ Competence</b>	Individual choices based on preferences Associated freedom to choose individual mobility Shaping daily mobility Feeling of confidence Feeling of control Self-perceived competence and skills Personal facilities Confidence
<b>Relatedness</b>	Feeling of being connected to likeminded people Feeling near to a social peer group
<b>Data practices</b>	Data privacy, security and usage
<b>Environment-related motives</b>	<i>No predefined codes</i>
<b>Personal privacy</b>	<i>No predefined codes</i>

## 5.2 Summarizing

After the coding process, a summarizing table is created per participant. Summarizing the data in tables is inspired by the method of thematic analysis by Swain (2018), who suggests this is a useful way of getting an overview of the data and the responses related to specific questions. Swain (2018) created one table for multiple respondents, however, this thesis will create a separate table per participant.



Reasons for this are that the number of participants in this thesis is relatively low and creating a table for each participant enables me to give a more elaborated overview of their motivations. The tables each present all themes and codes (theory and data-driven), what the specific participant says about this and a corresponding quote. The quotes are translated from English to Dutch by me. All summarizing tables are presented in Appendix 1: Summarizing tables. Note that the summarizing tables include all themes and codes, regardless what is said about it. For example, pieces of text were coded when they related to a certain topic, regardless the participant talks positively or negatively about the topic concerning its influence on the use of MaaS. In the following chapter I will write about the results of this process of coding and summarizing in relation to sub-questions of this thesis.

## 6. RESULTS

The results presented in this chapter are derived from the thematic analysis in which summarizing tables per participant were created. These analyses contribute to answering the three sub-questions, subsequently answering the overarching research question. This chapter is divided in the three sub-questions. Firstly, in section 6.1, the focus is on looking for motivations for the target group that correspond with the proposed research model by Schikofsky et al. (2020). The following section, 6.2, states motivations for older age groups in rural areas to use MaaS that are not present in this proposed research model. Lastly, in section 6.3, visible relationships between the motivations for the target group are described.

### 6.1 Theory-driven motivations

The research model proposed by Schikofsky et al. (2020) contains multiple motivational factors for the adoption of MaaS. These are perceived usefulness, perceived ease of use, hedonic motives, habit congruence, autonomy/competence and relatedness. In this section the motivations of older age groups in rural areas to use MaaS are compared to this research model. I will discuss every motivational factor that is present in the proposed research model and examine if and how they are present in the motivations for the target group, along with a corresponding quote.

#### PERCEIVED USEFULNESS

In all interviews, the concept of MaaS is perceived as useful. For all topics that are covered by this factor (perceived efficiency and performance of using MaaS, perceived rational and functional benefit and expected economic benefit), positive statements have been made. The following three quotes illustrate that MaaS is perceived as efficient, namely that traveling with MaaS is possible with few means, such as time. This efficiency is perceived as important for choosing a transport mode. See the following quotes:

- P5      *“Look, if you have such a concept that you can immediately go somewhere, without all those transit moments that take a long time, because a transit moment is not a bad thing as long as it does not take too much time, then you could say that you could easily choose the MaaS concept over the car, maybe.”*
- P2      *“It should not have to take an hour or an hour and a half to get from place A to B.”*
- P3      *“I have the feeling that I like to travel straight to my destination. [...]. I don’t know how it works with [MaaS], but traveling kind of straight to your destination, is of course very nice.”*

The rational and functional benefit of the MaaS concept has also been recognized multiple times. For example, MaaS is seen as something that would benefit the transport system and the mobility for themselves in the future:

P3 *“Well, I think, especially for rural areas, [...], [MaaS] could offer new possibilities.”*

P4 *“[With using current public transport] I still need to be picked up from or dropped off at the station, and that is a disadvantage. There should be a solution for that, that could be MaaS, which could get you to the station.”*

P1 *“If I would be in such a situation, [MaaS] would help me [traveling].”*

Besides the statements that MaaS should be economically beneficial, the expected economic benefits have also been recognized:

P3 *“It seems, if it is affordable, that [MaaS] could have a future, let’s put it that way.”*

P2 *“[...] in the city, due to high parking fees, then you could work with public transport, and with that the possibility of renting a bike and traveling in this way, or with a taxi or whatever form.”*

P4 *“I don’t know if [MaaS] is cheaper, but I think so.”*

### **PERCEIVED EASE OF USE**

The same pattern is seen for the factor perceived ease of use. Topics that are covered here are easy access to mobility and easy operation of the MaaS platform/app. Both of these topics have been mentioned positively regarding the use of MaaS. The easy access to mobility is often mentioned in relation to the use of one platform:

P1 *“That I can say to a website: I want to be in Roosendaal at 3:15 PM, and then, at the right moment, a car arrives at my door and fixes it. That is what I can imagine.”*

P3 *“Then, this system seems pleasant to me. That I can say, I have my app and I walk to the bus and I can just get on the bus. And somewhere waits a taxi or a bicycle.”*

Additionally, the use of the MaaS platform or app is also mostly perceived as easy and would not form a problem for them. Easy use of the platform is recognized as important. One participant mentioned that he may have difficulties using the app at first, but that he would be able to learn how to use it. MaaS is perceived as easy to use, and easy to learn how to use.

P4 *“For myself, [using an app] would be no problem.”*

P3 *“I have also such a telephone now. [...] If it is necessary, I can learn how to use it and I will. And otherwise, there are always people who want to help.”*

P4 *“And I think not only for myself, but also people who are not familiar with an app, it would be easy to learn.”*

### **HEDONIC MOTIVES**

Hedonic motives were less represented than the abovementioned motivational factors. Three out of five participants mentioned emotion-related motives for using MaaS. These were focussed on the following topics: fun and pleasure. The following quotes illustrate that participants perceived the use of (aspects of) MaaS as fun or pleasant.

- P4 *“At a certain moment, [public transport modes] could be even more sociable, if you are with more people.”*
- P3 *“It seems pleasant to me, using everything just like that.”*
- P3 *“We were on vacation [...], and there were also rows of bicycles. [...]. And I believe they could also lock it again at another location. In itself quite easy and fun.”*

The other topics (anticipated enjoyment associated with the use of MaaS and emotional benefit) were not mentioned in the interviews of the target group.

### **HABIT CONGRUENCE**

Habit congruence-related motives were not present in all interviews. However, statements about these were made concerning all topics (mental transfer from associated habits in other consumption domains, typical usage patterns, abstract familiarity). The following quotes illustrate that the use of MaaS was correlated with habits, often focused on the use of an app or the use of shared modes:

- P4 *“I am already familiar with [using an app].”*
- P1 *“For me personally, yes, I am an internet animal, I have an ICT-background, so it has few secrets.”*
- P2 *“Wherever there is something digital, I am often the first in line. [...]. Because I like to be in the digital world a lot.”*
- P5 *“Yes, I know of that concept [of sharing bikes], because I used to use that in [a city] as well. I arrived at central station in [a city] and then I took a NS-bicycle and then I cycled to work [...].”*

### **AUTONOMY/COMPETENCE**

The motivational factor autonomy/competence was mentioned multiple times positively regarding using the concept of MaaS. However, not all topics that belong to this factor are present in the responses of the participants (see motivational factors and topics that belong to them in Table 1). These topics are feeling of confidence, self-perceived competence and skills, personal facilities and confidence. The other topics did show presence in the responses of the target group. The following quotes relate to the feeling of having choices based on preferences:

- P4 *“[When planning a trip, it is important] to have the possibility to choose at that moment what you want, public transport or a car or a bicycle or another transport mode.”*
- P5 *“Well, [being able to use all kinds of different modes] would be attractive. That you can choose all kinds of different possibilities, that there will always be something that exactly suits you.”*

Also, the associated freedom to choose individual mobility was mentioned to be important and present for MaaS in the following quotes:

- P1 *“[...] at my age, freedom and mobility is crucial.”*
- P4 *“Because you have a choice. You could choose individual modes, but also shared/public modes. So, that way I think the independency persists.”*

Shaping daily mobility has been recognized to be important and present in MaaS:

- P1 *“[...] they could say to one input address, like, I want to be there at this time, and fix it.”*

P4 *“Imagine that MaaS would work, if I think in the morning, ‘well, I could go to [a city]’, it should be possible with the app immediately. You should not have to reserve that days ahead.”*

The importance of feeling of control has been specifically mentioned by one participant:

P1 *“For me, transport is something I want to keep in control.”*

## RELATEDNESS

Relatedness is underrepresented in the responses of the participant. There is one statement of a participant that positively relates other people using MaaS to his own choice of using MaaS:

P4 *“It would have some kind of herd behaviour effect then. I take part in this myself as well. When I see that [MaaS] is easy for others, I would join that more easily as well, I think.”*

The other participants mentioned that their choice would not be influenced by other people using MaaS.

## 6.2 Data-driven motivations

This section presents the motivations that are present for older age groups in rural areas, but not present in the proposed research model by Schikofsky et al. (2020). During the thematic analysis, data-driven codes were generated that can form two data-driven themes. These data-driven themes are the motivations that are present for the target-group, but not present in the proposed research model by Schikofsky et al. (2020), namely: perceived comfort and clear communication.

### PERCEIVED COMFORT

Two data-driven codes were generated from the interviews that relate to comfort, namely: perceived comfortable social contact and comfortable design of transport mode. These motivations for the target group were mentioned multiple times in relation to the use of MaaS.

The importance of perceived comfortable social environment has been recognized by two participants. This is illustrated by the following quotes:

P5 *“When you are travelling with other people, and you’re looking at older people versus [...] the younger people, [...], it should be respectful.”*

P5 *“There should not occur moments where people do not feel welcome in the transport mode because they are a little slower than the others.”*

P3 *“And if there are some more other people sitting there as well... well, if they don’t bite, then it’s okay.”*

Additionally, the importance of a comfortable design of the transport mode is mentioned by three participants:

P2 *“I think good seating, a quiet environment, not too crowded... Like you mentioned, comfortable, yes, that are requirements.”*

P2 *“I think it is important that [a transport mode] is well equipped.”*

P5 *“I would find that important, especially when you cannot drive your car anymore, it is just important that there is space for [baggage] as well.”*

P1 *“[My car offers me] [...], not having to sit packed with other people.”*

## CLEAR COMMUNICATION

Clear communication may be perceived as part of perceived ease of use; however, a new motivational factor is made for this. This is because the clear communication does not only relate to the use of the concept, but also to the awareness of data practices and benefits of using MaaS. Therefore, clear communication consists of three topics: communication about data practices, communication about benefits and communication concerning the use of the MaaS platform.

The importance of clear communication with MaaS about data practices has been recognized by two participants:

P1 *“At least explain [elderly] that the data are completely anonymous and not being transferred to others.”*

P5 *“Such an app should guarantee that only the transport companies can follow you.”*

Communication about benefits of MaaS has been pointed out explicitly by one participant:

P4 *“I think they should directly add an overview of the costs, and then see how much more beneficial it is compared to owning a car. Like, that [MaaS] has a kind of price per km compared to the price per km when you own your car [...].”*

P4 *“I think [economic benefit] is especially important to clarify for the success [of MaaS].”*

P4 *“If I would run [MaaS] myself, I would pay a lot of attention to this. That it is very transparent, and how much cheaper it is relatively, [...].”*

Communication concerning the use of the MaaS platform has been mentioned to be important by two participants:

P1 *“[My father] would want to call somebody [...]. He wants a voice; he wants to hear somebody. [...] So, I suppose, if this app wants to be successful, focused on those elderly, you need an entrance by telephone. A real person, I think.”*

P3 *“[...] I don't speak English; I don't have a feeling with it. I have difficulties with these words.”*

P3 *“[It is important] that it is easy to find. And that if I must use it, it is feasible to learn. It might take a little longer, but it will be fine.”*

## OTHER

Factors that were mentioned by Schikofsky et al. (2020) not to be present as motivations to use MaaS, and therefore not shown in their research model, are: data practices, environment-related motives and personal privacy. In the interviews of this thesis, these factors were included in the interview guide to confirm whether these factors are present for older age groups in rural areas. Firstly, data practices seemed not to be an issue for 4 out of 5 participants. They often mentioned that they did not worry about this, because these practices were already perceived as normal. This corresponds with the research by Schikofsky et al. (2020). The following quote illustrates that data practices were not a problem for most participants:

P1 *“No, no problem, because that gets documented now anyways.”*

P3 *“It is what it is. I mean, when I buy a train ticket, they can also see that I bought a train ticket in my bank statements.”*

The use of data practices was even seen as positive:

P2 *“I think it is important in the future that organisations like this can benefit from [saving data]. Based on data, matters can be organised better [...].”*

However, concerns were raised for others belonging to older age groups to be hesitant towards data practices:

P1 *“I do expect that many elderly people have some kind of, almost an innate fear for this.”*

One of the participants did recognize that he had slight concerns about this, however, he felt that the platform should therefore guarantee security. This is why communication about data practices is part of the data-driven motivational factor *clear communication*. The following quotes illustrate the slight concern and the importance of guaranteeing security:

P5 *“I have light concerns about [data practices]. If malicious people could follow you, it would not be okay of course. [...] But a hacker should not be able to follow you. Because then you could get examples, like, that people are away from home and thieves can just make their moves.”*

P5 *“Such an app should guarantee that only the transport companies can follow you.”*

Environment-related motives were in this study not found to be decisive for choosing to use MaaS. There were differences in the way participants perceived the environmental benefit, but all participants recognized that environmental benefits did not outweigh the usefulness of the concept for themselves:

P5 *“If there are major differences in time, this would outweigh [the environmental benefits].”*

P2 *“[...] I think it is important that I can transport myself well, in the first place. [...]. [Environmental benefit] is a pleasant side effect.”*

P1 *“Even if [MaaS] would produce provable environmental benefits, it would not outweigh what I told you before, the feeling of having control.”*

However, one participant did recognize that in the future, he could imagine that environment-related motives would play a bigger, more decisive part in choosing mobility:

P5 *“I have to say, the environmental benefits do not play a very dominant role in your considerations, but I can imagine, that this would be addressed more in the future. So, I can imagine that this would then also be considered. In my own considerations as well.”*

But in their current situations, environmental benefits do not outweigh the benefits for their own mobility. This corresponds with the research by Schikofsky et al (2020).

Personal privacy was not seen as something that would influence people's choice on MaaS. Participants mentioned that they did not mind others to be able to see them making use of public transport modes:

P3 *“Oh no. No, I don't have problems with [personal privacy when traveling].”*

P4 *“I can shape this privacy myself as well. When I am sitting in the train and I want to make a phone call, I should not do that at that moment. So, you have a lot of influence on that yourself as well.”*

However, some participants mentioned privacy to be pleasant when traveling. This was related to the way the transport mode is designed; they did not want to sit packed with other people. This desire for a

design where they would not have to deal with a very crowded transport mode, is therefore added to the data-driven motivational factor *comfortable design*. Quotes that illustrate this are the following:

P2 *“I like not having to sit close to each other. I also say that [public transport] has to be set up like that, because when you want to get more people to use public transport, you should watch out for that as well.”*

P1 *“[My car offers me][...], not having to sit packed with other people.”*

### 6.3 The motivations for older age groups in rural areas to use MaaS

The following table (Table 5) summarizes all motives that are present for the target group. This consists of both theory-driven codes and themes, and data-driven codes and themes. The themes represent the motives for older age groups in rural areas to use MaaS. The codes represent topics that the overarching themes cover. Note that some pre-defined codes and themes are not present in this table. This is the case when these codes and themes were not present in the data. Sometimes participants did speak about these codes and themes, but not positively relating to their motivation to use MaaS. In this case, the codes and themes are also not present in the table, because they did not form motivations for the target group to use MaaS. One corresponding quote is given along with each present topic.

Theory-driven codes      **Theory-driven themes**  
 Data-driven codes        **Data driven themes**

Table 5: Motivations for older age groups in rural areas to use MaaS

	Exemplary quote
<b>Perceived usefulness</b>	
Perceived efficiency and performance of using MaaS	<i>“Look, if you have such a concept that you can immediately go somewhere, without all those transit moments that take a long time, because a transit moment is not a bad thing as long as it does not take too much time, then you could say that you could easily choose the MaaS concept over the car, maybe.”</i>
Perceived rational and functional benefit	<i>“[With using current public transport] I still need to be picked up from or dropped off at the station, and that is a disadvantage. There should be a solution for that, that could be MaaS, which could get you to the station.”</i>
Expected economic benefit	<i>“I don’t know if [MaaS] is cheaper, but I think so.”</i>
<b>Perceived ease of use</b>	
Easy access to mobility	<i>“Then, this system seems pleasant to me. That I can say, I have my app and I walk to the bus and I can just get on the bus. And somewhere waits a taxi or a bicycle.”</i>
Easy operation of the MaaS platform/app	<i>“And I think not only for myself, but also people who are not familiar with an app, it would be easy to learn.”</i>
<b>Hedonic motives</b>	
Fun	<i>“At a certain moment, [public transport modes] could be even more sociable, if you are with more people.”</i>
Pleasure	<i>“It seems pleasant to me, using everything just like that.”</i>
Relaxation	<i>“Yes, a relaxed way to be transported like this.”</i>
<b>Habit congruence</b>	
Mental transfer from associated habits (in other consumption domains)	<i>“Wherever there is something digital, I am often the first in line.”</i>
Typical usage patterns	<i>“Yes, I know of that concept because I used to use that in Zwolle as well. I arrived at central station in Zwolle and then I took a NS-bicycle and then I cycled to work [...]”</i>
Abstract familiarity	<i>“For me personally, yes, I am an internet animal, I have an ICT-background, so it has few secrets.”</i>
<b>Perceived comfort</b>	

Perceived comfortable social contact	"There should not occur moments where people do not feel welcome in the transport mode because they are a little slower than the others."
Comfortable design of transport mode	"I think good seating, a quiet environment, not too crowded... Like you mentioned, comfortable, yes, that are requirements."
<b>Clear communication</b>	
Communication about data practices	"At least explain [elderly] that the data are completely anonymous and not being transferred to others."
Communication about benefits	"I think they should directly add an overview of the costs, and then see how much more beneficial it is compared to owning a car. Like, that [MaaS] has a kind of price per km compared to the price per km when you own your car [...]."
Communication concerning the use of the MaaS platform	"[It is important] that it is easy to find. And that if I must use it, it is feasible to learn. It might take a little longer, but it will be fine."
<b>Autonomy/competence</b>	
Individual choices based on preferences	"[When planning a trip, it is important] to have the possibility to choose at that moment what you want, public transport or a car or a bicycle or another transport mode."
Associated freedom to choose individual mobility	"Because you have a choice. You could choose individual modes, but also shared/public modes. So, that way I think the independency persists."
Shaping daily mobility	"Imagine that MaaS would work, if I think in the morning, 'well, I could go to [city], it should be possible with the app immediately. You should not have to reserve that days ahead."
Feeling of control	"For me, transport is something I want to keep in control."
<b>Relatedness</b>	
Feeling near to a social peer group	"It would have some kind of herd behaviour effect then. I take part in this myself as well. When I see that [MaaS] is easy for others, I would join that more easily as well, I think."

## 6.4 Visible relationships between motivations

The proposed research model by Schikofsky et al. (2020) includes direct and indirect relationships between the factors and the intention to use MaaS. These were validated through their quantitative research. This thesis does not validate the motivations for the target group with a quantitative research but explores the motivations with qualitative research. However, the relationships are still an important part of the proposed research model, which makes it interesting to see if these same relationships can be explored using the qualitative data from this thesis. This section therefore seeks to present the visible relationships between the motivations for older age groups in rural areas to use MaaS. Consequently, as much as possible information is extracted from the collected data, which contributes to the comparison of the proposed research model by Schikofsky et al. (2020) and the motivations of the target group. Note that these relationships are interpreted from the qualitative data and not validated through a quantitative research.

### CORRESPONDING WITH THE PROPOSED RESEARCH MODEL

The proposed research model of Schikofsky et al. (2020) includes a total of 12 different direct and indirect relationships. The relationships that are visible within the collected data from older age groups in rural areas will be illustrated with an exemplary quote.

Direct relationships towards using MaaS are:

- Perceived usefulness  $\Rightarrow$  intention to use MaaS
- Perceived ease of use  $\Rightarrow$  intention to use MaaS
- Habit congruence  $\Rightarrow$  intention to use MaaS
- Hedonic motivation  $\Rightarrow$  intention to use MaaS



Indirect relationships towards using MaaS are:

- Autonomy/competence  $\Rightarrow$  perceived usefulness
- Autonomy/competence  $\Rightarrow$  perceived ease of use
- Autonomy/competence  $\Rightarrow$  hedonic motivation
- Relatedness  $\Rightarrow$  perceived usefulness
- Relatedness  $\Rightarrow$  hedonic motivation
- Habit congruence  $\Rightarrow$  perceived usefulness
- Habit congruence  $\Rightarrow$  perceived ease of use
- Perceived ease of use  $\Rightarrow$  hedonic motivation

The relationship perceived usefulness  $\Rightarrow$  intention to use MaaS is visible when a participant explains a situation in which he may use MaaS. It is also visible when a participant states that the interest to use a transport mode depends on the usefulness. See the following quotes:

P3 *“If [MaaS] is possible, and if I cannot drive the car in a couple of years, this would be of course very pleasant, because the bus lines here are also cancelled.”*

P5 *“You’re depending a lot on, if I want to go from A to B, on the amount of time that is needed to travel. If that is too much, your interest to use [a transport mode] is a lot less.”*

The relationship perceived ease of use  $\Rightarrow$  intention to use MaaS is visible when a participant mentions he could use MaaS because of its ease to use:

P3 *“If I am not able to drive anymore, I need to make use of public transport modes in some way. And if that is possible with one [platform], it is very easy.”*

The relationship habit congruence  $\Rightarrow$  intention to use MaaS is visible in the following quote:

P2 *“Wherever there is something digital, I am often the first in line.”*

The relationship autonomy/competence  $\Rightarrow$  perceived usefulness is visible when a participant mentions that it is important with MaaS that shaping his daily mobility should be able in an efficient way:

P4 *“Imagine that MaaS would work, if I think in the morning, ‘well, I could go to Den Haag’, it should be possible with the app immediately. You should not have to reserve that days ahead.”*

The relationship autonomy/competence  $\Rightarrow$  hedonic motivation is visible when a participant mentions the influence of the freedom to choose transport modes on hedonic motives:

P3 *“It seems pleasant to me, using everything just like that.”*

The relationship relatedness  $\Rightarrow$  perceived usefulness is visible when a participant recognizes that seeing others benefit from MaaS, it could influence him as well.

P4 *“It would have some kind of herd behaviour effect then. I take part in this myself as well. When I see that [MaaS] is easy for others, I would join that more easily as well, I think.”*

The relationship habit congruence  $\Rightarrow$  perceived ease of use is visible when a participant is asked if he perceives the use of MaaS as easy and why:

P2 *“Yes, absolutely. Because I like to be in the digital world a lot.”*

The relationship perceived ease of use  $\Rightarrow$  hedonic motivation is visible when a participant states that the ease of accessing a transport mode influences the feeling of being welcome:

P5 *“Especially the easiness of accessing a transport mode and such plays an important part [in feeling welcome].”*

Six out of twelve proposed relationships by Schikofsky et al (2020) were interpreted as visible in the collected data from the older age groups in rural areas. Four of the relationships were not found to be visible for this target group. These are: hedonic motivation  $\Rightarrow$  intention to use MaaS, autonomy/competence  $\Rightarrow$  perceived ease of use, relatedness  $\Rightarrow$  hedonic motivation and habit congruence  $\Rightarrow$  perceived usefulness.

#### **NOT CORRESPONDING WITH THE PROPOSED RESEARCH MODEL**

There are two new data-driven motivational factors for older age groups in rural areas to use MaaS. As they are not present in the proposed research model by Schikofsky et al. (2020), there are of course no relationships present there for these new factors as well. From the collected data in this thesis, there are six relationships visible between these new factors. These are:

- Clear communication  $\Rightarrow$  perceived usefulness
- Clear communication  $\Rightarrow$  perceived ease of use
- Ease of use  $\Rightarrow$  perceived comfort
- Perceived comfort  $\Rightarrow$  intention to use MaaS
- Perceived comfort  $\Rightarrow$  hedonic motives
- Perceived comfort  $\Rightarrow$  perceived usefulness

The relationship clear communication  $\Rightarrow$  perceived usefulness is visible when a participant states that sharing information about MaaS contributes to the way people perceive the usefulness of the concept:

P4 *“I think they should directly add an overview of the costs, and then see how much more beneficial it is compared to owning a car. Like, that [MaaS] has a kind of price per km compared to the price per km when you own your car [...].”*

The relationship clear communication  $\Rightarrow$  perceived ease of use is visible when a participant mentions that communication regarding the use of the MaaS app would contribute to the ease of using this:

P3 *“[It is important] that it is easy to find. And that if I must use it, it is feasible to learn. It might take a little longer, but it will be fine.”*

The relationship ease of use  $\Rightarrow$  perceived comfort is visible when a participant explains that the ease of accessing a transport mode would influence having a comfortable social environment.

P5 *“Especially the easiness of accessing a transport mode and such plays an important part [in feeling welcome].”*

The relationship perceived comfort  $\Rightarrow$  intention to use MaaS is visible when a participant mentions that a comfortable design is a requirement for choosing a transport mode:

P2 *“I think good seating, a quiet environment, not too crowded... Like you mentioned, comfortable, yes, that are requirements.”*

The relationship perceived comfort  $\Rightarrow$  hedonic motives is visible when a participant explains that the comfort of the social environment influences his feeling of being welcome:

P5 *“There should not occur moments where people do not feel welcome in the transport mode because they are a little slower than the others.”*

The relationship perceived comfort  $\Rightarrow$  perceived usefulness is visible when a participant mentions that having enough space in the transport mode is important for being able to bring needed baggage:

P5 *“I would find that important, especially when you cannot drive your car anymore, it is just important that there is space for [baggage] as well.”*

## 7. DISCUSSION

In this discussion, the focus will firstly lie on describing the validity of this research. The second section discusses the results, their relation to the research questions and a comparison with the literature. Lastly, the limitations of this thesis are described.

### 7.1 Validity of the research

This thesis considered rural areas in the province of Noord-Brabant, the Netherlands. In this research, this meant focussing on small villages up to 15.000 inhabitants. In terms of transportation, Eckhardt et al. (2018) perceive rural areas as having poor coverage by public transport. However, in the Netherlands, connectivity is already quite high due to the high density of roads and public transport. This relatively high density of motorways and railways in comparison to other European countries is visible in the Figure 2 and Figure 3. Living in small villages in the Netherlands could therefore differ compared to living in small villages elsewhere in Europe in terms of transportation. This may influence the way the

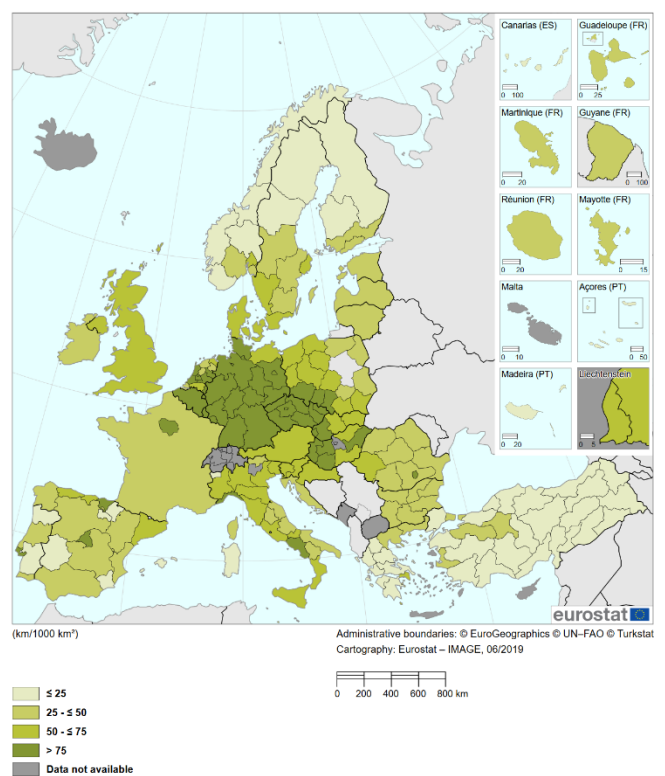
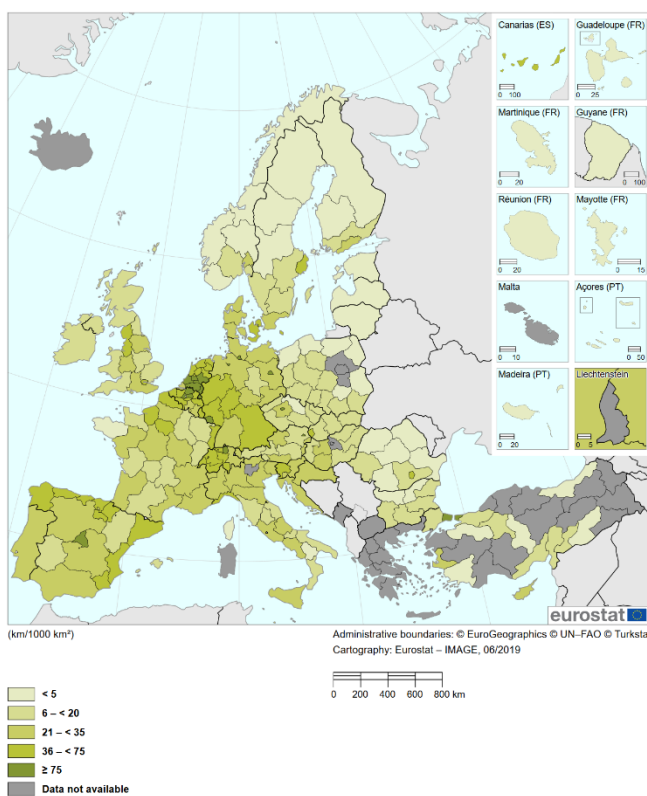


Figure 3: Motorway density (Eurostat, 2019)

Figure 2: Railway lines density (Eurostat, 2019)

participants perceive the differences between MaaS and their current ways of transporting. Generalizing the results from this thesis to rural areas outside of the Netherlands may therefore be not possible.

The sample consists of five individuals belonging to older age groups in rural areas of Noord-Brabant. Because it is a relatively small sample, including only male individuals with car-ownership in one region, the results cannot be generalized to all older age groups in rural areas, as there are normally many differences among older people and they should not be considered as an identical group (Shrestha et al., 2017). Also, it is important to acknowledge that the results may not be representative for the next generations of older age groups in rural areas in the near future, by the time that MaaS is fully implemented and could be used by the target group.

During the thematic analysis, new data-driven codes and themes were generated that formed the two new motivations for older age groups in rural areas to use MaaS. As qualitative research is more subjective than quantitative research and different researchers may interpret phrases in a different way, it is important to acknowledge that other researchers may have generated different data-driven codes and themes. This could influence the reliability of the analysis because other outcomes could result from an analysis by a different researcher. Circumstances that limited the possibilities for enhancing the reliability are described in section 7.3 Limitations.

## 7.2 Results

The results suggest that next to the motivational factors proposed by Schikofsky et al. (2020), two additional motivations are present for older age groups in rural areas to use MaaS: perceived comfort and clear communication. The results imply that for perceived comfort both a comfortable design and a comfortable social environment are features for the motivation of older age groups in rural areas to use MaaS. This answers the research question relating to motivations not corresponding to the proposed research model. The motivation of perceived comfort for older age groups could be related to the findings by Wong, Szeto, Yang, Li and Wong (2017), who suggest that the availability of seats and respectful behaviour of the driver and other passengers should be payed attention to in order to enhance the use of public transport services by older age groups.

Another motivation that shows presence in for the target group but absence in the proposed research model by Schikofsky et al. (2020) is clear communication. The finding that clear communication is important for the target group is in line with Waara, Risser and Ståhl (2013), who found that accessible online traveller information services increase the confidence of older age groups to use public transport and thus the quality of their travel. In relation to the research questions, this result suggests that this motivation is present for the target group, but not included in the research model by Schikofsky et al. (2020). This means that clear communication should be recognized as a motivation for older age groups in rural areas to use MaaS.

The results show few statements about safety concerns. One participant mentioned that he would expect older people to be hesitant about safety among data practices, and one participant mentioned he has light concerns about this. Notably, safety issues outside of data practices were not mentioned in any of the interviews, even though safety is said to be an important part of the acceptance of older age groups to use public transport modes (Shrestha et al., 2017), and is also recognized in many European governments as an important quality for transport needs of older people (Johnson, Shaw, Berding, Gather & Rebstock, 2017). The results suggest however that safety is not a motivation for the target group

to use MaaS. However, in a research by Alonso-González et al. (2020), it is assumed that a small number of respondents choosing safety as important factor in their transport mode choice is likely due to that they “presumably consider safety a precondition present in all modes from which they make their mode decisions”, instead of perceiving safety as unimportant factor (Alonso-González et al., 2020, p. 394). If this is the case, this reasoning could be present for the participants of this thesis as well.

All participants have car-ownership and mentioned that they currently use their car for most trips rather than public transport. However, in some cases, the participants would prefer other modes such as public transport modes or a bicycle, depending on the destination. Also, some participants mentioned that they would probably not use the concept of MaaS as long as they are able to drive their own cars. So, the results suggest that the motivation to use MaaS is influenced by their current transport behaviour. This is in line with findings by Alonso-González et al. (2020), who found that current transportation behaviour is linked to adoption potential of MaaS. They also found that car-ownership need is one of the main barriers that makes people deter from adopting MaaS (Alonso-González et al., 2020), a concept that minimizes the need of owning a vehicle. As all participants own a car, abovementioned findings could imply that this is linked to their attitude towards the concept of MaaS. In the interviews, the participants were asked to imagine themselves using MaaS in a future where they may not be able to drive their own cars anymore, trying to explore what they would find important for choosing MaaS. However, in relation to answering the research questions, it is therefore important to acknowledge that the motivations derived from the results may be influenced by current transport behaviours.

Explanations for the results can also lie in gender-related effects. Ahern and Hine (2012) found that older aged men in rural areas experience more difficulties in adapting to a life without a car than older aged women in rural areas. They showed that older men in these areas were less likely to use alternative transport services as they wanted to be independent and were reluctant about sharing transport modes, things that older aged women in rural areas did not worry about as much (Ahern & Hine, 2012). The way the participants in this thesis often preferred their own cars over public transport modes could be due to this reasoning as well, as the sample consisted of only male participants.

### 7.3 Limitations

In this section I will describe the limitations that this thesis had to face due to the circumstances and their possible effects on the research. Concerning the sample, the combination of a short timeframe of the thesis and the circumstances due to the Corona-crisis affected the ease of contacting a large and heterogenous sample. The possible consequences of having a relatively small and homogenous sample for the validity of this thesis are described in section 7.1 (7.1 Validity of the research). However, these limitations could affect other aspects of the research as well. The results in chapter 6 (6.4 Visible relationships between motivations) show that certain relationships are not visible in the collected data. This does not necessarily mean that these relationships are absent; the invisibility of the relationships could be due to the relatively small number of interviews. This could be the case for the generation of codes and themes as well. Absence of theory-driven codes and themes, as well as of new data-driven themes and codes, could be due to the small number of interviews.

As stated in the section about validity, the thematic analysis may have issues concerning reliability. Possibilities achieving higher reliability of the analysis could be peer debriefing (to see if another researcher interprets the data similarly) or member checking (to see if the participant agrees with the

researcher's perceptions of the data), as described by Nowell et al. (2017). However, due to the individual approach of this thesis, having a second coder is not possible. Also, due to the time constraints, it was not feasible to check the interpretations of the data with the participants.

## 8. CONCLUSION

This chapter will firstly present conclusions drawn from the results and the discussion to answer the research question. Secondly, three recommendations are made for future research.

### 8.1 Answering the research question

Besides the motivational factors present in the proposed research model by Schikofsky et al. (2020), the results derived from the data and analysis suggest two other motivations to be present for older age groups in rural areas to use MaaS. These are perceived comfort and clear communication, and both factors have been mentioned in earlier research to be of importance for older people in terms of transportation. These data-driven motivations are therefore important to acknowledge when adoption of MaaS by older age groups in rural areas is considered. Notable is that safety did not form a motivation for the target group to use MaaS in the results, however, the results cannot confirm if this is really absent in the motivations of the target group. It should be recognized that in line with the discussion of the research, it is not possible to draw firm conclusions from the results for the whole target group, due to the limitations and the explorative character of the research. Therefore, the results can solely suggest the motivations to be present for the target group to use MaaS. Next to exploring the motivations to use MaaS, the findings were compared to the proposed research model by Schikofsky et al. (2020). As Schikofsky et al. (2020) mentioned in their discussion, it could be valuable to investigate specific target groups as differences may occur. This thesis indeed found differences between the motivations proposed in the model and the ones present for older age groups in rural areas. Therefore, the results suggest that the proposed research model is elaborated, but not exhaustive enough to be usable for the target group. Accordingly, this thesis recognizes the importance of exploring the motivations of a specific target group in order to be able to address its specific needs.

### 8.2 Recommendations

Derived from the conclusions of this thesis I will now present three recommendations for future research. Motivations for older age groups in rural areas to use MaaS were here explored with a qualitative research. However, the degree to which the motivations for the target group actually influence the behaviour to use MaaS is not validated through a quantitative research method. It would therefore be interesting to investigate the influential power of each motivations on the behaviour to MaaS by the target group, as the researchers Schikofsky et al. (2020) did for their proposed research model. This would contribute to a better understanding of the influence of the motivations for older age groups in rural areas to use MaaS. Future research could formulate hypotheses for all motivations and then validate these with quantitative research methods. Inspired by the research of Schikofsky et al. (2020), relationships between motivations can also be validated this way. Having this knowledge is valuable for distinguishing between the influence of motivational factors to use MaaS and creating tailored policies directed to a desired goal concerning the use of this transport concept.

As stated in the discussion (7. Discussion), the Netherlands differs from other European countries in motorway and railway density. Living in rural areas considered in this thesis could therefore differ from

living in rural areas elsewhere, in terms of transportation. To gain a better understanding of the motivations to use MaaS of people in rural areas, it is valuable to conduct a similar explorative qualitative research in rural areas other than in the Netherlands. This type of research focussed in more poorly connected rural areas could provide results that are more representative for rural areas outside the Netherlands.

The results of this thesis suggest that the proposed research model by Schikofsky et al. (2020) is elaborated, but not exhaustive enough to be usable for the target group. As stated earlier in this document, the importance of focussing on the adoption of MaaS by different specific target groups is recognized (Fioreze et al., 2019; Schikofsky et al., 2020). The results of this thesis demonstrate that this is indeed of importance as differences occurred between the motivations in the proposed research model and for the target group. Future research should therefore focus on extending knowledge on motivations to use MaaS by other specific target groups. This would contribute to a more thorough understanding of the motivation to use MaaS.

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# APPENDIX 1: SUMMARIZING TABLES

## A.1.1 Summarizing table participant 1

The following table presents the summarizing table of participant 1.

Theory-driven codes    **Theory-driven themes**  
 Data-driven codes    **Data driven themes**

	P1	Quotes P1
<b>Perceived usefulness</b>		
Perceived efficiency and performance of using MaaS	P1 perceives MaaS as flexible, but not compared his current situation. For others it seems a flexible transport concept.	“I know some elderly that do not have their own transport modes and want something more flexible.” “[With MaaS] I can say, like, get to my door half an hour in advance. So, that is flexible, that is freedom in another way.”
Perceived rational and functional benefit	P1 perceives MaaS as functional, but not compared to his current situation. In case he would not be able to drive his car, he thinks MaaS could help him getting to a destination better.	“In case I will ever be in need [of another way of traveling], then it is of course a different story.” “If I would be in such a situation, [MaaS] would help me [traveling].”
Expected economic benefit	n/a	
<b>Perceived ease of use</b>		
Easy access to mobility	P1 perceives MaaS as a concept with easy access to mobility.	“That I can say to a website: I want to be in Roosendaal at 3:15 PM, and then, at the right moment, a car arrives at my door and fixes it. That is what I can imagine.”
Easy operation of the MaaS platform/app	P1 perceives the use of a platform/app as easy for himself, but also has concerns about the use of apps by people older than himself.	“That I can say to a website: I want to be in Roosendaal at 3:15 PM, and then, at the right moment, a car arrives at my door and fixes it. That is what I can imagine.” “For me personally, yes, I am an internet animal, I have an ICT-background, so it has few secrets.” “[...] namely that target group, and then I’m talking about the older people, is hard to get on the internet.”
<b>Hedonic motives</b>		
Anticipated enjoyment associated with the use of MaaS	n/a	
Emotional benefit	n/a	
Fun	n/a	

Pleasure	n/a	
Relaxation	n/a	
<b>Habit congruence</b>		
Mental transfer from associated habits (in other consumption domains)	n/a	
Typical usage patterns	P1 makes use of internet a lot. P1 thinks that this makes it easy for him to use a MaaS platform.	“For me personally, yes, I am an internet animal, I have an ICT-background, so it has few secrets.”
Abstract familiarity	P1 has an ICT-background.	“For me personally, yes, I am an internet animal, I have an ICT-background, so it has few secrets.”
<b>Perceived comfort</b>		
<i>Perceived comfortable social contact</i>	n/a	
<i>Comfortable design of transport mode</i>	P1 thinks it is important not having to sit packed with other people.	“[My car offers me] [...], not having to sit packed with other people.”
<b>Clear communication</b>		
<i>Communication about data practices</i>	P1 mentions the importance of explaining the security of data practices of MaaS.	“At least explain [elderly] that the data are completely anonymous and not being transferred to others.”
<i>Communication about benefits</i>	n/a	
<i>Communication concerning the use of the MaaS platform</i>	P1 thinks that good communication is important for older age groups to use a concept like MaaS.	“[My father] would want to call somebody [...]. He wants a voice; he wants to hear somebody. [...] So, I suppose, if this app wants to be successful, focused on those elderly, you need an entrance by telephone. A real person, I think.”
<b>Autonomy/Competence</b>		
Individual choices based on preferences	n/a	
Associated freedom to choose individual mobility	P1 thinks MaaS could help people to have more freedom in traveling. In his current situation, P1 prefers his car as it gives him more freedom, which is something he values.	“[With MaaS] I can say, like, get to my door half an hour in advance. So, that is flexible, that is freedom in another way.” “[...] at my age, freedom and mobility is crucial.” “[My car offers me] total freedom, self-determination, and not having to sit packed with other people.”
Shaping daily mobility	It is important to P1 that he is able to shape his daily mobility efficiently. He thinks that MaaS could enable people to have more flexibility in shaping mobility.	“That when I have to be at 8 in Roosendaal, I don’t have to leave at 5:30 already.” “[...] they could say to one input address, like, I want to be there at this time, and fix it.”
Feeling of confidence	n/a	
Feeling of control	It is very important to P1 that he has control over his own mobility.	“For me, transport is something I want to keep in control.”
Self-perceived competence and skills	n/a	

Personal facilities	n/a	
Confidence	n/a	
<b>Relatedness</b>		
Feeling of being connected to likeminded people	n/a	
Feeling near to a social peer group	Not important for P1.	“It strikes me that when I look around in my own age group, I feel as I am the rebel sometimes.” “As long as I have my own car available, I wish everyone fun with [MaaS], but it won’t change anything for me.”
<b>Data practices</b>		
Data privacy, security and usage	No problem for P1. However, there are concerns that people older than himself might worry about this.	“They can know where I am and where I go, no problem.” “At least explain [elderly] that the data are completely anonymous and not being transferred to others.” “I do expect that many elderly people have some kind of, almost an innate fear for this.”
<i>Data practices perceived as normal</i>	P1 perceives data practices as normal, because this is already happening with other things as well.	“No, no problem, because that gets documented now anyways.” “Even when you buy a ticket at the cinema, they know that I’ve been there, so, I don’t worry about that at all.”
<i>Perceived benefit of data practices</i>	n/a	
<b>Environment-related motives</b>		
<i>Perceived environmental benefit</i>	P1 perceives environmental benefit as very small or absent.	“I think that the effect is so small, it will disappear in the rounding differences.”
<i>Importance of environment-related motives</i>	Environment-related motives are not decisive for P1.	“Even if [MaaS] would produce provable environmental benefits, it would not outweigh what I told you before, the feeling of having control.” “[...], there are more important things in life. [Environment-related benefits] are rarely decisive for me.”
<b>Personal privacy</b>		
<i>Importance of personal privacy when traveling</i>	P1 prefers his car rather than public transport because of his personal privacy.	“[My car offers me] [...], not having to sit packed with other people.”

## A1.2 Summarizing table participant 2

The following table presents the summarizing table of participant 2.

Theory-driven codes    **Theory-driven themes**

Data-driven codes    **Data driven themes**

	P2	Quotes P2
<b>Perceived usefulness</b>		
Perceived efficiency and performance of using MaaS	P2 mentions the importance of having a good connection within MaaS and time efficiency.	“[...] it calls for a good connection, it also calls for the time that is also important.” “It should not have to take an hour or an hour and a half to get from place A to B.”
Perceived rational and functional benefit	P2 thinks MaaS would complement the transportation system, especially in urban environments.	“I think [MaaS] is a good addition.” “[...] our son lives in Amsterdam; there [MaaS] would have even more impact and also a chance at a short term.”
Expected economic benefit	P2 perceives MaaS as having an economic benefit in cities, compared with cars and the high parking fees.	“[...] in the city, due to high parking fees, then you could work with public transport, and with that the possibility of renting a bike and traveling in this way, or with a taxi or whatever form.”
<b>Perceived ease of use</b>		
Easy access to mobility	n/a	
Easy operation of the MaaS platform/app	P2 thinks MaaS could be easier to use than having to look into many different time schemes.	“Look, if I have to browse through time scheme, and I can make the [MaaS] app do that for me, yes, that is easy if you put it that way. [...]. I do not feel like walking around with some A4 pages in my pocket to just read all those times and connections again.”
<b>Hedonic motives</b>		
Anticipated enjoyment associated with the use of MaaS	n/a	
Emotional benefit	n/a	
Fun	n/a	
Pleasure	P2 thinks it is pleasant when public transport is set up in a comfortable way.	“I think it is pleasant when I sit in the train and I have enough space and opportunities to sit, and some kind of privacy, I like that.”
Relaxation	P2 thinks using public transport is a relaxed mode of transport.	“Yes, a relaxed way to be transported like this.”
<b>Habit congruence</b>		
Mental transfer from associated habits (in other consumption domains)	P2 mentions that he often likes to work with new digital technologies.	“Wherever there is something digital, I am often the first in line.”
Typical usage patterns	n/a	

Abstract familiarity	P2 likes to use digital technologies, therefore thinks it would be easy to use an app for MaaS.	“Because I like to be in the digital world a lot.”
<b>Perceived comfort</b>		
<i>Perceived comfortable social contact</i>	It is important for P2 that the environment in the transport mode is quiet.	“[...] a quiet environment [...]”
<i>Comfortable design of transport mode</i>	P2 mentions the importance for a comfortable design of the transport mode.	“I think good seating, a quiet environment, not too crowded... Like you mentioned, comfortable, yes, that are requirements.” “I think it is important that [a transport mode] is well equipped.” “I find comfort important, [...]”
<b>Clear communication</b>		
<i>Communication about data practices</i>	n/a	
<i>Communication about benefits</i>	n/a	
<i>Communication concerning the use of the MaaS platform</i>	n/a	
<b>Autonomy/Competence</b>		
Individual choices based on preferences	n/a	
Associated freedom to choose individual mobility	n/a	
Shaping daily mobility	P2 does not mind having to choose a certain time to use public transport.	“Look, when I travel with public transport, I choose to be on the road at a certain time, and I know where I arrive. That is a conscious choice.”
Feeling of confidence	n/a	
Feeling of control	n/a	
Self-perceived competence and skills	n/a	
Personal facilities	n/a	
Confidence	n/a	
<b>Relatedness</b>		
Feeling of being connected to likeminded people	n/a	
Feeling near to a social peer group	Others using MaaS is not a reason to use MaaS for P2.	“No, [others using MaaS] is not a reason for me to then use MaaS as well.”
<b>Data practices</b>		
Data privacy, security and usage	No problem for P2.	“No, I don’t have a problem with [data practices].”
<i>Data practices perceived as normal</i>	n/a	

<i>Perceived benefit of data practices</i>	P2 thinks that data practices are important for the future and could benefit the functionality of organisations.	“I think it is important in the future that organisations like this can benefit from [saving data]. Based on data, matters can be organised better [...]”
<b>Environment-related motives</b>		
<i>Perceived environmental benefit</i>	P2 thinks effects on the environment are important. He acknowledges the benefits of electric cars for example.	“Also, very important, that attention is being payed to the environment, absolutely. Look, it is not for nothing that there are more electric forms of driving or transporting in the future. Yes, I think that is important.”
<i>Importance of environment-related motives</i>	P2 thinks paying attention to the environment is important, but this is not a reason to use MaaS. Being able to move freely is more important to P2.	“At this moment, no, less. I think it is important that I can transport myself well, in the first place.” “[Environmental benefit] is a pleasant side effect.”
<b>Personal privacy</b>		
<i>Importance of personal privacy when traveling</i>	P2 thinks it is pleasant when there is enough personal privacy in public transport. He also thinks that this is important when trying to get more people to use public transport.	“[...] and some kind of privacy, I like that.” “I like not having to sit close to each other. I also say that [public transport] has to be set up like that, because when you want to get more people to use public transport, you should watch out for that as well.”

### A1.3 Summarizing table participant 3

The following table presents the summarizing table of participant 3.

Theory-driven codes    **Theory-driven themes**

Data-driven codes    **Data driven themes**

	<b>P3</b>	<b>Quotes P3</b>
<b>Perceived usefulness</b>		
Perceived efficiency and performance of using MaaS	Traveling straight to the destination is important for P3.	“I have the feeling that I like to travel straight to my destination. [...]. I don’t know how it works with [MaaS], but traveling kind of straight to your destination, is of course very nice.”
Perceived rational and functional benefit	P3 thinks MaaS could help him traveling when he would not be able to drive his car anymore.	“If [MaaS] is possible, and if I cannot drive the car in a couple of years, this would be of course very pleasant, because the bus lines here are also cancelled.” “In the former times, you had to buy a ticket or something for everything. [...], but if everything is possible with one card or one chipcard... If you order a taxi and pay or arrange it with that thing, that is of course very simple.”



Expected economic benefit	P3 perceives economic benefit as important.	“It seems, if it is affordable, that [MaaS] could have a future, let’s put it that way.”
<b>Perceived ease of use</b>		
Easy access to mobility	P3 thinks the concept of MaaS seems easy to access transport modes.	“Then, this system seems pleasant to me. That I can say, I have my app and I walk to the bus and I can just get on the bus. And somewhere waits a taxi or a bicycle.”
Easy operation of the MaaS platform/app	Using an app may be difficult due to P3’s skills, but he also thinks learning how to use the app would be feasible. The app should be easy to find, and it should be feasible to learn how to use it, according to P3.	“I have also such a telephone now. [...] If it is necessary, I can learn how to use it and I will. And otherwise, there are always people who want to help.” “[...] I don’t speak English; I don’t have a feeling with it. I have difficulties with these words.” “[It is important] that it is easy to find. And that if I must use it, it is feasible to learn. It might take a little longer, but it will be fine.”
<b>Hedonic motives</b>		
Anticipated enjoyment associated with the use of MaaS	n/a	
Emotional benefit	n/a	
Fun	P3 perceives combining transport modes to cover the whole trip as fun.	“[The MaaS concept] would be of course very nice.” “We were on vacation [...], and there were also rows of bicycles. [...]. And I believe they could also lock it again at another location. In itself quite easy and fun.”
Pleasure	P3 thinks it is pleasant to use all kinds of transport modes.	“It seems pleasant to me, using everything just like that.”
Relaxation	P3 thinks it is pleasant to not drive himself sometimes.	“We have family in [...], and then I am also happy if I can drive with them, that I don’t need to drive myself. So, it is pleasant to not drive myself.”
<b>Habit congruence</b>		
Mental transfer from associated habits (in other consumption domains)	n/a	
Typical usage patterns	n/a	
Abstract familiarity	n/a	
<b>Perceived comfort</b>		
<i>Perceived comfortable social contact</i>	P3 shortly mentions that he is fine with public transport modes when other users behave normal.	“And if there are some more other people sitting there as well... well, if they don’t bite, then it’s okay.”
<i>Comfortable design of transport mode</i>		
<b>Clear communication</b>		
<i>Communication about data practices</i>	n/a	

<i>Communication about benefits</i>	n/a	
<i>Communication concerning the use of the MaaS platform</i>	For P3, it is important that the MaaS platform is easy to find and easy to learn how to use.	“[...] I don’t speak English; I don’t have a feeling with it. I have difficulties with these words.” “[It is important] that it is easy to find. And that if I must use it, it is feasible to learn. It might take a little longer, but it will be fine.”
<b>Autonomy/Competence</b>		
Individual choices based on preferences	n/a	
Associated freedom to choose individual mobility	n/a	
Shaping daily mobility	P3 perceives shaping his mobility as important.	“[With my car] I can just say, like, I want to go right now, and I get into the car and I can go. If you want to have a shared car, you do have to order such a thing in some way.”
Feeling of confidence	n/a	
Feeling of control	n/a	
Self-perceived competence and skills	n/a	
Personal facilities	n/a	
Confidence	n/a	
<b>Relatedness</b>		
Feeling of being connected to likeminded people	P3 does not mind if others would use MaaS.	
Feeling near to a social peer group	P3 does not mind if others would use MaaS.	
<b>Data practices</b>		
Data privacy, security and usage	No problem for P3.	“I don’t have anything to hide when I travel somewhere.” “I do not worry about [...] my private data, I mean.”
<i>Data practices perceived as normal</i>	P3 perceives data practices as normal.	“It is what it is. I mean, when I buy a train ticket, they can also see that I bought a train ticket in my bank statements.”
<i>Perceived benefit of data practices</i>	n/a	
<b>Environment-related motives</b>		
<i>Perceived environmental benefit</i>	n/a	
<i>Importance of environment-related motives</i>	P3 thinks the environmental benefits sound positive, but it would not be decisive for using MaaS.	“In itself a good idea. But you have to give up the freedom you have to go wherever you want [with your own car], and personally, I think that is a bit difficult.”
<b>Personal privacy</b>		
<i>Importance of personal privacy when traveling</i>	No problem for P3.	“Oh no. No, I don’t have problems with [personal privacy when traveling].”

		<p>“I don’t mind if people in general can check whether I have been in a bus or not. And if there are some more other people sitting there as well... well, if they don’t bite, then it’s okay.”</p> <p>“I don’t mind getting in a bus or taxi, even when there are other people in it too.”</p>
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## A1.4 Summarizing table participant 4

The following table presents the summarizing table of participant 4.

Theory-driven codes    **Theory-driven themes**

Data-driven codes    **Data driven themes**

	P4	Quotes P4
<b>Perceived usefulness</b>		
Perceived efficiency and performance of using MaaS	n/a	
Perceived rational and functional benefit	P4 thinks MaaS could help to get to a destination more easily.	“[With using current public transport] I still need to be picked up from or dropped off at the station, and that is a disadvantage. There should be a solution for that, that could be MaaS, which could get you to the station.”
Expected economic benefit	P4 thinks it is important that it is economically beneficial.	“I think they should directly add an overview of the costs, and then see how much more beneficial it is compared to owning a car.” “I don’t know if [MaaS] is cheaper, but I think so.”
<b>Perceived ease of use</b>		
Easy access to mobility	n/a	
Easy operation of the MaaS platform/app	P4 thinks using an app for MaaS would be no problem. He also thinks others would be able to learn how to use it easily.	“For myself, [using an app] would be no problem.” “I see the possibilities, especially in these times, how fast people can learn [how to use an app].” “And I think not only for myself, but also people who are not familiar with an app, it would be easy to learn.”
<b>Hedonic motives</b>		
Anticipated enjoyment associated with the use of MaaS	n/a	

Emotional benefit	n/a	
Fun	P4 thinks the use of public transport could be more sociable than using your own car.	“At a certain moment, [public transport modes] could be even more sociable, if you are with more people.”
Pleasure	n/a	
Relaxation	n/a	
<b>Habit congruence</b>		
Mental transfer from associated habits (in other consumption domains)	n/a	
Typical usage patterns	n/a	
Abstract familiarity	P4 is already familiar with using apps.	“I am already familiar with [using an app].”
<b>Perceived comfort</b>		
<i>Perceived comfortable social contact</i>	n/a	
<i>Comfortable design of transport mode</i>	n/a	
<b>Clear communication</b>		
<i>Communication about data practices</i>	n/a	
<i>Communication about benefits</i>	P4 thinks it is important for the adoption of MaaS that the concept informs people about its economic benefits.	“I think they should directly add an overview of the costs, and then see how much more beneficial it is compared to owning a car. Like, that [MaaS] has a kind of price per km compared to the price per km when you own your car [...].” “I think [economic benefit] is especially important to clarify for the success [of MaaS].” “If I would run [MaaS] myself, I would pay a lot of attention to this. That it is very transparent, and how much cheaper it is relatively, [...]. I don’t know if it is cheaper, but I think so.”
<i>Communication concerning the use of the MaaS platform</i>	n/a	
<b>Autonomy/Competence</b>		
Individual choices based on preferences	Being able to have a choice in using preferred mobility is important to P4.	“Because you have a choice. You could choose individual modes, but also shared/public modes. So, that way I think the independency persists.” “Now I will use the car for larger distances, but there could be a time that I will not be able to do this anymore. And then there are other possibilities.” “[When planning a trip, it is important] to have the possibility to choose at that moment what you want, public transport or a car of a bicycle or another transport mode.”

		“So, if the weather is good, I will also be able to cycle a larger distance, but if it is bad weather, I would want to have another possibility.”
Associated freedom to choose individual mobility	P4 thinks MaaS will give the opportunity to choose preferred mobility.	“Because you have a choice. You could choose individual modes, but also shared/public modes. So, that way I think the independency persists.” “[When planning a trip, it is important] to have the possibility to choose at that moment what you want, public transport or a car of a bicycle or another transport mode.”
Shaping daily mobility	It is important to P4 to be free in shaping daily mobility.	“I think that it is also important for the independency to think, ‘well, I could go somewhere right now’, and then there should be a transport mode available.” “Imagine that MaaS would work, if I think in the morning, ‘well, I could go to Den Haag’, it should be possible with the app immediately. You should not have to reserve that days ahead.”
Feeling of confidence	n/a	
Feeling of control	n/a	
Self-perceived competence and skills	n/a	
Personal facilities	n/a	
Confidence	n/a	
<b>Relatedness</b>		
Feeling of being connected to likeminded people	n/a	
Feeling near to a social peer group	P4 thinks if he sees other people using MaaS easily, it may influence his choice to use MaaS.	“It would have some kind of herd behaviour effect then. I take part in this myself as well. When I see that [MaaS] is easy for others, I would join that more easily as well, I think.”
<b>Data practices</b>		
Data privacy, security and usage	No problem for P4. He also thinks that these kinds of apps probably have ways to guarantee privacy.	“Yes, I know of the problems concerning privacy sensitivity. I would not have many problems with that myself.” “[...], such an app would probably have to guarantee privacy in some ways.”
<i>Data practices perceived as normal</i>	n/a	
<i>Perceived benefit of data practices</i>	n/a	
<b>Environment-related motives</b>		
<i>Perceived environmental benefit</i>	P4 thinks MaaS would be beneficial for the environment.	“MaaS would of course also include driving cars, but the total [of emissions] would decrease.”

<i>Importance of environment-related motives</i>	P4 thinks the environment-related benefits could contribute to the choice of using MaaS, if it works well.	“[...] but I think when there are positive experiences with MaaS, I would like to use it.”
<b>Personal privacy</b>		
<i>Importance of personal privacy when traveling</i>	P4 has no problems with personal privacy when traveling, because he thinks he has control over it.	“I can shape this privacy myself as well. When I am sitting in the train and I want to make a phone call, I should not do that at that moment. So, you have a lot of influence on that yourself as well.”

## A1.5 Summarizing table participant 5

The following table presents the summarizing table of participant 5.

Theory-driven codes    **Theory-driven themes**  
 Data-driven codes    **Data driven themes**

	P5	Quotes P5
<b>Perceived usefulness</b>		
Perceived efficiency and performance of using MaaS	Having a good connection and short waiting times is very important to P5, also within MaaS.	<p>“[Good connection] is crucial. That is at least my experience [...], if you have to wait in transit [...], it is already a lot less attractive.”</p> <p>“Look, if you have such a concept that you can immediately go somewhere, without all those transit moments that take a long time, because a transit moment is not a bad thing as long as it does not take too much time, then you could say that you could easily choose the MaaS concept over the car, maybe.”</p> <p>“You’re depending a lot on, if I want to go from A to B, on the amount of time that is needed to travel. If that is too much, your interest to use [a transport mode] is a lot less.”</p>
Perceived rational and functional benefit	P5 thinks that, especially in rural areas, MaaS could offer new possibilities for travelling. However, it should be useful in terms of doing groceries as well.	<p>“Well, I think, especially for rural areas, [...], [MaaS] could offer new possibilities.”</p> <p>“Then there is the question: when you use the concept of MaaS, how would you [bring your groceries]?”</p> <p>“The amount of baggage that you carry with you and that you expect to bring home, is also important in choosing what you want to use.”</p>
Expected economic benefit	n/a	
<b>Perceived ease of use</b>		

Easy access to mobility	Easy access of the transport mode should be payed attention to according to P5, because otherwise older people may not feel welcome.	“Especially the easiness of accessing a transport mode and such plays an important part [in feeling welcome].”
Easy operation of the MaaS platform/app	P5 thinks he would be able to use the MaaS app.	“I think I would use [the MaaS app].”
<b>Hedonic motives</b>		
Anticipated enjoyment associated with the use of MaaS	n/a	
Emotional benefit	n/a	
Fun	n/a	
Pleasure	n/a	
Relaxation	n/a	
<b>Habit congruence</b>		
Mental transfer from associated habits (in other consumption domains)	n/a	
Typical usage patterns	P5 used to use shared bicycles. He thinks that this experience may contribute to the ease of use in the future.	“Yes, I know of that concept, because I used to use that in Zwolle as well. I arrived at central station in Zwolle and then I took a NS-bicycle and then I cycled to work [...].” “Yes, [being familiar with shared bicycles] would contribute to [the ease of use such a concept].”
Abstract familiarity	n/a	
<b>Perceived comfort</b>		
<i>Perceived comfortable social contact</i>	P5 thinks it is important in public transport and MaaS that people act respectfully towards each other, even though older people are often a bit slower.	“When you are travelling with other people, and you’re looking at older people versus [...] the younger people, [...], it should be respectful.” “There should not occur moments where people do not feel welcome in the transport mode because they are a little slower than the others.”
<i>Comfortable design of transport mode</i>	For P5 it is important that there is enough space for bringing baggage.	“I would find that important, especially when you cannot drive your car anymore, it is just important that there is space for [baggage] as well.”
<b>Clear communication</b>		
<i>Communication about data practices</i>	It should be clarified that MaaS guarantees data privacy, according to P5.	“Such an app should guarantee that only the transport companies can follow you.”
<i>Communication about benefits</i>		

<i>Communication concerning the use of the MaaS platform</i>		
<b>Autonomy/Competence</b>		
Individual choices based on preferences	Having many choices with MaaS could make sure that there is always something that suits you best, according to P5.	“Well, [being able to use all kinds of different modes] would be attractive. That you can choose all kinds of different possibilities, that there will always be something that exactly suits you.”
Associated freedom to choose individual mobility	P5 values freedom when planning a trip.	“[Having freedom when planning a trip is important because] you can choose your own times [to travel].”
Shaping daily mobility	Having freedom also helps to shape P5’s own daily mobility.	“[Having freedom when planning a trip is important because] you can choose your own times [to travel].”
Feeling of confidence	n/a	
Feeling of control	n/a	
Self-perceived competence and skills	n/a	
Personal facilities	n/a	
Confidence	n/a	
<b>Relatedness</b>		
Feeling of being connected to likeminded people	n/a	
Feeling near to a social peer group	Not important to P5.	“[Knowing others that use MaaS] would not influence me.”
<b>Data practices</b>		
Data privacy, security and usage	P5 has a light concern about data privacy.	“I have light concerns about [data practices]. If malicious people could follow you, it would not be okay of course. [...] But a hacker should not be able to follow you. Because then you could get examples, like, that people are away from home and thieves can just make their moves.”
<i>Data practices perceived as normal</i>	n/a	
<i>Perceived benefit of data practices</i>	n/a	
<b>Environment-related motives</b>		
<i>Perceived environmental benefit</i>	n/a	
<i>Importance of environment-related motives</i>	P5 thinks environmental benefits could influence the choice to use MaaS, if it meets the same efficiency as a car. However, if MaaS is way slower than using an owned car, environment-related motives are not decisive.	“We should all pay a little more attention to the environment. And I can imagine that this could be a consideration to use for example that concept of MaaS.”



	P5 also thinks that environment-related motives may become more decisive in the future.	<p>“If there are major differences in time, this would outweigh [the environmental benefits].”</p> <p>“I have to say, the environmental benefits do not play a very dominant role in your considerations, but I can imagine, that this would be addressed more in the future. So, I can imagine that this would then also be considered. In my own considerations as well.”</p>
<b>Personal privacy</b>		
<i>Importance of personal privacy when traveling</i>	n/a	

