

Mobility as a Service as a travel mode for business trips

Exploratory study to understand what needs to be done for Radboud University and Radboudumc employees to be willing to use Mobility as a Service for their domestic business trips



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Title Page

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Front page images: Shared mobility options on campus (Source: Own pictures).

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Abstract

Key words: *Mobility as a Service, business trips, smart mobility, transport mode choice*

Mobility as a Service (MaaS) is still a very new concept and as such, there are multiple issues concerning MaaS that still need to be studied. One of these issues is the level of MaaS acceptance and understanding how that level can be increased. Aiming to contribute to the knowledge about MaaS acceptance, the goal for this study is to understand what is needed for people to be willing to start using MaaS. In this case specifically, the focus is on the use of MaaS for business trips of Radboud University and Radboudumc employees.

To be able to explore the means and services that are necessary to create this willingness, the following research question was used: *“What services are needed for Radboud University- and Radboudumc employees to be willing to use one central interface which carries out every aspect, such as planning, booking, and payment, of their domestic business trips?”* This research question was divided into sub-questions to create a framework for the execution of the study.

This was done through a literature review of the key concepts and semi-structured interviews with Radboud employees as the use of semi-structured interviews would make it possible to grasp every aspect that is needed to create the willingness to use MaaS. These interviews were transcribed and the transcripts were used to analyse the qualitative data. The analysis led to the understanding that MaaS needs to be able to compete with other transport modes in terms of efficiency to be successful. For this to be possible, Radboud and the MaaS-platform need to create a fully integrated network of mobility options, both on campus and throughout the country. Besides, Radboud needs to create support for MaaS among employees, which can best be done through a joint communication strategy for both Radboud University and Radboudumc.

Based on the opinions and preferences of the employees, it is recommended to implement MaaS at Radboud in phases. Further research can, case-specifically, be done to understand the best way to shape the first phase of the implementation of MaaS. Theory related, further research can be done to understand whether efficiency and accessibility are the most important aspects in the transport mode choice for business trips and to expand the knowledge on the use of MaaS for business trips.

Preface

Dear reader,

In front of you lies my Master's thesis called 'Mobility as a Service as a travel mode for business trips'. The research for this thesis was conducted among employees of Radboud University and Radboudumc on behalf of the Occupational Health and Environment Service (Arbo- en Milieudienst). This thesis was written to graduate from the Spatial Planning Master's programme.

For this research, I was supervised by prof. dr. Henk Meurs from Radboud University and drs. Carlo Buise from Radboudumc, whom I would like to thank for the pleasant cooperation during the process of writing my thesis. Whenever I had a question I could easily reach out to them and discuss the problem I was having. I appreciate the easy and educational supervision that I experienced during this period.

Furthermore, I would like to thank all the employees that voluntarily contributed to this research through the interviews that were held with them and the employees that made it possible to reach out to the respondents. Without them, it would have been impossible to bring this process to a good end.

I hope you enjoy reading this thesis.

Daan Ackema

Nijmegen, April 2021

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1. Introduction

1.1. Research context and research problem

Starting the Master Thesis period, the idea for this research was to contribute to a Mobility as a Service-pilot called 'SLIM Nijmegen'. The MaaS (Mobility as a Service) pilot 'SLIM Nijmegen' is part of SCRIPTS, which is an abbreviation for 'Smart Cities Responsive Intelligent Public Transport Systems'. SCRIPTS is a project which started in 2017 and was originated by knowledge institutions – TU Delft, TU Eindhoven, Radboud University Nijmegen, and Hogeschool Arnhem Nijmegen – in combination with several governments and private parties (Meurs & Van Oort, 2018). In short, the goals of the SCRIPTS project are fivefold: developing a model system to predict the demand for hybrid public transport systems, developing models for the design of such systems, developing an evaluation framework regarding the implementation of such innovations, creating a series of pilots and showcases, and networking with international networks to discuss strategies and solution (Radboud University Institute for Management Research, n.d.). The SCRIPTS project is funded by the VerDuS SURF (which stands for 'Smart Urban Regions of the Future') knowledge program, which is a collaboration between the Ministry of Infrastructure and Water Management, the Ministry of the Interior and Kingdom Relations, the Ministry of Economic Affairs and Climate Policy, the NWO, Platform31, and the National Taskforce for Applied Research (NRPO-SIA) (VerDuS, n.d.; NWO, n.d.). The idea for the 'SLIM Nijmegen' pilot was for Radboud University- and Radboudumc employees to use MaaS for their domestic business trips for a certain period. For this, employees would use the 'GoAbout' app, which was the MaaS-platform for this pilot. During the pilot period, the employees would fill in different surveys through time, to see how their attitude toward MaaS would change, or would not change. This pilot was built on a previous study that took place from 2017 to 2019 named 'Monitoring- & Evaluatierapportage MaaS pilot SLIM Heyendaal' (Haanstra et al., 2019), which was not targeting business trips. However, due to the COVID-19 crisis, domestic business trips came to a halt during this pilot period, making the use of MaaS impossible. Because of this, the research idea had to be shifted towards the use of in-depth interviews with these employees, asking them what they would need Radboud to do for them to be able to use MaaS in the future. The research aim and methods will be discussed further later on.

Regarding the context of the research, there are many more MaaS pilots in the Netherlands, besides the 'SLIM Nijmegen' pilot, with different main research interests, such as accessibility within cities, sustainability, international boundaries, rural accessibility, and participation (Rijksoverheid, 2018). However, getting from pilots to a working business model and eventually creating a successful (inter)national MaaS platform is a very big challenge, for which a strong collaboration between the

government, the market and knowledge institutions is essential (Connekt Taskforce MaaS, 2017). Other central challenges with MaaS at the moment are the current lack of interest of people in using MaaS, creating a working business model, and technological concerns regarding the implementation of MaaS (MaaS Alliance, 2019).

Adding to the context of the research are the sustainability goals that both Radboud University and Radboudumc have published in recent years. Radboud University has a sustainability agenda with sustainability goals for the period from 2016-2020 (Deneer & van Gemert, n.d.), but also there are the Radboud Green Office and Radboud Centre for Sustainability Challenges (Radboud University, n.d.). Travelling does not play a big part in these sustainability goals set by the university and are mainly focused on the day to day commutes by students and employees (Deneer & van Gemert, n.d.). However, in the sustainability goals of the Radboudumc, transport takes a bigger place. Radboudumc wants to be a CO2 neutral organisation in 2030. Approximately 25% of the Radboudumc's CO2 footprint is caused by transport to and from Radboudumc (Radboudumc, n.d.). To become CO2 neutral concerning transport, a large shift has to be made from using private cars to the use of bicycles, public transport and shared mobility. Using MaaS for domestic business trips can be regarded as an effort to contribute to the goal of reaching CO2 neutrality. Besides these sustainability goals, both Radboud University and Radboudumc work together with ten other parties in an initiative called 'Duurzaam Bereikbaar Heyendaal', which should also lead to a reduction of CO2 emissions (Duurzaam Bereikbaar Heyendaal, n.d.). Furthermore, during the process of writing this thesis, it has become clear that Radboud aims to be CO2 neutral in all the traffic flows around campus by 2030, which should partly be achieved by creating a car-free campus (Radboud University, 2020).

The central challenge for this research is still to understand the (lack of) interest people have in using MaaS, but also taking it a step further, trying to understand what is needed to change this interest in MaaS, in this case specifically for Radboud

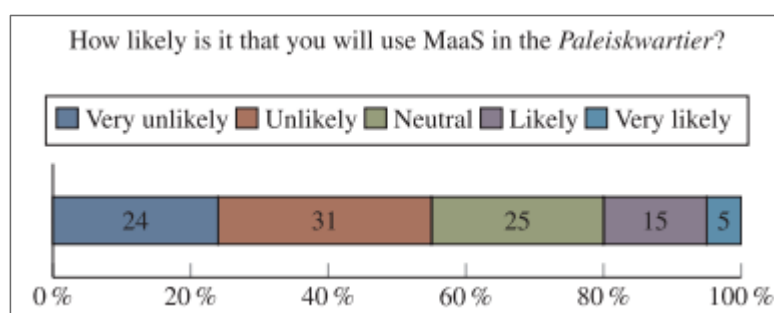


Figure 1 Likelihood of using MaaS in the Paleiskwartier (Source: Fioreze et al., 2019)

employees. The current lack of interest in MaaS is based on research by Fioreze et al. (2019), who researched the interest of people in using MaaS in the Paleiskwartier in Den Bosch. In this research, they came to understand that only 20% of the people in the Paleiskwartier was interested in using MaaS. Comparing that to the percentage of people that declared not to be interested, 55%, that is a

very big difference. The percentage of people interested in MaaS in the Fioreze et al. (2019) study in the Paleisquare is shown in figure 1.

Instead of researching whether the attitude towards MaaS would change over time when people use MaaS for that particular period, the goal is now to understand what people, in this case the Radboud employees, need to see changed to be willing to use MaaS instead of the travel modes they currently use.

1.2. Research aim

The central aim of the research is to understand what employees of Radboud University and Radboudumc need their employer to facilitate for them to be willing to start using a MaaS-platform when it comes to domestic business travels.

1.3. Research questions

The main research question builds on the before-mentioned research aim and is as follows: *“What services are needed for Radboud University- and Radboudumc employees to be willing to use one central interface which carries out every aspect, such as planning, booking, and payment, of their domestic business trips?”*

To be able to answer this main research question, several sub-questions will be discussed. These are the following:

- What is the current mode of transport used for business travels by the employees?
 - o What are the motives for the employees to choose a certain travel mode?
- What needs to be changed for employees to switch to using a MaaS-platform for their business travels?
 - o What are the employees’ motives in considering using MaaS for their domestic business trips?
- What services should Radboud University and Radboudumc offer to stimulate employees to use MaaS?
- What services should be included in a MaaS-platform according to the employees?

1.4. Societal relevance

The main real-life issue for which MaaS tries to provide a solution is the fact that private car ownership is very inefficient. There are three main reasons for this. First, cars are parked for over 90% of the time and in doing so occupy valuable land. Second, when driving, cars only carry 1,6 people on average while most cars can carry four to five people. And third, congestion costs are very high for economies (Bondorová & Archer, 2017). In recent years, Mobility as a Service has become a

very interesting alternative for private car ownership, with Dutch ministries investing money in the development of MaaS through the NWO and programs such as VerDuS SURF (NWO, n.d.). As was mentioned in the first paragraph, to understand the potential of MaaS, Dutch ministries and local governments are involved in a lot of pilots on MaaS (Rijksoverheid, 2018). These pilots are starting to obtain positive results, as the Zuidas pilot “Zuidas Mobility Experience” shows. In this pilot, employees were given €1000 for a month to spend on their daily commute, if they would not use their lease car for that month. After this month, 50% of the respondents chose the mobility budget option and 50% preferred their old lease car (Amsterdam Zuidas, 2018). This is much higher than the 20% that was likely to use MaaS in figure 1. However, this pilot contained only 11 respondents, which does not contribute to the validity of the study. Besides, in this pilot, the respondents were given €1000 and did not have to pay to use MaaS themselves. If they were to pay for it themselves, MaaS would need to be a better and cheaper alternative than the privately-owned car (Allen, 2019).

Interest in MaaS is also growing as it is another example of the increasingly popular sharing economy (Kózlak, 2020). With examples such as Airbnb, Spotify & Uber, it is clear that private ownership has become less important in recent years (Van de Weijer, 2020). Flexibility, availability and service have become more important, especially for young consumers (Rijksoverheid, n.d.).

Researching the use of MaaS for business trips could bring a shift in the way businesses pay for their employees’ travel expenses, could help to add to the sustainability of those businesses, and can show what those businesses need to take care of before their employees consider using MaaS for their business trips.

The growth of the sharing economy in combination with the inefficiency of private car use and the fact that not a lot of businesses use MaaS for their business travels yet shows the societal relevance for MaaS research. The combination with the scientific relevance discussed in the following paragraph creates the relevance for the research aim discussed in paragraph 1.2.

1.5. Scientific relevance

Over the last couple of years, there has been a lot of research on the concept of Mobility as a Service, but it is still a relatively new concept. Most of the research around MaaS can be divided into four main categories: governance and collaboration between different parties in supplying MaaS (Surakka et al., 2018; Meurs et al., 2020; Jittrapirom et al., 2018; Smith et al., 2018), creating a functioning business model (Polydoropoulou et al., 2020; Sarasini et al., 2017; Eckhardt et al., 2017), (un)likelihood of people using MaaS (Fioreze et al., 2019; Ho et al., 2018, Ho et al., 2020; Alonso-González et al., 2020), and technological concerns regarding the implementation of MaaS (Cottrill, 2020; Callegati et al., 2017). Before Covid-19, the main focus of this research would be the likelihood

of people using MaaS. This is still the case, however now, the focus will be on the use of MaaS for business trips and what is needed for people to use MaaS for their business travels, instead of researching what will happen if they use MaaS for a certain period.

Mulley (2017, p. 250) discussed the central issue with MaaS concerning the before-mentioned research problem and the societal relevance of this research: “Technology can clearly enable the MaaS solution but for MaaS to make a contribution to the sustainability of our cities, it needs to engender a paradigm shift not only in the way in which mobility is delivered but also in cultural appreciations and practical adoption of shared travel options. This shift is required for the majority of the population, not just the Millennials.”

Looking at the scientific relevance for this study, previous research around the likelihood of people using MaaS has mainly been focused on measuring people’s attitude towards MaaS or describing factors that influence the likelihood of people using MaaS (Fioreze et al., 2019; Alonso-González et al., 2020).

The scientific relevance can no longer be found in the unique way in which the pilot is set up, with people being obligated to use MaaS for a certain period, as people are unable to travel for their work due to Covid-19. This means that the current scientific relevance for this research can be found in the lack of research on the use of MaaS for business travels. This is a topic that has not been researched yet, and with the current developments in society, it can be interesting to see what Radboud University and Radboudumc employees think about the use of MaaS for their future business travels.

1.6. Reading guide

From here on forward, chapter 2 will provide an overview of the relevant concepts based on a literature review and will present the theoretical framework that will be used for this study. In chapter 3, the methodology for this study will be discussed, after which the results will be presented in chapters 4 to 6. Based on these results, the main research question will be answered in the conclusion in chapter 7. Chapter 8 will discuss the implications of this conclusion, the limitations of this study, and the recommendations for future research.

2. Literature review and theoretical framework

2.1. Literature review

This paragraph builds up from a discussion on the broad spectrum of smart mobility and its place in the smart city discourse towards a more specific discussion on Mobility as a Service as one of the developments within this spectrum and as the central concept within this research, with its different definitions and the concept's central challenges.

2.1.1. Smart mobility and the smart city paradigm

Since the last years of the twentieth century, with the rise of computer technologies, the relations between these technologies and the city were studied (Mora et al., 2017). This was first done by

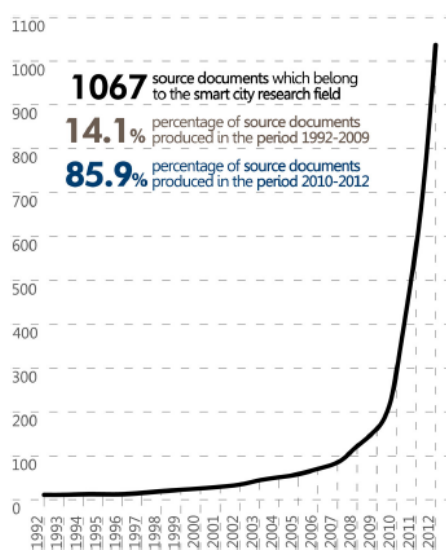


Figure 2 Growth of smart city research documents during the first two decades of smart city research (Source: Mora et al., 2017)

Graham & Marvin (1996) in their book 'Telecommunications and the city'. This book provided "the first critical and state-of-the-art review of the relations between telecommunications and all aspects of city development and management (Graham & Marvin, 1996, p. 1)." Since then, this relation has increasingly been studied and led to the rise of the smart city concept in research over the last three decades. Mora et al. (2017) described this growth with their graphic which is shown in figure 2, in which it becomes clear that during the first two decades on smart city research, the amount of 'source documents' used for Mora et al.'s (2017) research has been growing increasingly, especially from 2010 onwards.

Despite this recent growth in research on the smart city concept, a clear definition of the concept has not yet been developed. Defining the concept is difficult since researchers understand smart cities to consist of different aspects and characteristics. A lot of definitions, especially in earlier research, revolve around the use of ICT in cities, but this is hardly the only aspect defining a smart city (Caragliu et al., 2011; Albino et al., 2015). Albino et al. (2015) argue that the lack of a sufficient definition is due to the fact that researchers use the term 'smart city' in two different ways. They distinguish "hard domains" (such as buildings, mobility, and energy grids) in which the role of ICT plays a central role and "soft domains" (such as education, culture, and social inclusion) in which these technologies are less important.

Based on research by Giffinger et al. (2007), Caragliu et al. (2011) tried to include both domains and defined smart cities as follows:

“We believe a city to be smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance.”

- Caragliu et al., 2011, p. 70

This definition includes a lot of different characteristics of smart cities, such as ‘human and social capital’, ‘communication infrastructures’, ‘economy’, ‘quality of life’, ‘environment’, and ‘governance’. Looking at this definition, it becomes clear in which way it is built on previous research by Giffinger et al. (2007). In this research, six key characteristics of smart cities were defined. These

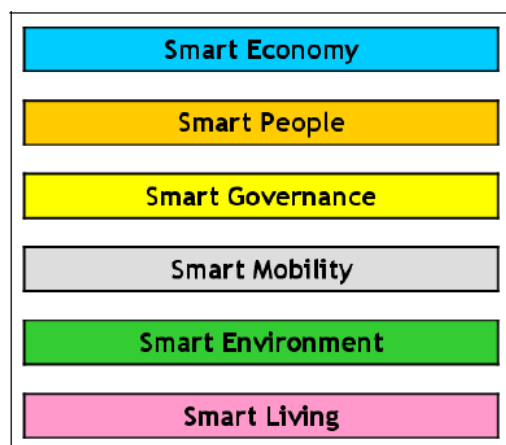


Figure 3 Six key smart city characteristics (Source: Giffinger et al., 2007)

six characteristics are widely understood to be very important in defining a smart city. The six characteristics are shown in figure 3. Giffinger et al. (2007) used these characteristics to measure the smartness of several European cities to create a smart city ranking. To be able to measure the different characteristics, they also defined 31 factors influencing the characteristics. These 31 factors were then influenced by 74 indicators. This way, Giffinger et al. (2007) created a pyramid of elements influencing the 6 key characteristics.

For this research, smart mobility is the most important characteristic in the smart city paradigm as Mobility as a Service is one of the core developments within the smart mobility discourse. The

factor	indicator
Smart Mobility	Local accessibility
	Public transport network per inhabitant
	Satisfaction with access to public transport
	Satisfaction with quality of public transport
	(Inter-)national accessibility
	International accessibility
	Availability of ICT-infrastructure
	Computers in households
Sustainable, innovative and safe transport systems	Broadband internet access in households
	Green mobility share (non-motorized individual traffic)
	Traffic safety
	Use of economical cars

Figure 4 Factors and indicators influencing smart mobility (Source: Giffinger et al., 2007)

factors and indicators, defined by Giffinger et al. (2007), influencing smart mobility can be seen on the left in figure 4. Smart mobility is, just like smart cities in general, defined in different ways. A very broad definition was proposed by Lyons (2018, p. 9), who defined

smart mobility as “connectivity in towns and cities that is affordable, effective, attractive and sustainable.” Lyons argues that ICT does not necessarily need to be part of the smart mobility paradigm. However, together with Giffinger et al. (2007), a lot of other scholars do believe that the use of ICT needs to be included in the definition of smart mobility.

Fourie et al. (2020, p. 163) argue that smart mobility “entails the coordinated use of technology to increase the quality and efficiency of mobility provision, while minimizing or reducing the space consumed and externalities generated by transportation supply.” The coordinated use is something that other scholars disagree with. In an ideal situation, the availability and use of smart mobility initiatives could be coordinated, but in current society, smart mobility initiatives are often initiatives that are being launched apart from each other and are commonly grouped under the term

‘Smart Mobility’ (Borysov et al., 2019). The separate initiatives also come forward in the definition by Chen et al. (2017, p. 382), who define smart mobility as “a series of transport initiatives that are integrated with broader city efforts aided by technology to improve liveability, competitiveness, and sustainability.” The initiatives mentioned are a very wide range of initiatives including automated vehicles, ride-sharing, electrification of vehicles, intelligent infrastructure, and also Mobility as a Service. According to Gassmann et al. (2019, p. 40), these types of initiatives pursue five key objectives. These objectives are (1) sustainable, innovative, and secure transportation systems; (2) access to diverse transportation modes; (3) good availability in the entire city; (4) inclusion of non-motorised transportation; and (5) integration of ICT in transportation systems. The next paragraph will discuss Mobility as a Service as one of the smart mobility initiatives.

2.1.2. Mobility as a Service

As was explained in the previous paragraph, Mobility as a Service can be seen as an initiative that is part of the smart mobility paradigm, which is itself part of the smart city discourse. The definition of MaaS has been studied thoroughly during recent years. The first definition was developed by Sampo Hietanen (2014, p. 3), the founder and current CEO of MaaS Global, who described MaaS as a “mobility distribution model in which a customer’s major transportation needs are met over one interface and are offered by a service provider.” One year later, Burrows et al. (2015, p. 19) comprehensively described MaaS as: “the provision of transport as a flexible, personalised on-demand service that integrates all types of mobility opportunities and presents them to the user in a completely integrated manner to enable them to get from A to B as easily as possible.”

With MaaS still being a very new concept, Holmberg et al. (2016) did not attempt to define the concept because it would be preliminary to create a clear definition. However, they did discuss

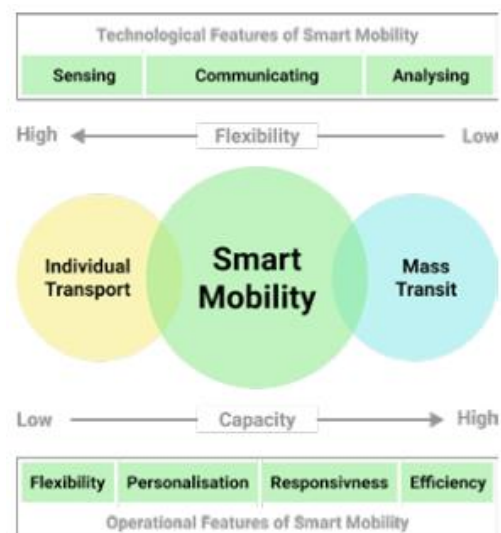


Figure 5 The gap for which smart mobility initiatives try to find a solution (Source: Borysov et al., 2019)

drivers behind MaaS, divided into societal, economic and technological drivers. These drivers are shown below in table 1.

Drivers behind Mobility as a Service (Holmberg et al., 2016)	
Societal	Urbanisation and densification
	Climate change
	Millennials and the sharing economy
Economic	Monetize excess or idle inventory
	Increase financial flexibility
Technological	Mobile devices and platforms
	Social networking – Social profiles and reputations tracking

Table 1 Drivers behind MaaS (Source: Holmberg et al., 2016)

Building further towards one clear definition, Jittrapirom et al. (2017) developed a broad spectrum of MaaS definitions by executing a literature study on different definitions. Based on a literature review, they understood nine core characteristics to be part of MaaS. These are shown in Table 2.

Core Characteristic	Description
1. Integration of transport modes	A goal of MaaS schemes is to encourage the use of public transport services, by bringing together multi-modal transportation and allowing the users to choose and facilitating them in their intermodal trips. Following transport modes may be included: public transport, taxi, car-sharing, ride-sharing, bike-sharing, car-rental, on-demand bus services. Envisioning a service beyond the urban boundaries, it will embrace also long-distance buses and trains, flights, and ferries.
2. Tariff option	MaaS platform offers users two types of tariffs in accessing its mobility services: "mobility package" and "pay-as-you-go". The package offers bundles of various transport modes and includes a certain amount of km/minutes/points that can be utilized in exchange for a monthly payment. The pay-as-you-go charges users according to the effective use of the service.
3. One platform	MaaS relies on a digital platform (mobile app or web page) through which the end-users can access to all the necessary services for their trips: trip planning, booking, ticketing, payment, and real-time information. Users might also access to other useful services, such as weather forecasting, synchronization with personal activity calendar, travel history report, invoicing, and feedback.
4. Multiple actors	MaaS ecosystem is built on interactions between different groups of actors through a digital platform: demanders of mobility (e.g. private customer or business customer), a supplier of transport services (e.g. public or private) and platform owners (e.g. third party, PT provider, authority). Other actors can also cooperate to enable the functioning of the service and improve its efficiency: local authorities, payment clearing, telecommunication and data management companies.
5. Use of technologies	Different technologies are combined to enable MaaS: devices, such as mobile computers and smartphones; a reliable mobile internet network (WIFI, 3G, 4G, LTE); GPS; e-ticketing and e-payment system; database management system and integrated infrastructure of technologies (i.e. IoT).
6. Demand orientation	MaaS is a user-centric paradigm. It seeks to offer a transport solution that is best from customer's perspective to be made via multimodal trip planning feature and inclusion of demand-responsive services, such as taxi.
7. Registration requirement	The end-user is required to join the platform to access available services. An account can be valid for a single individual or, in certain cases, an entire household. The subscription not only facilitates the use of the services but also enables the service personalisation.
8. Personalisation	Personalisation ensures end users' requirements and expectations are met more effectively and efficiently by considering the uniqueness of each customer. The system provides the end-user with specific recommendations and tailor-made solutions on the basis of her/his profile, expressed preferences, and past behaviors (e.g. travel history). Additionally, they may connect their social network profiles with their MaaS account.
9. Customisation	Customisation enables end users to modify the offered service option in according to their preferences. This can increase MaaS' attractiveness among travelers and its customers' satisfaction and loyalty. They may freely compose a specified chained trip or build their mobility package with a different volume of usage of certain transport modes to better achieve their preferred travel experiences.

Table 2 Core characteristics of MaaS (Source: Jittrapirom et al., 2017, p. 16)

However, after this literature review, Jittrapirom et al. (2017) did not develop one overarching definition for Mobility as a Service.

There still is a definitional gap, which can be explained by the current shortcomings regarding MaaS, the different views between scholars on what MaaS is, and on what MaaS tries to achieve (Wong et al., 2020). Very recently, Arias-Molinares & García-Palomares (2020), have discussed basic W-questions – such as ‘What is MaaS?’, ‘When and where did the term appear?’, and ‘Why should it be implemented – about MaaS through the use of a literature review. The first question, ‘What is MaaS?’, helped in finding a definition in which all aspects and perspectives on MaaS were considered. The definition they adopted was created by Kamargianni & Matyas (2017, p. 2) and extended by themselves into the following definition: “[We define MaaS] as a user-centric, multimodal, sustainable and intelligent mobility management and distribution system, in which a MaaS provider brings together offerings of multiple mobility service providers (public and private) and provides end-users access to them through a digital interface, allowing them to seamlessly plan and pay for mobility (Arias-Molinares & García-Palomares, 2020, p. 6).”

This definition includes almost all core characteristics named by Jittrapirom et al. (2017) and is, however under development, at the moment, a very well-substantiated definition of Mobility as a Service, which will thus be used for this research.

2.1.3. Current issues regarding Mobility as a Service

As mentioned earlier in paragraph 1.5, there are four key problems with MaaS that currently disable the use of MaaS on a large scale, which are issues with governance and collaboration, the lack of interest in using MaaS, creating a profitable business modal, and technological issues regarding privacy and safety. Especially the latter one is an issue that is visible in more smart mobility initiatives, such as the use of automated vehicles and intelligent infrastructure, as ICT and data play an increasingly big role in these initiatives (Lei et al., 2018). In MaaS, sharing of real-time data plays a big role, which might lead to issues concerning privacy regulations (Cottrill, 2020).

Issues with governance and collaboration are multiple. For MaaS to work, different transport providers will need to cooperate in one MaaS-platform, which is difficult as different stakeholders have different interests (Meurs et al., 2020). Other issues with collaboration and governance are the lack of willingness to collaborate, the governance of future research developments, and the uncertainty of whether MaaS will become a successful concept, which means that money, time and resources are being invested in a concept that has not yet proven to be successful. Besides, it is unclear what role urban, regional, national, and maybe even European governments should play in developing a framework for MaaS (Fenton et al., 2018; Jittrapirom et al., 2018; Smith et al., 2018). A third problem is the lack of a well-functioning profitable business model. In some ways, this is linked to the previous problem of collaboration and governance. What roles should different stakeholders fulfil? (Eckhardt et al., 2017); should the business model be commercial, with private parties only, or

a collaboration between public and private parties? (Eckhardt et al., 2017); how can MaaS be a profitable initiative? (Sarasini et al., 2017; Polydoropoulou et al., 2020); and should there be one overarching business model or can different models apply to different settings, for instance, a difference between an urban and a rural business model? (Eckhardt et al., 2017; Polydoropoulou et al., 2020). These are all examples of questions that revolve around the issue that Mobility as a Service is unprofitable as it is currently operating (Klochikhin, 2019). A final challenge regarding the MaaS business models is the integration of every possible type of transport into the MaaS-platform, which is often very difficult because of the different stakeholders' priorities (Ho et al., 2018). The fourth and last issue is the lack of interest of people in using MaaS. As this is the most important problem for this thesis, this will be discussed separately in the next paragraph.

2.1.4. MaaS acceptance

As discussed in paragraph 1.1., the research by Fioreze et al. (2019) is important for this thesis as it reviews the likelihood of using MaaS in a neighbourhood in a Dutch city, Den Bosch, which is approximately the same size as Nijmegen. Besides the fact that only 20% of the respondents in their research would likely use MaaS, which was shown in figure 1, Fioreze et al. (2019) also discussed other subjects in this study, such as the aspects that make people choose a certain mode of transport. From their survey, they found that 'travel time', 'comfort', and 'flexibility' were the three most important aspects in choosing a mode of transport. On the other hand, 'environment' and 'health' were aspects that were less important to the respondents (Fioreze et al., 2019, p. 794). To understand why people are willing or unwilling to use Mobility as a Service, Fioreze et al. (2019) posited eight statements that could help explain the reasons behind the likelihood of using MaaS. These statements and results are shown in figure 6.

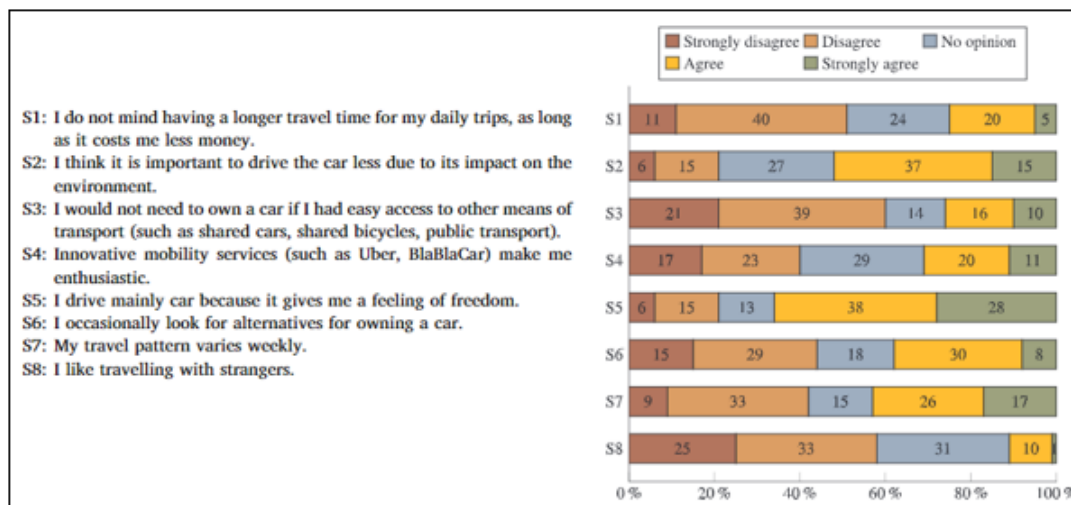


Figure 6 Statements to understand the reasons behind the likelihood of using MaaS (Source: Fioreze et al., 2019)

It is notable that both S3 and S5, which focus on car ownership, have the highest scores, S3 in disagreeing and S5 in agreeing. From this, it can be concluded that car ownership is still valued very highly by the respondents. Another notable conclusion from figure 6 is that people think it is important to drive the car less due to impacts on the environment, while the respondents earlier declared that 'environment' was not an important aspect in choosing which mode of transport to use. From their study, Fioreze et al. (2019, p. 796) concluded that "people who do not see car ownership and its usage as very important, who regularly use public transport and who are mostly concerned with the environment and with a healthy commuting lifestyle, are more receptive to the idea of using MaaS." Looking forward to the article written by Alonso-González et al. (2020), which will be discussed next, there is a last interesting point in the study by Fioreze et al. (2019), namely their clusters of people with similar intentions towards using Maas. Fioreze et al. (2019) distinguished four different clusters of people, namely 'MaaS curious' (18%), 'Frequent car drivers' (24%), 'Multimodal travellers' (30%), and 'Car lovers' (28%). The 'MaaS curious' cluster can be labelled as potential MaaS users. 'Multimodal travellers' could follow up once MaaS has proven to be convenient, but the people in the other two clusters, which represent more than 50% of the total amount of respondents, are very unlikely to use MaaS (Fioreze et al., 2019, p. 797).

The reference to the article by Alonso-González et al. (2020) was made because that study also created clusters of people with different attitudes towards the acceptance of Mobility as a Service. This research conducted a survey to identify potential MaaS users in (sub)urban areas in the Netherlands. Based on their response to different indicators, these respondents were clustered into different groups through the use of a Latent Class Cluster Analysis. This way, through their response to the observed indicators, the respondents could be clustered according to a latent class variable (Alonso-González et al., 2020). The analysis led to the creation of five different clusters: (1) 'MaaS-FLEXI-ready individuals', (2) 'Mobility neutrals', (3) 'Technological car-lovers', (4) 'Multimodal public transport supporters', and (5) 'Anti new-mobility individuals'. With 32% of the people being represented, the first cluster was the biggest one, which is positive as people in the first cluster are most likely to start using MaaS. However, the people in the other four clusters, representing 68%, are not likely to start using MaaS. Multimodal public transport supporters could be expected to use MaaS, but are at first not being regarded as interested in MaaS, because they indicate that they do not have a positive attitude towards pooled on-demand mobility services.

Alonso-González et al. (2020) found three characteristics that set the car-driven clusters (clusters 3 and 5) apart from the other three clusters. These characteristics are 'ownership', which means that these two clusters are car-driven because the people already own a car, 'price relevance', the people in the two car-driven care less about their mobility costs than the people in the other three clusters,

and ‘environmental friendliness’, as the people in the two car-driven clusters indicate that they care less about the environmental consequences than the people in the other three clusters (Alonso-González et al., 2020).

All in all, Alonso-González et al. (2020) identify two main barriers in adopting Mobility as a Service. First, ownership is a big determinant in choosing a travel mode, which means that people who own a car will often choose to use their car, especially the people in the car-centred clusters, and second, low technology adoption in the ‘mobility neutrals’ cluster causes them to not pick up on MaaS. Besides, Alonso-González et al. (2020) conclude that the results of this research cannot be used to predict any behavioural changes. Case-specific research is needed to determine whether a behavioural change will emerge. It can, however, be concluded from both articles, that car ownership and car usage is still rated very highly among people in the Netherlands, and that this will be a difficult problem to overcome.

2.2. Theoretical framework

As the theoretical framework for the original pilot was already decided upon before the process of writing this thesis had started (Meurs & Sharmeen, n.d.), the choice was made to use the same theoretical model for this study after it turned out that the pilot could not go through in its original form. This decision was made because the key aspects of the research – transport mode choices for business trips and the willingness to use MaaS in the future – were maintained.

With Mobility as a Service, a distinction can be made between a mobility component, the different mobility options, and a technology component, the app that represents the MaaS platform. Because of that, the Technology Acceptance Model (TAM) with components from the Theory of Planned Behaviour is the most interesting theory for this research. Within this research, the Technology Acceptance Model applies more to the technology component, and the Theory of Planned Behaviour to the mobility component (Alonso-González, 2020). It is used as a guiding theory in interviewing the employees and understanding the employee’s current travel modes and future perspectives on MaaS. This paragraph will discuss this theoretical model and its link to transport mode choices.

2.2.1. Technology Acceptance Model

The Technology Acceptance Model was developed by Davis et al. (1989), following the Theory of Reasoned Action (TRA), which is shown in figure 7.

Originating from information systems research, the Technology Acceptance Model was developed to

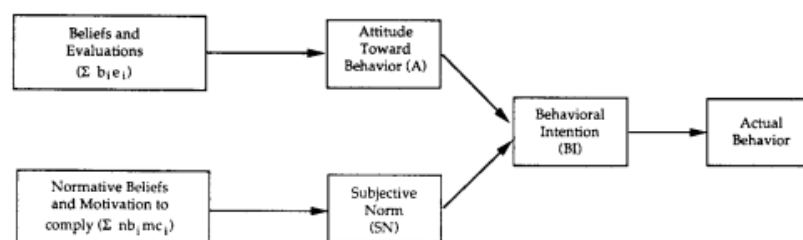


Figure 7 Theory of Reasoned Action (Source: Davis et al., 1989)

understand why people accept or reject the use of computers. As this was a very challenging issue in information systems research, researchers suggested involving intention models from social psychology to get to grips with the issue. In 1967, Fishbein developed the Theory of Reasoned Action, which was extended by Fishbein & Ajzen (1975), to understand virtually any kind of human behaviour (Davis et al., 1989). Instead of focusing on the relationship between attitude and behaviour, which had been researched a lot in previous years but was showing not to be very consistent, Fishbein & Ajzen (1975) argued that the intention to perform an action was of greater influence on behaviour than the attitude towards that behaviour.

However, as mentioned above, TRA is a very general model that can be used for the understanding of human behaviour in a lot of different fields. To make the model useful for information systems research, Davis (1986) adapted the model to the Technology Acceptance Model mentioned earlier. In 1986, Davis left the behavioural intention variable out of the model because of the instability of behavioural intention, which was already described by Fishbein & Ajzen (1975). Because a person's intention can change over time, "a measure of intention taken some time prior to observation of the behaviour may differ from the person's intention at the time that his behaviour is observed (Fishbein & Ajzen, 1975, p. 370)." However, in 1989, Davis et al. did include the 'behavioural intention' variable in their new, updated TAM. Both models can be seen in figure 8.

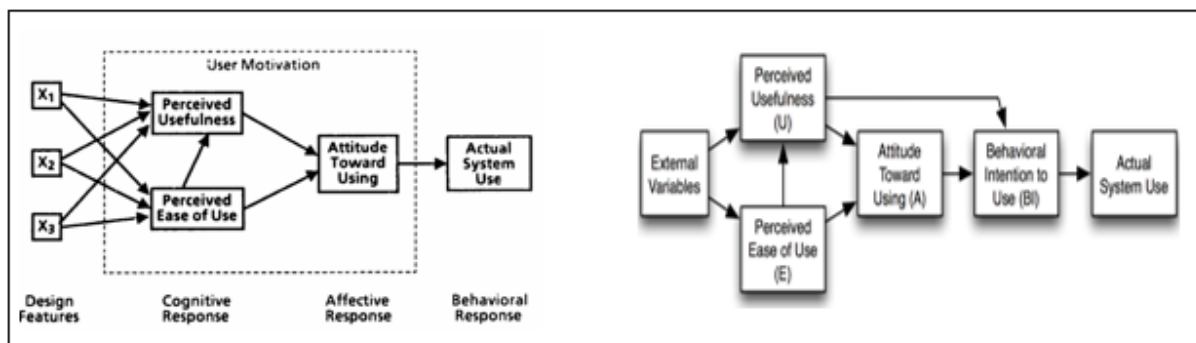


Figure 8 Evolution of the Technology Acceptance Model (Sources: left: Davis, 1986; right: Davis et al., 1989)

In contrast to the Theory of Reasoned Action, the Technology Acceptance Model postulates that 'behavioural intention' is not just formed by the 'attitude toward using', but also by the 'perceived usefulness'. By linking these two variables, Davis et al. (1989, p. 986) hypothesized that "people form intentions ... based largely on a cognitive appraisal of how it will improve their performance."

In TAM, 'perceived usefulness' and 'perceived ease of use' are hypothesized to be the main drivers behind acceptance behaviours (Davis et al., 1989). 'Perceived usefulness' is defined as "the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context (Davis et al., 1989, p. 985)." 'Perceived ease of

use' is defined as "the degree to which the prospective user expects the target system to be free of effort (Davis et al., 1989, p. 985)."

2.2.2. Technology Acceptance Model with components from the Theory of Planned Behaviour

The Technology Acceptance Model was combined with components from the Theory of Planned Behaviour by Taylor & Todd (1995). This model is shown in figure 10. The Theory of Planned

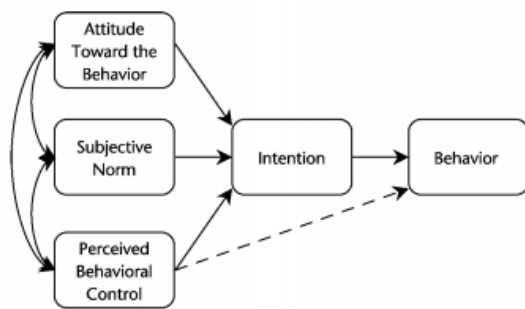


Figure 9 Theory of Planned Behaviour (Source: Ajzen, 2005)

Behaviour (figure 9) was introduced by Ajzen (1988)

and also builds on the theory of reasoned action.

This theory, similar to the theory of Reasoned Action, poses that a person's intention to behave is central in performing that behaviour. As can be seen in

figure 9, intention is influenced by three different

determinants: people's personal 'attitude toward the behaviour', 'subjective norm' for the people's

perception of social pressure to perform or not perform the behaviour, and 'perceived behavioural

control' to describe people's self-efficacy to perform the behaviour (Ajzen, 1988). This means that

"people intend to perform a behaviour when they evaluate it positively, when they experience social pressure to perform it, and when they believe that they have the means and opportunities to do so

(Ajzen, 2005, p. 118)." 'Ownership', which was one of the variables distinguished by Alonso-González

et al. (2020) in paragraph 2.1.4. setting the car-driven clusters apart, is part of the 'perceived

behavioural control'. Ajzen (1988) also added a possible direct link between 'perceived behavioural control' and 'behaviour'. This link describes the probability that 'perceived behavioural control' also

partly reflects the actual control people have over their behaviour. Following this, behavioural

intentions can only find expression in behaviour if that behaviour is under some degree of volitional

control (Ajzen, 1988; Ajzen, 1991). Thus, 'perceived behavioural control' can be seen as a partial

substitute for the degree of actual control. This actual control consists of non-motivational factors

such as the availability of resources and opportunities, like time, money and skills (Ajzen, 1988;

Ajzen, 1991). When a person has the opportunities and resources needed for behaviour and the

intention to fulfil that behaviour, that person likely succeeds in that behaviour (Ajzen, 1991). After

testing three competing models, the Technology Acceptance Model (TAM), the Theory of Planned Behaviour (TPB), and a Decomposed Theory of Planned Behaviour, Taylor and Todd (1995a) came to

understand that 'behavioural intention' is indeed the main contributor to actual behaviour. However,

they also found that both TAM's direct link from 'perceived usefulness' to 'behavioural intention' as

well as TPB's direct links from 'subjective norm' and 'perceived behavioural control' to 'behavioural

intention' contribute to the explanation of 'behavioural intention' (Taylor & Todd, 1995a). Because of

these findings, Taylor and Todd (1995b) added the 'subjective norm' and 'perceived behavioural control' to the Technology Acceptance Model because of their predictive utility and their widespread application in social psychology. Their 'augmented TAM', as they called this model, is shown in figure 10.

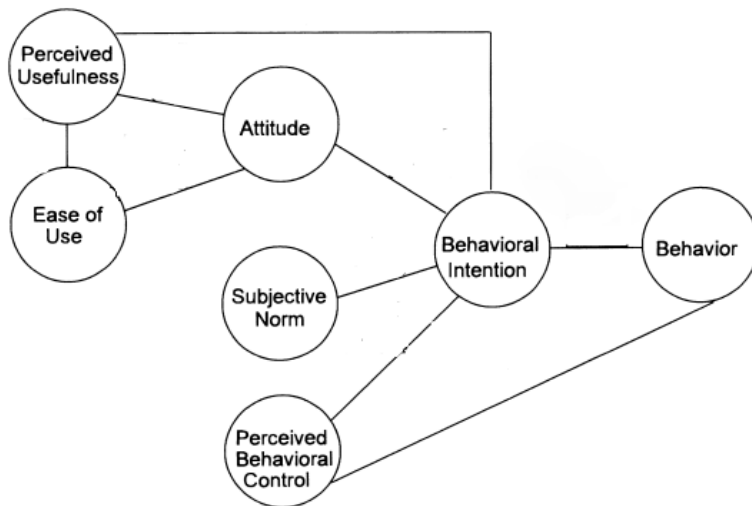


Figure 10 Technology Acceptance Model with components from Theory of Planned Behaviour (Source: Taylor & Todd., 1995)

Before this research, it was clear that prior experience had a large impact on behaviour which meant there could be a difference in behaviour between experienced- and inexperienced users. In Taylor & Todd's (1995b) research, the Technology Acceptance Model with components from the Theory of Planned Behaviour proved that it could predict usage behaviour for both experienced as well as inexperienced users.

In 2003, Bamberg et al. discussed the Theory of Planned Behaviour in relation to travel mode choices and the effect that an intervention (introduction of a prepaid bus ticket) had on the modes chosen. Because it was clear that prior behaviour affects future behaviour, Bamberg et al. (2003) added 'habit' as a variable that could influence future behaviour. The study showed that 'attitude', 'subjective norm', and 'perceived behavioural control' all played a role in the prediction of future travel mode choices and thus, that the Theory of Planned Behaviour is a useful conceptual model for predicting future travel mode choices. However, regarding 'habit', Bamberg et al. (2003) concluded that this variable only contributes to the prediction of future behaviour when circumstances are relatively stable. After carrying out a meta-analysis, Lanzini & Khan (2017) also concluded that 'habit' and past behaviour had a big influence on the choice of travel mode, even more so than 'attitude toward using', 'perceived behavioural control' and 'subjective norm'.

Based on the previous research by Bamberg et al. (2003), Chen & Chao (2008) introduced a conceptual model including both TAM and TPB but also added Habit as a variable that would negatively influence the intention to change travel modes as well as negatively influencing 'attitude' and 'perceived behavioural control'. This conceptual model is shown in figure 11.

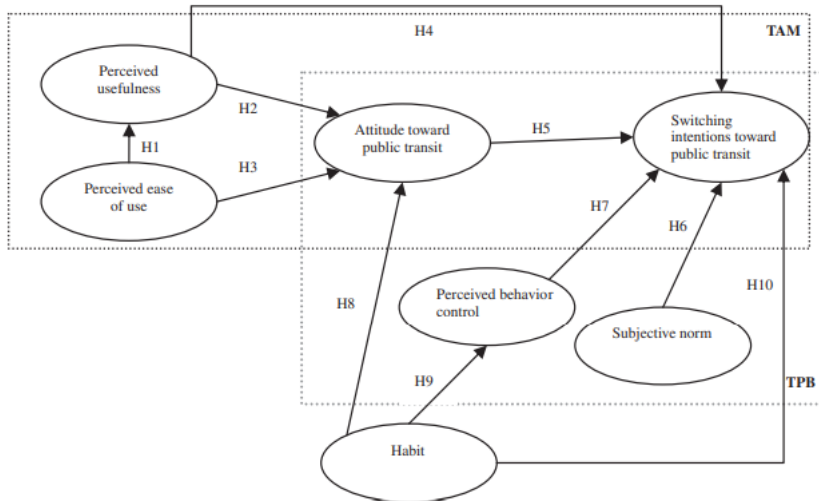


Figure 11 TAM-TPB-Habit (Source: Chen & Chao, 2008)

This theory, combining the Technology Acceptance Model, the Theory of Planned Behaviour, and the negative effects of Habit, is very interesting for this research. Chen & Chao (2008) researched the intentions of private vehicle users in switching to a new Mass Rapid Transit system. The research showed that 'habit' had a significantly negative impact on 'perceived behavioural control' and 'switching intentions', but that there was no significant effect on the 'attitude toward public transit'. This means that habit does directly and indirectly – through 'perceived behavioural control' – influence the 'switching intentions' (Chen & Chao, 2008). Applying this theoretical model to the current research, using MaaS instead of public transport in general, the model by Chen & Chao (2008) would look as follows, in figure 12.

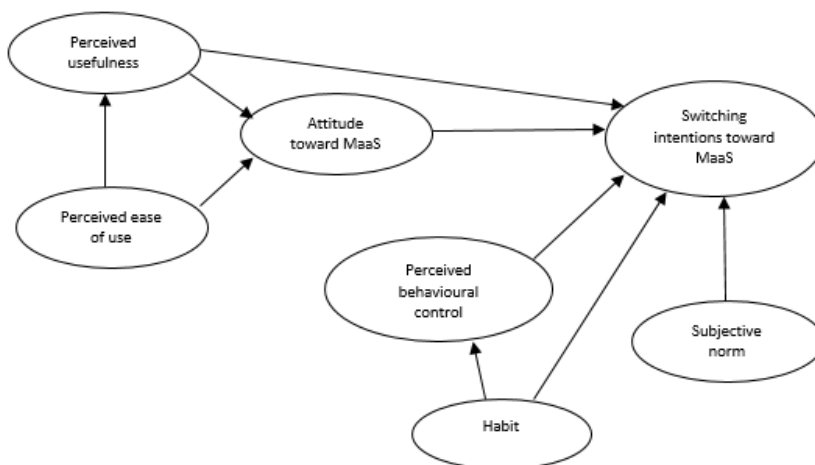


Figure 12 Chen & Chao's (2008) model adapted to MaaS (Source: own work; Chen & Chao, 2008)

As the research aim of this study is to understand what Radboud employees need to see changed to start using MaaS for their business travels, thus switching their intentions to use different travel modes, TAM-TPB-Habit is very interesting in guiding this research. The different variables influencing behavioural intentions will be used in analysing the interviews with the employees to be able to answer the research questions.

2.3. Conceptual model and propositions

The conceptual model that will be used for this research is shown in figure 13. This conceptual model is a visual representation of the questions that will be answered in this study. This is done using propositions that represent the expected relations between the different variables, based on the literature study and theoretical framework. The use of propositions in qualitative research is not customary, as they are impossible to be tested. However, with propositions that show expected relations, these propositions can be used as a steering mechanism for the rest of the research, as the interviews will be divided into subjects that correspond with the research questions and as the results can be discussed along the lines of the propositions. This means that the propositions contribute to the guidance of this research in analysing the data and describing the results. Besides, as the propositions and links in the conceptual model are mainly based on the literature review and theoretical framework, using the propositions as guidance for the analysis can make those theories more plausible when the findings in this research match the expectations.

The model shows five propositions. P1 and P3 are based on the theoretical model discussed in paragraph 2.2.2. and show that both the past travel mode choice and future use of MaaS for domestic business travels is influenced by the variables named in figure 12 (TAM-TPB-Habit). P2 displays the correlation that is expected between travel made choices that were made in the past and the future use of MaaS, based on the research named in paragraph 2.1.4., especially the quote by Fioreze et al. (2019, p. 796) which states that “people who do not see car ownership and its usage as very important, who regularly use public transport and who are mostly concerned with the environment and with a healthy commuting lifestyle, are more receptive to the idea of using MaaS.” P4 and P5 display the central aim of this study. These show the effect that is expected from the services that are offered by Radboud and a MaaS-platform on the future use of MaaS for domestic business trips. As the central aim of this research is to understand what these services should be, P4 and P5 represent this aim. As this is an exploratory study, these propositions do not contribute to making a theory more or less plausible.

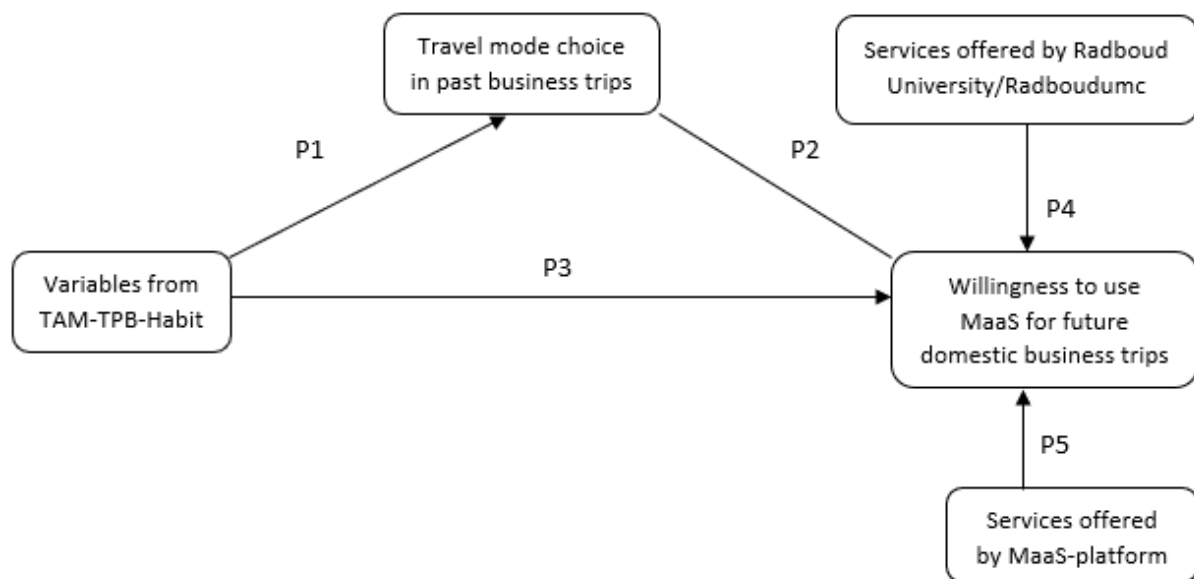


Figure 13 Conceptual model (Source: own work)

Elaborating on the propositions, the conceptual model entails the following assumptions:

P1: The TAM-TPB-Habit variables are expected to influence the current travel mode choices for domestic business trips.

P2: Based on previous research on MaaS acceptance, a correlation is expected between the travel mode choice for past business trips and the willingness to use MaaS for future business trips.

P3: The TAM-TPB-Habit variables are expected to influence willingness to use MaaS for future domestic business trips based on Chen & Chao's (2008) research, which discussed these variables in relation to people's switching intentions.

P4: The future use of MaaS for domestic business trips is expected to be influenced by services offered by Radboud University/Radboudumc. It is expected that MaaS-promoting measures taken by Radboud will influence the willingness of the employees to use MaaS positively. This study aims to understand what these services should be.

P5: The future use of MaaS for domestic business trips is expected to be influenced by services offered by the MaaS-platform. It is expected that the MaaS-platform can add value to the use of MaaS when it creates an easy-to-use app with services that are lacking in the current situation. This study aims to understand what these services should be.

3. Research execution

3.1. Research strategy

This research follows the interpretative approach to science, in which it is assumed that everyone has their own perspective on reality (Van Thiel, 2014). The interpretative school of thought emphasises the importance of both the interpretation and the observation of the social world (Ritchie & Lewis, 2003). Within this approach, it follows the constructivist research philosophy (Guba & Lincoln, 1994). Each research philosophy can be distinguished by its ontological, epistemological and methodological position (Guba & Lincoln, 1994; Van Thiel, 2014). The ontological position of constructivism is that reality is constructed and that there are multiple local and specific constructed realities, as opposed to one objective reality which is tangible and which can be measured, which is the case in the empirical-analytical approach (Guba & Lincoln, 1994; Van Thiel, 2014). Epistemologically, it means that knowledge is 'created' through the interaction between researcher and object of research (Guba & Lincoln, 1994). In this research, the knowledge will be created through the use of semi-structured interviews in which the researcher and the respondent discuss the actions that need to be taken for the employees to start using MaaS. The methods used will be discussed in the following paragraph.

Following the interpretative approach in this research means that a holistic approach is followed to the case of MaaS at Radboud University and Radboudumc. Because of this approach, only a few units of study will be used for this research, which makes the results of the study not very generalizable. However, as this research is very case-specific, generalizability is not a big issue here (Van Thiel, 2014). This also leads to the understanding that this will be an inductive study in which qualitative data will be used to answer the research questions. As this is an exploratory study that aims to get the most elaborate opinions of the employees on the use of MaaS, qualitative data is the most suitable as its exploratory power is high.

3.2. Research methods

For this research, two methods have been used in answering the research questions. These two methods are literature study and semi-structured interviews. At first, a literature study was done to understand the main theoretical aspects and definitions used in this research. Once this was done, an interview guide was made that was used for in-depth interviews with the employees. As semi-structured interviews were used, the interviews were not bound to the questions from the interview guide, leaving space for slight alterations throughout the interviews. Due to Covid-19, the interviews were held through the use of Zoom or by telephone, depending on the preference of the employee. If an employee did not have a preference, Zoom was used to be able to notice non-verbal communication. These interviews were recorded, with permission from the respondents, and

transcribed.

The respondents were approached in multiple ways. Since employees were mainly working at home, approaching them for interviews also happened online. To reach employees of Radboud University, several messages were posted on the supply & demand page of Radboudnet.nl, the intranet of Radboud University. Besides that, an email was sent to secretaries of departments, asking them to forward the message to contribute to this research to the employees of their departments. Reaching out to employees of Radboudumc was more difficult, as it is not possible to post a message on the intranet of Radboudumc for non-medical students, so the network of Carlo Buise was mainly used for reaching out to Radboudumc employees.

The interview guide was used to steer the interviews in the right direction and discuss the same points in every interview to gather reliable data. The interview guide can be found in appendix 2. The interview guide is divided into four different subjects which match the four main subjects of the sub-questions discussed in paragraph 1.3. These four subjects are 'Current travel behaviour', 'MaaS and future travel behaviour', 'RU and Radboudumc services', and 'MaaS-platform services'. To be able to link the data to the theoretical framework, the employees have been asked about the reasons behind their travel mode choices in the first two categories of the interview guide. To make sure that the employees would not see the variables from TAM-TPB-Habit as a list of fixed choices, the variables were not literally discussed in the interviews. That way, the goal was for every employee to really be able to give their opinion on why they choose to use a transport mode for their business trips.

3.3. Data analysis

The qualitative data retrieved from the interviews was analysed using transcripts of the interviews as data. The choice was made to use literal, verbatim transcripts to keep validity as high as possible and not have to worry about researcher bias (Van Thiel, 2014). These transcripts were coded using ATLAS.ti to come to understand the employees' willingness to use MaaS and the main needs of the employees in using MaaS for their business travels. The codes were gradually developed and refined during the analysis of the data (Van Thiel, 2014). The coding process was guided by the hypotheses discussed in the conceptual framework. This means that the focus in the coding process was on the variables that make the employees choose different travel modes as well as focusing on the different services that were discussed in the interviews. Following the idea that the TAM-TPB-Habit variables should not be used as a fixed list of reasons behind travel mode choices, those variables were used alongside other reasons as codes in analysing the employee's considerations in choosing a transport mode.

The coding process followed the types of coding that were introduced by Strauss & Corbin (1998):

open coding, axial coding and selective coding. During open coding, codes were assigned to pieces of text that were understood to be important in answering the research questions. Afterwards, axial coding took place, in which codes with the same purport were merged and codes that belonged to the same concept were put into categories. The open and axial coding was an iterative process, meaning that they are not chronological successive procedures. Lastly, selective coding took place, in which the different codes and categories were linked to each other and networks were created to understand the relations between these codes and categories. The networks that were created were not added to the text in the results chapters because these were too unreadable. However, to show the relations between codes, the network analyses per subject and the complete network have been added to the appendices and can be seen in appendix 3.

The interviews with the employees were held in Dutch, meaning that the transcripts were also written in Dutch. However, as this thesis is written in English, English codes were used. Besides, quotes from employees that were useful for the results chapters were translated from Dutch to English as closely as possible and were put in the text as direct quotes. This also means that contractions such as 'can't' or 'it's' were used in the translations of quotes as that is the best way to represent spoken language. For readability purposes, every 'uhm' and other small words that decreased readability were eliminated from the quotes in the results chapters. Commas were often used to represent a moment where an employee paused in a sentence. That way, the aim is to show the way that the sentence was built up as good as possible. In the quotes, two kinds of brackets have been used. The round brackets – (and) – were used to explain a statement when it was thought to be unclear. The square brackets – [and] – were used to add words that were spoken by the respondent at a different place in the text but were important to make the quote understandable.

3.4. Reliability and validity

Regarding reliability and validity, the use of semi-structured interviews has its advantages and disadvantages. Two main criteria define reliability, which are accuracy and consistency (Van Thiel, 2014). Accuracy concerns whether the right variables are discussed with the use of the right research method. The accuracy of this research is guaranteed by the use of an interview guide in which the central variables and hypotheses of the conceptual model are discussed and making sure that these concepts are discussed during the actual interviews, which is a responsibility for the researcher. Consistency concerns the question of repeatability (Van Thiel, 2014), which is harder to guarantee when using semi-structured interviews. Repeatability means that if a study will be executed a second or third time, the results will be similar. Consistency will be greater when using structured interview or questionnaires, but research will be less consistent when using open interviews. As Radboud employees, human beings, are the object of research, repeatability is hard to guarantee because

these employees can learn from prior experiences and will not always produce similar answers to earlier research (Van Thiel, 2014). For this research, this means that reliability has mainly been guaranteed by the use of a sound interview guide and by making sure that the key variables and concepts are being discussed during the interviews.

Similar to reliability, validity is also defined by two main criteria, namely internal- and external validity. Internal validity refers to the question of whether the researcher has really studied the concepts and relationships discussed in the research aim and research questions (Van Thiel, 2014). In this case, especially propositions 4 and 5 are important, as these discuss the services that should be offered by Radboud University, Radboudumc and the MaaS-platform, which matches the research aim. Internal validity is high when the interviews discuss the right concepts and relations, and when the right codes are used during data analysis.

External validity concerns the extent to which research can be generalized. This is mainly important in big statistical research, with large sample groups (Van Thiel, 2014). As this is a case-specific study, with a small group of research objects, external validity is not as important as internal validity, but this being a case-specific study also means that external validity is low.

Regarding the reliability and validity for this research, the main concerns were to execute the research with an interview guide that discusses all central concepts and relations discussed earlier on in the conceptual model and propositions, and that these relations are displayed by using the right coding during the data analysis period.

4. Past travel behaviour

This chapter is the first of three chapters in which the results of this research will be discussed. In this chapter, different aspects of past business trips that the employees made will be discussed in order to review the first sub-question. The aspects that will be discussed are the employee's transport mode choices, motives behind these choices including aspects of TAM-TPB-Habit, and the current expense claiming process with its pros and cons, because of the effect that implementing MaaS can have on the expense claiming process.

4.1. Transport modes & reasons behind transport mode choice

This paragraph reviews the modes of transport that were used by the interviewed employees in the past, before Covid-19, why the employees chose that transport mode, and the role that the variables of TAM-TPB-Habit play in this, representing the first proposition from the conceptual model. The employees were asked about their mode of transport for both business- as well as non-business trips. The emphasis in the results will be on the business trip modes since the central subject for this study is MaaS for business trips.

Two things stood out in the difference between non-business trips and business trips. First, there is a clear distinction between the transport modes that were used for non-business trips, such as the commute to and from work or private trips, and the modes that were used for business trips. The bicycle and car were the most mentioned modes for non-business trips, whereas public transport was the most mentioned mode of transport for business trips. Second, the aspects of TAM-TPB-Habit match the reasons behind travel mode choices for non-business trips much more than for business trips.

In non-business trips, cycling was often named as the preferred way of travelling because of health considerations and because it is seen as a pleasant way of travelling, which corresponds to the 'attitude' variable in TAM-TPB-Habit. Another reason for choosing the bicycle was 'perceived behavioural control'. This was especially the case for the respondents that commute by cycling to and from work, stating that it is just as fast as using the car and that it is possible because they own a bicycle. This applied to the people living in or around Nijmegen. 'Subjective norm' or sustainability reasons were not named as a reason to choose for cycling in non-business trips. Sustainability reasons might be implied when someone says that they prefer cycling, but this cannot be concluded. On the other hand, the car was mainly chosen because of the 'perceived ease of use' and 'perceived usefulness'. These were often practical reasons, such as grocery shopping, travelling with bad weather or having to shower when cycling. A last important aspect which played a role in non-business trips was 'efficiency', which applied to the people that use the car for their commute and

who argued that their travel time would be much higher when they would use a different mode of transport.

Efficiency and saving travel time provides a nice link to the reasons behind business trips since 'efficiency' was the most frequently mentioned reason to choose either public transport or the car for business trips. Although variables of TAM-TPB-Habit do play a role in the modal choice for business trips, this role is much less significant than with non-business trips. The main reason for this came forward in several interviews. The first, most comprehensive quote is the following: *"It's just an appointment, but elsewhere. So there is no added value in making that trip. It is, it is just not pleasant to be on the road constantly, being in traffic jams, it just takes a lot of your time. And, I like travelling, but not in this way. For a holiday it is fun, but these kinds of business trips, that is not an advantage of your job (Respondent 2)."* Another quote, related to this one is that *"the main goal is obviously to not waste too much time and money on making a business trip (Respondent 8)."* A third respondent also broaches the subject of saving time, stating: *"you see, my time is limited... half a day of travelling is really quite a lot for some employees (Respondent 11)"*, emphasizing the fact that employees have limited time and thus, that saving time is an important aspect of business trips. These three quotes represent the basic idea with which most of the employees make their business trips. Many employees indicate that they prefer to travel more sustainably and try to use public transport, but that public transport is not always efficient enough. As one respondent said: *"I support the basic idea [of promoting sustainable ways of travelling]... but I hope that we keep a little flexibility [in choosing a travel mode] (Respondent 8)."* Some of the interviewees apply a rule for themselves that when public transport does not take a certain amount of time longer than using the car, they choose to use public transport. However, all in all, almost all respondents argued that travelling for business is mostly annoying and time-consuming and consequently, that saving time is a central objective in making business trips.

These quotes explain why 'efficiency' was such an important reason for multiple employees. It is important to state that 'efficiency' comprises multiple aspects, such as reducing the aforementioned travel time, but also being able to work during your trip in public transport, or practical benefits in travelling by car like being able to bring attributes to a congress. Related to saving travel time is 'accessibility', which was also mentioned by many interviewees. This reason mainly entails that respondents are more likely to choose public transport for a meeting which takes place in a city centre near a station where there are parking issues, whereas they are more likely to choose the car when a destination is hard to reach with public transport.

Of TAM-TPB-Habit, 'perceived behavioural control' was the most important aspect in modal choice for business trips, as all but one of the respondents owned at least one car and almost all of the

respondents have an 'OV-Chipkaart', some with a 'Dalvoordeel' subscription. This shows that the respondents had the means and opportunities to use either their car or public transport for their business trips. Lastly, 'attitude' is an important reason to choose for public transport as multiple respondents argued that they thought travelling by public transport is a more pleasant way of travelling than by car since you do not have to focus on traffic and have some time for yourself.

A final aspect that influences the travel mode choice for business trips, which was not taken into account beforehand and asked for during the interviews, was proposed by two of the interviewees, who argued that the travel mode choice for commute also influences the travel mode choice for business trips. *"The moment someone can choose between their bicycle or public transport... or their own car, and he or she has an appointment later that day, then, then that person will just use their own car (Respondent 1)."* And: *"It is also the case that if people use their car to go to business appointments, they are often very likely to come to campus by car as well, so that they can make a multi-purpose trip out of their appointment somewhere in the country (Respondent 9)."*

With regard to the first proposition, it can be concluded that for the interviewed employees, TAM-TPB-Habit plays a much bigger role in the transport mode choice for non-business trips than for business trips. This mostly has to do with the fact that business trips are regarded as a 'necessary evil', at least the travelling part of the trip. The TAM-TPB-Habit variables do play a role in the modal choice for business trips, but other variables play a bigger role. These other variables are more consistent with the variables that were named by Fioreze et al. (2019), which were discussed in paragraph 2.1.4.

4.1.1. Place of departure in past business trips

An important aspect of past business trips that came forward in the interviews, following the importance of efficiency in business trips, is the fact that employees often depart from home for their business trips. The division between departing from home and from campus was approximately fifty/fifty for most of the respondents. The interviewees argued that they often travelled from home when that was more efficient than travelling from campus so that they were able to save time. One respondent described this as follows: *"What I, what I notice sometimes, is that I have to use my own bicycle as some sort of intermediate transport so to speak, to go to the station, and sometimes I stay at home working before I have an appointment because it's more convenient to leave from home by car (Respondent 1)."* Another employee said that departure often took place *"right from home. I often try to combine that, yes, I don't know, when I have to be in Utrecht at 10 o'clock then, yes, then I work at home in the morning before I take the train and then, well I don't know, say I'm back home around 4 o'clock so to speak, then I also work those last couple of hours from home (Respondent*

12).”

This is an important point to emphasize because it has direct consequences for the future implementation and acceptance of Mobility as a Service. The way that MaaS was designed during the pilot would mean that it mostly applies to business trips that depart from campus, especially when shared mobility options are introduced around the campus. However, with 50% of business trips departing from home, you will also need those shared mobility options around people’s homes. On the other hand, one could argue that MaaS would make leaving for business trips from campus more efficient in the future, thus making business trips from home less significant, but the question is whether that would be desirable looking at initiatives that aspire to spread the number of travel movements around the campus throughout the day and create less congestion around the campus.

4.2. Expense claiming process

The expense claiming process is something that was discussed in the interviews because claiming one’s travel expenses with MaaS could be a lot easier than the way this is currently arranged. As it is possible that claiming your expenses through a MaaS-platform will be much easier than the current expense claiming process, this was an important aspect of past business trips to discuss in the interviews.

What stood out regarding the expense claiming process were the differences between the respondents regarding multiple aspects of the process, which was already very notable during the interviews. Differences between University and UMC employees, differences between employees with a high- or low number of business trips, and differences between people who think that the current system works fine and people who think the current system is a failure. These differences and the consequences that they have is what will be elaborated on in this paragraph.

The most important difference that was determined was the difference between employees who were generally positive and those who were generally negative about the current expense claiming process. Some respondents thought that claiming expenses in the current system works fine, some said that there is room for improvements, some said it is a laborious system, and one even said that BASS – the University’s financial system – is a “big disaster” (Respondent 5). These differences in opinion on the current system make it harder to say something sensible about the current system in general. However, in order to be able to do so, the other differences between these employees were explored and linked to their opinions on the current expense claiming process.

Two aspects seem relevant in dividing the group of respondents into different groups. These are the number of business trips they approximately made and whether they work for the university or for the hospital, because of the different financial systems and corresponding expense claiming

processes. First, the different number of business trips. The interviewed employees were divided into three groups: high-, medium- and low number of business trips. As can be seen in table 3, employees with approximately more than 40 business trips per year were understood to make a high number of business trips, employees with approximately 10 to 40 business trips per year made a medium number of business trips, and employees with approximately less than 10 trips per year made a low number of business trips.

Number of business trips	
High	40 > per year
Medium	10 - 40 per year
Low	< 10 per year

Table 3 Number of business trips (Source: own work)

Besides, two separate groups were made, one with UMC respondents and one with University respondents. After that, table 4 was made in which these five groups were put in the columns. To understand of which groups a majority was positive or negative about the expense claiming process, every code that judged the claiming process positively or negatively was put in the rows of the table. The rows which were positive about the expense claiming process were made green and the negative ones were made red.

	Business trips_High Gr=566; GS=7	Business trips_Low Gr=107; GS=2	Business trips_Medium Gr=91; GS=2	Radboudumc employees Gr=370; GS=6	University employees Gr=394; GS=5	Totals
Expense claiming process current_BASS: Big disaster Gr=1	1	0	0	0	1	2
Expense claiming process current_BASS: Laborious system Gr=5	5	0	0	0	5	10
Expense claiming process current_BASS: Lot to gain in the expense claiming process Gr=1	1	0	0	0	1	2
Expense claiming process current_BASS: Time-consuming Gr=5	5	0	0	0	5	10
Expense claiming process current_BASS: Works fine Gr=3	3	0	0	0	3	6
Expense claiming process current_Discussed other options in the past Gr=7	4	0	3	5	2	14
Expense claiming process current_Explaining the "business nature" of a trip is cumbersome Gr=6	5	0	1	5	1	12
Expense claiming process current_Explaining the "business nature" of a trip isn't a problem Gr=1	0	1	0	1	0	2
Expense claiming process current_GoAbout: Works great Gr=2	0	2	0	2	0	4
Expense claiming process current_UMC: Cumbersome Gr=4	2	0	2	4	0	8
Expense claiming process current_UMC: Works fine Gr=5	3	2	0	5	0	10
Totals	29	5	6	22	18	80

Table 4 Thoughts on current expense claiming process per group of respondents (Source: own work)

As can be seen, there is indeed a small difference between University- and UMC respondents and a difference between people making a large number of business trips and those making a small number of business trips. In general, people with a low number of business trips experienced fewer troubles with the expense claiming process in the past than people with a high or medium number of business trips. This can be explained by the fact that people who travel more need to claim more costs, thus losing more time in claiming their travel expenses and having more struggles with the

expense claiming process. Besides, looking at the other groups, university employees were less positive about the process in the past than UMC employees. However, as this is a qualitative study and generalizability is low, it cannot be concluded that these findings account for all Radboud employees. It is only a potential explanation for the differences between the respondents that took part in the interviews.

There were more aspects of the expense claiming process that stood out during the interviews. First of all, one respondent was already using GoAbout at the time of the interview and was very positive about the expense claims through that app. This person stated: *“if you look at that GoAbout app. That really is the way to claim your expenses. You choose your destination, you get a ticket and you are done. You do not have to worry about it anymore. And that is, in my opinion, just really useful. You do not have to think about it anymore, you do not have to worry that your expense claims are overdue or that kind of stuff (Respondent 1).”* This can be seen as a confirmation of the expectation that using a MaaS-platform could really add value in the expense claiming process and, because of that, work as a catalyst for the future use of MaaS at Radboud University and Radboudumc. This assumption is strengthened by the fact that this is a Radboudumc respondent, while it was shown above that in general, the Radboudumc employees are already more satisfied with the current expense claiming process.

Second, the fact that people have to explain the ‘business nature’ of their trip when they claim their travel expenses for public transport trips. By most of the employees, this is experienced as a cumbersome addition to the expense claiming process, as it is possible that claimed expenses are disproved because the ‘business nature’ was not explained correctly. One respondent said that this plays a part in travel expenses for public transport trips being harder to claim than trips by car, for which this explanation is not needed: *“Actually, expenses for trips made by car are much easier to claim because you can just say: I went there, it was this many kilometres, and then there is a, well, a price rolls out x 0,19 [cents]. While with public transport, you need to ... attach an evidence document, which means that you have to make a selection of your business expenses in ‘Mijn NS’. But, yes, that is of course mixed with private trips so you will have to separate those, then you need to export them, then you need to put those in the system and then you get a response from the financial department like: yes, but, can you also add ... why this was a business trip. Well, that is all doable, but it is all a bit more laborious (Respondent 8).”* The fact that costs for business trips made by car are easier to be claimed could mean that this regulation adds to business trips being made in a less sustainable way. Another respondent, who argued that BASS is a big disaster, stated the following about the expense claiming process being time-consuming: *“If there is one thing you lose time over, it’s expense claiming ... there is a platform that is as user-unfriendly as possible, BASS, and I ... I am very clear about it, also*

to the people who decided to use it. You know, our financial director of the University supports it 100%. But that is because it suits him well since everything is insightful. To make it insightful, a lot of people have to put in a lot of time, which has nothing to do with education and research (Respondent 5)."

Lastly, there is the code with the most quotations in table 4, which is: "discussed other options in the past". Several respondents declared that they discussed other ways of claiming expenses with their superior or other people in their department in the past. This shows that these employees are unsatisfied with the current process. An option that was named frequently in the interviews was the NS-Businesscard. The NS-Businesscard could also be seen as a step towards implementing MaaS, since 'OV-fietsen' and 'Greenwheels' can be included in these subscriptions, meaning that employees would already be able to use a nation-wide shared mobility network, next to the public transport options which are included in an NS-Businesscard subscription (NS, n.d.). The second and third aspect named above were illustrated by a quote from one of the respondents, namely: *"I have said it before to my secretary like: can I not just get a business subscription which links the costs to the right cost centre? That was not possible with Radboud or something like that, so I have to claim my expenses myself every time I travel. I also have to say why I went to the places I went to. And I think that is rather cumbersome (Respondent 6)."* This was also indicated by another employee who argued that expense claiming could be made easier: *"Well, what I find very uncomfortable is that you have to enter every trip, one by one, into your app yourselves and then get approval from your supervisor and then you get it back. But in fact, you have to pay for everything in advance, and that actually applies to all expense claims. That's why I would prefer having such an NS-businesscard on which they can just put an x-amount of money that you can travel with and which takes off the costs of the trip in good faith (Respondent 4)."*

Since it was already noticed during the interviews that some of the respondents had discussed other expense claiming options, a small interview with the expense claiming department (CFA) of CIF (Control, Information & Finance), the University's financial department, was held as well, but that did not lead to big new insights. The people of this department were quite sceptical about MaaS and other ways of claiming travel expenses, for example, the NS-Businesscard, explaining that *"maybe you travel once per month for business purposes, or maybe even once per 6 months. Well, how would you justify an NS-Businesscard so to speak. Some people do have such a card for their commute, but that is a different story. But you cannot just reimburse people for an X-amount of money to have such a card when you only travel to Groningen once per month, for example (Respondent 10)."* Besides, choosing a new financial system instead of BASS would be a multi-year project, since BASS involves all financial activities, not just the expense claiming process. They indicated that they know about the

dissatisfaction that exists around BASS and iExpense, but also stated that there will be dissatisfaction with every expense claiming system: *“the module iExpense, as it’s called, RU expense claiming for employees, to make that a little easier, it is indeed subject to improvement, which we are constantly working on. Because of course we get complaints about it, but you will also get complaints about an app, you will get complaints about every other form of claiming expenses, because yes, it remains difficult. You have to justify expenses to get your money back (Respondent 10).”* Besides, adding to that, that *“Possible improvements in all kinds of areas are being studied, but the leading fact is that our financial logistics system (BASS) will last for another three or four years (Respondent 10).”*

However, if the MaaS-platform is able to interact with the financial department in such a way that processing the expense claims does not take way longer than they currently do, as was the planning in the pilot with pdf-files being sent from GoAbout to CIF, then CIF might still be able to get on board. But this shows that, as one respondent also mentioned in that interview, getting CIF aboard will eventually be a challenge for the implementation of MaaS (Respondent 5). All in all, the fact that several respondents have discussed other ways to pay for business trips shows once more that expense claiming through MaaS could work as a catalyst for the acceptance of MaaS at Radboud, especially for Radboud University employees.

5. Future travel behaviour and choice for MaaS

This chapter discusses the respondent's views on MaaS as a concept, the likelihood of them using Mobility as a Service for future business trips, and the links between their past business trips and their future trips, coming back to proposition 2 and 3. Also, because of the current situation, the employees were asked about their expectations around Covid-19 and future business trips, which will also be discussed here.

5.1. Opinions on Mobility as a Service

The respondents were asked about their opinion on the concept of Mobility as a Service. What stood out was that almost every employee that was interviewed has a positive attitude towards MaaS, is interested in the concept and thinks that using it for business trips in the future can have added value. The reasons that respondents like the concept of MaaS are multiple. One reason that was named often is the fact that MaaS can raise opportunities for more sustainable business trips: *"I think that it at least raises opportunities to get from A to B in a, well, I wouldn't say the sustainable way, but a more sustainable way. At least we are being more conscious and that helps (Respondent 5)."* Another respondent argued that choosing to work with a MaaS-platform could ease the choice for public transport for employees who used the car in the past (Respondent 9). Other reasons why interviewees like the concept of MaaS are the availability of shared mobility options for short trips or for the first/last mile of a business trip, being able to claim expenses through a MaaS-app, and the better facilitation in planning a business trip. *"It's the variety of possibilities, that, for me, also partly depend on weather and time, sometimes I have more time and then I think: what do I care, I'll cycle a bit ... But sometimes I have a really tight timeframe. Well, then you have to be ultimately efficient because otherwise I won't be back at Radboud in time for an important meeting. And well, then it is useful to be able to make a package of that so that I can use such a rental car or car on loan to get back to the station very quickly for example (Respondent 6)."*

Although most of the respondents were positive about the concept of Mobility as a Service, a large majority had never considered using Maas. Regarding that, one interviewee said to have *"never made the thinking step from hearing about MaaS, because that was already a few years ago, to thinking that it could be something for myself. So concerning that, I needed the step that the organisation thinks for me, so, that the organisation comes up with an idea in which it is made possible for me (to use MaaS) through a business subscription (Respondent 9)."* Another employee who already knew about Mobility as a Service made a similar remark: *"what has withheld me from using it is just that, the supply and the fact that you have to take out time of your own to sort everything out (Respondent 5)."*

There were also three main arguments that were negative about MaaS as a concept. First, some employees argued that there is little added value in MaaS when you already have a public transport subscription with shared mobility options such as 'Greenwheels' and the 'OV-fiets', expect for claiming expenses. The second argument that was named is that those employees do not feel a need for an app that assists them in planning their full trip, for example stating: *"I mean, if you show me an app and tell me that it is going to fix something that is a problem for me, then, yes, then I am, I am not technophobic, so then I will use that. But I have to feel the need. If I want to make a trip right now, the choice about how I am going to make that trip is in no way an issue (Respondent 7)."* Third, there is a general concern that MaaS will not work as claimed. This follows the fact that MaaS is still a new concept and that there are not a lot of use-cases in the real world yet. *"Well, that it doesn't work as you just said. Big stories but in practice it all doesn't work. That's what I see as a drawback (Respondent 3)."* Another respondent also argued that *"we know that all kinds of things can happen on the road, but it should not be because of MaaS that I would arrive somewhere too late (Respondent 5)."*

This third concern is one that was underlined by the statements from the employee that already used GoAbout. At the moment, there are two issues with MaaS that emerged from that interview, which were quite logical as the use of GoAbout at the campus was in a pilot stage. The first one is the lack of availability of shared vehicles: *"I have that GoAbout app and I use it now for my business- and private trips, which I find really useful, such an app. I used it last night. But if you look at the app and for example you say: I would like to use a bicycle, well, then there is one bicycle on campus and that is not available at the moment. Well, that is not very useful (Respondent 1)."* This is a challenge which will be discussed further in chapter 6. Second, there is the fact that using GoAbout took a lot of effort during the time of the interview: *"If I have to take the bus, I need my own 'OV-chipkaart', and I also received another pass from Carlo, which does not work here in Nijmegen but does work in the rest of the country. That pass is called MobilityMixx. So that does not work in Nijmegen. That means you have to use three things, your phone, you have your own 'OV-chipkaart' and you have that MobilityMixx. Well, I like participating in tests like this, so I do not really mind, but it would of course be useful if you just have one app with which you can plan your trip from door to door (Respondent 1)."*

All in all, multiple respondents said in the interviews, that MaaS has to add some sort of value to the process of making business trips to become an interesting alternative. Building on paragraph 4.2, claiming expenses through a MaaS-app could be the aspect that adds value and creates a need for these employees to consider using MaaS as well. This was also indicated by the respondents. The employees argued that the variety of modalities, the integral overview of a trip in the app, but most

of all the implementation of expense claims in the MaaS-app could add value to the process of business trips. Other aspects that will play a role in the future success of MaaS have to do with its quality and with how it will be implemented. For example, one respondent argued: *“Yes, well, because that is also something that is the case for MaaS you know, eventually it has to, it all stands or falls with a, well let’s call it quality, but if I plan something through MaaS it has to be feasible (Respondent 5).”* Another employee stated that *“how it will be arranged is very important (Respondent 2).”* This is something that is central for the whole discussion around MaaS at Radboud and will be discussed in-depth in chapter 6.

5.2. Future travel behaviour

In this paragraph, propositions 2 and 3 will be discussed, along with other aspects that need to be kept in mind for the future use of MaaS according to the respondents.

As was shown with proposition 1, the TAM-TPB-Habit variables play a bigger role in non-business trips for the interviewed employees. This is also noticeable looking at the future use of MaaS. Hardly any aspects of TAM-TPB-Habit were named when the concept of MaaS and the considerations for using MaaS were discussed in the interviews. The opportunity for more sustainable business trips, which is an important aspect as to why people like the concept, can be seen as a form of ‘subjective norm’ and ‘attitude’ towards the mode of transport, matching two of the TAM-TPB-Habit variables. Besides, the availability of different transport modes within MaaS can be seen as a form of ‘perceived usefulness’. However, at the same time, multiple respondents argued that they do not see a lot of added value in shared cars, which is something that will be discussed later on in chapter 6.

This shows that the link between TAM-TPB-Habit, which was already weak for proposition 1, is also weak for proposition 3. As ‘efficiency’ and ‘accessibility’ were the most important variables in choosing a transport mode for past business trips, it is very likely that this is also the case for future business trips, meaning that MaaS should at least be as efficient as their current transport modes to become a good alternative. Adding to this that multiple respondents argued that MaaS has to prove its added value, it can be determined that practical considerations are more important when it comes to the transport mode choice for future business trips than the TAM-TPB-Habit variables.

The fact that ‘efficiency’ plays such an important role also leads to some difficulty around proposition 2. This proposition was based on the idea that there is a correlation between the modal choice for past business trips and the modal choice for the future. In order to get a comprehensible overview of this correlation, table 5 was made, in which the respondent’s past travel modes and their negative and positive remarks concerning MaaS are displayed. The negatives and positives are displayed in the same way as in table 4. However, as ‘efficiency’ and ‘accessibility’ are key, employees use both public

transport and their own car, depending mainly on travel time. This makes it impossible to say something sensible about whether someone who chose to use public transport in the past would opt for MaaS in the future, which would have been the expectation based on the research by Fioreze et al. (2019).

	Car	Cycling	Public Transport	Shared Bicycles	Shared cars	Taxi	Walking	Afraid that MaaS will not work as claimed Gr=3	Considers MaaS for business trips departing from campus Gr=1	Doesn't see added value of shared cars Gr=4	Except for claiming expenses, no need for a MaaS-app to plan trip Gr=10	Likes the concept of MaaS Gr=10	Little added value in MaaS when you already have a public transport subscription with shared vehicle options Gr=6	Would consider using MaaS for business trips Gr=9	Totals
Respondent 1		1	1									1			6
Respondent 2	1											2		1	4
Respondent 3	1		1		2			1				1	2	1	9
Respondent 4	1		1									1	4		7
Respondent 5	1		2					1	1			1		1	7
Respondent 6	1	2	2				1					1		1	8
Respondent 7	1	2	2									1			14
Respondent 8	1		2	1		1		1				1		4	12
Respondent 9			1									1			5
Respondent 11	1	2	1	1						1	1	1		1	11
Respondent 12	1		1								1				3
Totals	9	7	14	2	2	1	1	3	1	4	10	10	6	9	86

Table 5 Respondents with their past modal choice for business trips and opinion on MaaS (Source: own work)

Nonetheless, a kind of correlation that could be distinguished and that could also be derived from the research by Fioreze et al. (2019), is the link between the fact that a majority of the employees argued that they preferred using public transport for business trips and the fact that most of the employees like MaaS as a concept. This shows the likeliness of the correlation, but due to the nature of this study, it cannot be concluded that this is unequivocally the case.

5.2.1. Impact of Covid-19

Because of the current situation around the world, which also had a big impact on the way in which this research was conducted, the respondents were asked for their opinions on the impact that Covid-19 will have on future business trips and whether Covid-19 has changed their opinions on public transport or shared vehicles. This will be discussed in this paragraph.

Regarding the attitude towards public transport and shared vehicles, the employees all said that this situation probably does not influence their future way of looking at these modes of transport. During Covid-19 however, the experiences of the respondents differed. A majority indicated that they did not have a different approach towards public transport during Covid-19. *“I still travel by train, I adjust myself to the amenities that are out there and the obligations that are there (Respondent 1)”* is an indicative quote for how most of these employees regard public transport. Other employees stated that they used the car more often for the little number of business trips they made during Covid-19, found public transport not to be a pleasant experience, or tried to avoid rush hour when using public transport. This was illustrated by the following quote: *“Another observation regarding myself is that I have still sometimes travelled by train, for example, we sometimes have a meeting in Ravenstein, and then I think it's doable to go by train and wear a face mask, but for a long trip by train, having to*

wear that face mask the whole time, that does not appeal to me. So those few times that I did travel over the past year I used the car, where I normally never did that before (Respondent 9)."

In general, the interviewed employees expect more changes when it comes to the lasting impact that Covid-19 has on working conditions, including business trips. A big majority of employees stated that online meetings have become normal over the past year. Although it has become normal, the pleasure of working at home and having online meetings differs per employee, which also leads to different expectations for the future. Generally, most of the employees think that, since working at home has turned out to work quite well, there will be a decline in the number of business trips when Covid-19 is done, compared to the situation before Covid-19. One clear example was given by an employee: *"Already now I notice that, I am also head of a number of committees which had people coming over from all across the country, for which meetings often took place in Utrecht and we used to come together four times per year. Well, there we have agreed: we will have 2 online meetings and 2 meetings in person in the future, you know, whereas that used to be just 4 physical meetings per year (Respondent 12)."* Another employee said that Covid-19 has fastened developments that were already happening, for example because of sustainability. Answering the question of whether Covid-19 would influence this respondent's future travel behaviour, the employee answered: *"I think that that will remain on a lower level. But for me, that is also the case because I just wouldn't do some things that I would have done in the past. Also because I was already reducing those things for that matter, and in that sense, this is the threshold which, now I am going over that threshold (Respondent 7)."*

On the other side, some employees emphasised that they thought that, once Covid-19 is over, everything will probably go back to normal and that there will be no lasting changes. An employee gave the following reason for this presumption: *"But on the other hand I notice that everyone also really yearns for physical meetings. And also really appreciates those physical meetings even more, you know. So then, especially in a business context, it is important for building and maintaining personal relationships. To be able to do just that, go to someone for a meeting, so I honestly don't think that there will be a lot of change concerning that (Respondent 8)."* This was not the only employee who argued or noticed that people feel a need for physical meetings and have built an aversion towards online meetings and education.

All in all, both sides of the story were named by an interviewee, who distinguished a difference between various kinds of meetings. *"There is a certain kind of meetings, short meetings, with factual subjects that are to the point, which are suited for [the use of Zoom and other media]. But as I just said, the meetings between, national meetings with faculty deans, well, then you want to talk to each other. You don't want to wait until someone has finished talking online, you want to meet each other*

in a real-life setting, so I expect that we get back to our old travel behaviour fairly quick (Respondent 9)."

These quotes sum up the impact that is to be expected from Covid-19. Based on the employee's opinions, there will likely be fewer business trips in the future, especially meetings which do not have a lot of added value, short meetings for which the trip itself is not worth the trouble. Especially, keeping in mind the argument that was already made in paragraph 4.1. which discussed the fact that making business trips is not something which is fun to do. Other meetings, such as meetings with clients, business relations or conventions which take all day, will probably return to their pre-Covid-19 state rather quickly.

6. Radboud's role and the MaaS-platform

This chapter will revolve around the fourth and fifth proposition, the roles that Radboud and the MaaS-platform can play in increasing the level of acceptance for MaaS. Since the main goal of this study is to understand what is needed from Radboud to start using MaaS, the questions in the interviews were really broad, in order to capture all the relevant aspects. That is why the considerations of the respondents will be divided into different paragraphs, based on their main subjects.

6.1. Radboud's challenges

In the process of discussing the role that Radboud should have in switching to MaaS, employees named several challenges that Radboud has to work on. The central challenges that were named had to do with changing employee's travel behaviour, creating awareness for alternative transport modes and convincing people to start using MaaS. All in all, these three challenges focus on the same issue, which is the level of MaaS-acceptance that needs to be increased, an issue that has been discussed earlier. The fact that other employee's travel habits needed to be changed was named by many of the interviewed employees. One respondent described this as follows: *"Until recently I was head of a department and there really were people that made business trips and I thought: why don't you take the train? You know, I started that conversation with them as well, those were mainly general practitioners that worked for me, well, they were married with their car, they don't even think about it (Respondent 6)."* This was also mentioned by another respondent, who argued that *"in Nijmegen, there is a substantial amount of people who prefer to do things as they have always done. So I think the biggest threshold is that you need to convince a certain amount of people to get to use it (Respondent 5)."*

Some of the employees gave examples of how they thought the challenge of changing people's behaviour could be tackled. Except for communicating about MaaS, which was named by a lot of employees and will therefore be discussed separately in the next paragraph, the approaches focus on creating tailored solutions for employees and specific examples of regulations that could improve the MaaS acceptance. For example, regarding the tailored approach, a respondent argued that surveys could be sent to all employees, asking them about their mode of transport and why they chose that mode. Another aspect was based on further automatization of the personnel administration, also with the data that can be derived from MaaS when the MaaS-platform is used by a larger amount of people, so that people can be asked about their travel behaviour based on that data. Another aspect of creating a tailored approach, also based on further automatization, is finding out in what area the largest gains can be made. *"When you see that a large amount of the trips by car are made to Amsterdam and you think: well, there's a train leaving every 10 minutes, maybe we should do*

something with that (Respondent 8).” Building on that, the same respondent gave an example of how this behaviour could be changed, if discussing it doesn’t lead to an adjustment: *“if you have a destination that is located within a certain distance of an easily accessible train station, then you could say: well, we’re going to stop paying for parking costs for those destinations* (Respondent 8).”

However, this employee also indicated that Radboud should be very reluctant in initiating such regulations. That is a subject that will be discussed further in paragraph 6.2.

A final argument that was made regarding the acceptance of MaaS is the idea that employees in high positions also have to stop using their car. Those employees have to be reached as well, as they also have some kind of exemplary role. An employee argued that changing employee’s mindset will not work that well *“as long as, let’s say, the Board of Directors or the managing board of the UMC keep driving their cars and come to campus with their cars. And maybe I have to personally add to that: non-electric cars* (Respondent 5).”

Another challenge that is currently at hand at Radboud, is the extent to which sustainable travel measures are being enforced by supervisors. In the list of instructions for expense claims by employees of Radboud University, which can be seen in figure 14, it is stipulated that “business trips are in principle made by public transport” (point 10) and that one’s “supervisor will check if the claimed expenses are business-related and if they can be reimbursed under the applicable regulations (point 7) (Radboud University, n.d.).” The extent to which these instructions must be followed and how they should be interpreted is open for discussions and was talked about in the interview with respondent 12. This respondent works for a department that used to be a University department, but is currently a Radboudumc department, so the differences between the two could be discussed. The employee indicated that *“back then [at the University] it was used that way (enforcing the use of public transport), it was interpreted like that and yes, our supervisor was pretty strict regarding that, but I don’t know how that is internally arranged within the Radboudumc ... but I feel like it is being less strictly enforced or that it’s being addressed less [at Radboudumc]* (Respondent 12).” The extent to which these regulations are being enforced logically differs per supervisor. Whether business trips are really made by public transport and how this is being addressed by supervisors also depends on the extent to which the supervisor thinks using public transport is important.



Instructions for expense claims by employees

Declarations

1. Expenses must be claimed using the electronic claims system.
2. Scans of the original invoices and receipts must be uploaded to the claims system. Without the original invoices or other official proof of payment, expenses cannot be claimed.
3. You must retain the original invoices and other proof of payment during the verification process. This terminates upon payment of the claim. During the verification process, the CFA Department may ask you to send in the original invoices.
4. Please state clearly the context in which you incurred the expenses (e.g. lunch & dinner expenses and representation expenses) and why they are business-related. For instance 'business meeting with...' or 'meal during business trip from...to...'. Including receipts without any explanation will not suffice.
5. Expenses that are reimbursed on a regular basis cannot be claimed using the declaration form.
6. Structural expenses, such as communication costs or internet costs, cannot be claimed. Compensation for structural expenses should be contractually agreed upon with your supervisor, who will send this agreement to your personnel office for inclusion in your personnel file.
7. Your supervisor will check if the claimed expenses are business-related and if they can be reimbursed under the applicable regulations at Radboud University Nijmegen.
8. CIF/CFA will test your claim against the applicable internal and fiscal regulations in consultation with the Human Resources Department.
9. Your entitlement to reimbursement lapses if your claim is not submitted to CIF/CFA via the electronic claims system within three months after incurring the expenses.

Declarations of travel, parking and accommodation expenses during business trips

10. Business trips are in principle made by public transport. You are allowed to travel first class. Should you choose to travel second class, the actual costs of your second class ticket will be reimbursed.
11. If public transport is not available or not efficient, you may use private means of conveyance. The allowance for travelling by private means of conveyance is EUR 0.19 per travelled kilometre.

Figure 14 Instructions for expense claims for Radboud University employees (Source: Radboud University, n.d.)

Furthermore, several comments were made about subjects that are not so much challenges, but more some concerns that employees had that should be considered by Radboud. First, there is the point that, in this initiative of studying the future use of MaaS, there should be realism about the costs of transport for business trips. *"You always have to find a good balance between costs, because it's just not the case that, that you think: well, those costs will be borne by my employer. That's not entirely the reality of a faculty or a research centre or a department. There will always be a supervisor looking at that who asks: why do you make these costs? ... As an employee you also have a role within an organisation in which you're not entirely free to choose any mode of transport you'd like (Respondent 8)."* Second, after asking how one of the respondents saw the role of Radboud, this respondent argued that Radboud should be honest about the contribution that this initiative makes

to CO2 reduction: *“I notice that they have ambitions in this, which is fine for me. But what I always have to think about then, is: how does this compare to, well, to the whole CO2 crisis et cetera. We all know that flying once is approximately equal to half a year of driving a car. So, sometimes you see that it’s symbolic politics. So I think that it should be properly calculated compared to other matters (Respondent 6).”* Besides, this respondent linked this argument to the fact that employees only have limited time, an issue that has been named earlier, and the loss of time that might be enclosed in the use of MaaS. Because of that, the employee argued that *“if those kinds of things get decided for me and the benefits are more symbolic than real, then I would have a problem with that... For me, the university can be a frontrunner in this, but then you also have to be honest about it, about the contribution that you’re actually making, nationally (Respondent 6).”*

These concerns stem from the ideas behind travel mode choice that were discussed in chapter 4. The standpoints that efficiency, practical needs and accessibility are most important in choosing a transport mode for business trips lead to the understanding that sustainability is an important goal but that for most of the interviewed employees being as sustainable as possible is not the objective in business trips. These concerns add to the challenge of increasing the level of MaaS acceptance.

6.1.1. Communication

Communication was seen as a key factor in creating MaaS acceptance by a lot of employees. In order to create awareness and convince people to start using MaaS *“it must be communicated, that is, of course, you know, communication is always essential. And in communicating you need to, both the sustainability goals and the ease of use must be emphasised (Respondent 9).”* The interviewed employees named lots of different options that could be used in communicating about MaaS, which is why they are presented as a list below, after which they will be discussed further:

- Communication departments
- Different networks of employees
- Intranet
- Newsletters
- Sustainability organisations within Radboud such as the Green Office and Centre for Green Information Technology
- Combined campaign for both the University and Radboudumc
- Already existing communication strategies of the faculties
- Shared vehicles on campus for promoting MaaS
- People who already travel by public transport as ambassadors for MaaS
- Inform and involve new employees at an early stage

All in all, these suggestions can be divided into different categories at various organisational levels. Because of this, the different aspects of communication can be linked to each other. Looking at it that way, the combined campaign for both Radboud University and Radboudumc can be seen as the central point which comprises the other aspects named by the respondents, which can themselves

be divided into involved people and organisations and promotion methods. The methods through which MaaS can be promoted, according to the respondents, are Radboudnet and the intranet of Radboudumc, newsletters and other university magazines, and the shared vehicles themselves. When shared vehicles are placed on campus, they can work as driving advertisements for MaaS. This last point was made by respondent 6, who argued that *“you need to make them (shared vehicles) notable. I think you really need to put them in special places so that people... it’s also your publicity you know.” “You have to put them in visible places. And also see that other people use them (Respondent 6).”*

The other aspects in the list can be distinguished as people and organisations that need to be involved according to the employees. According to the employees, the Radboud communication departments can play a central role in helping to build a campaign. Besides, within that campaign Radboud could use the already existing ways of organising communication. At Radboudumc, this can be done as follows: *“you would need to promote that. We have a network, which I’m the coordinator of, we have a network of health- and safety employees. We have all kinds of networks such as that and you should use the means of communication within those networks (Respondent 2).”* At Radboud University there was also an employee who argued that the already existing means should be used: *“I think that ... at the level of the whole institution, [there has to be] some sort of general communication strategy that gets processed to how that should be spread out within the faculties. To me, that seems to be how you should do that, because all of the faculties have their own, and that is also the case for the hospital, their own channels through which they reach employees (Respondent 9).”* Other entities that are thought to play a role in the communication campaign are the sustainability organisations within Radboud, Radboud Green Office and Radboud Centre for Green Information Technology, new employees who need to be involved in getting to know MaaS at an early stage, and people who already use public transport or MaaS. According to respondent 9, these people could be used as ‘ambassadors’ for MaaS, to show people that often use their car what the advantages of MaaS can be.

The list of options was turned into a schematic overview to create a more structured representation of all the aspects that were named above. This overview can be seen below in figure 15.

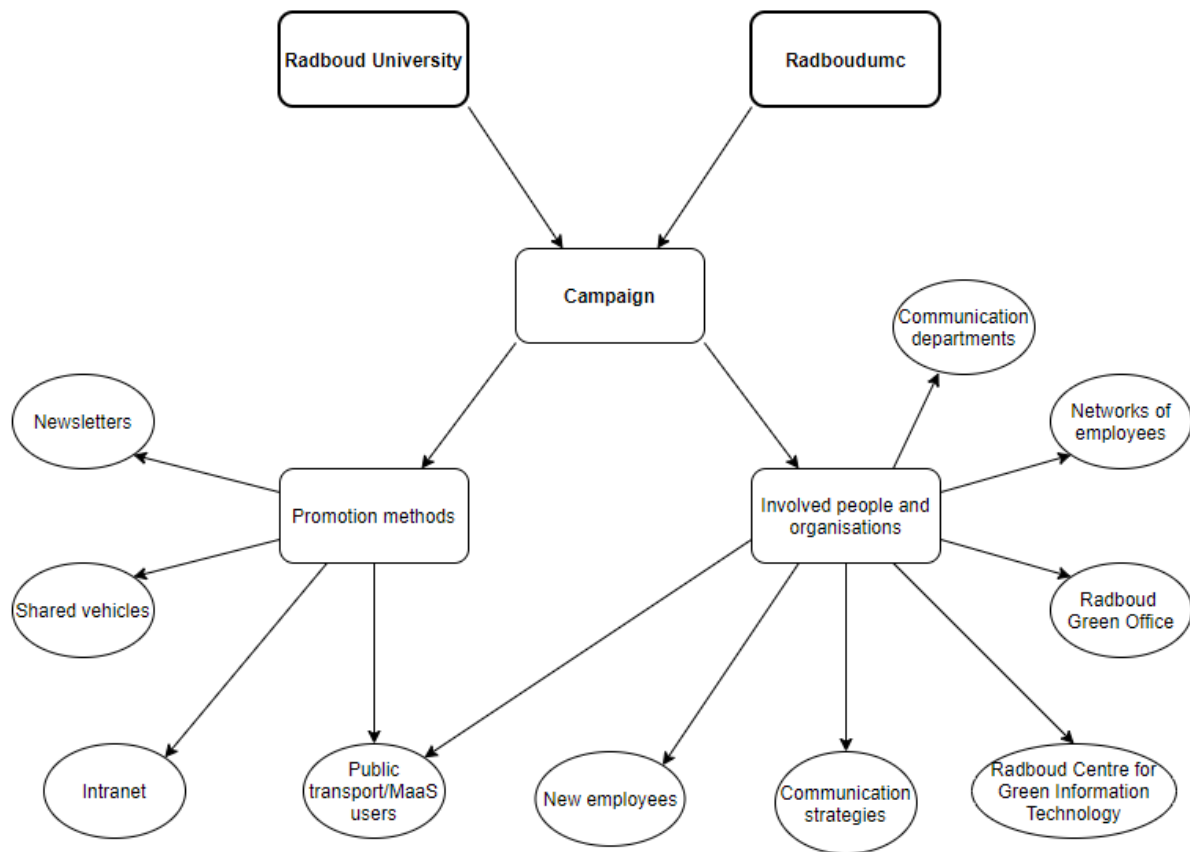


Figure 15 Schematic overview of communication strategy according to respondents (Source: own work)

Some concerns were shared in the interviews when it came to discussing communication. First, employees tend to get an information overload rather quickly. This was mentioned by employees from both the University and the Radboudumc: *“on the other hand, there really is a lot of information that gets uploaded on such a Radboud intranetsite, which also makes some people become really tired of the fact that there might be a new topic on there”* (Respondent 4) and *“at least within the faculty at which you also study, we have noticed that people quickly get an information overload”* (Respondent 9)."

A second concern that was shared had to do with the reduction of cognitive dissonance. *“I think you can best use a very tailored approach, you know, that’s also what advertising companies do of course. That’s what works best, when it’s very much applied to your specific situation. Because with general messages you always think: oh, that’s a message for someone else. And if you didn’t think about it yet, then you often ignore such a message... That’s called the reduction of cognitive dissonance, so the messages probably don’t get to the people who need it the most, if you can’t give them personal feedback about their behaviour”* (Respondent 6)."

These are two general concerns that should be kept in mind when creating a communication strategy. Some solutions, mainly for the latter concern, were already discussed at the end of paragraph 6.1., as some of the options that were named by the employees regarding those

challenges also had to do with creating a tailored approach to convince people to at least think about the way they travel.

6.2. Implementation

Building on what was already mentioned in paragraph 5.1., the quality of MaaS is crucial for whether it will be successful or not. This is also a central point of consideration when it comes to the way in which Radboud should implement MaaS. All of the employees were asked about their opinion on whether Mobility as a Service should be carried out top-down, enforcing people to use it for their business trips, or whether Radboud should stimulate people to use Mobility as a Service in a positive way. Both sides of this argument will be discussed in this paragraph.

A majority of the interviewed employees thought that MaaS should be stimulated in a positive way. The basic idea behind this for most of the employees is that travel mode choice should not be too restrictive and that they should have freedom of choice in deciding which transport mode to use for their business trips. The concerns about honesty and realism about the contribution that MaaS makes to the environment and its transport costs are also part of this belief. This will be illustrated by some of the quotes that address this point. First, a respondent argued that employees make serious considerations in their transport mode choice: *“Well, you know, as you can hear from me, I really make serious considerations every time and, well, I would find it silly when, for those few times that I take the car, that I would not get reimbursed for that for example. That kind of antics, yes, that’s probably what they will do then. Just like that parking money which I’m not getting reimbursed for anymore (Respondent 6).”* A quote that takes the same kind of position is the following: *“I don’t think you should curtail employees too much with that ... I think you should present that in a friendly way. With, let’s say: this is the greenest choice for your trip, this is the cheapest choice for your trip. Just like the fact that you can choose between the fastest and shortest, that you would also be able to choose, you know, if you want to travel sustainably, choose this option ... But I would be very reserved when it comes to financial incentives. Because it’s very childish and these are all high-educated people that work at a university (Respondent 8).”*

Second, these arguments about employees making serious considerations were linked to the fact that employees have a limited amount of time in making their business trips. *“Well, I prefer stimulating, you know, I prefer the carrot over the stick. So I think it (MaaS) has to prove its added value and, whichever way you look at it, travelling with public transport always has certain time disadvantages (Respondent 9).”* *“You see, I have limited time. I’m a department leader and I have a lot of appointments. And with national, what do you call it, domestic trips, that works pretty well the way it currently works, because when I have to combine meetings I can take the car when that works better for me, when it’s not achievable in another way ... on the other hand, of course, a lot of things*

for which you have to make a short trip will be online in the future, but half a day of travel really is a lot for some employees ... So, you know, when we discuss an app, without a doubt [I would consider using it], but you have to, it has to give people the opportunity to travel in a more sustainable way and it shouldn't be aiming at making people travel as sustainable as possible, because that is just, that is different for every job position (Respondent 11)."

The fact that a majority of the employees thought that stimulating MaaS and leaving room for employee's considerations in this, is also related to the fact that a lot of respondents argued that communication is key in creating support for Mobility as a Service so that support for MaaS could be created by communicating about it. However, one of the respondents that argued that MaaS should just be implemented argued that Radboud should not put in all that effort to generate support for MaaS. *"You shouldn't make this a participatory process and you also shouldn't want to create some sort of goodwill among people (Respondent 7)."* The standpoint of implementing MaaS top-down will be discussed below.

Opposite to the idea that Radboud should stimulate the use of MaaS in a positive way was the belief that *"an implementation stands or falls, any random implementation but especially those that lead to a more sustainable society, stands or falls with someone who eventually very clearly states: that is where we're going. And the person that does so, the higher that person is in the organization, the more effective the transformation will be (Respondent 5)."* The respondents that supported this idea made a comparison between the implementation of MaaS and other past policy innovations. When asked about the way that MaaS should be implemented, an employee argued to *"just roll it out, in the same way as other administrative changes have been implemented. The moment something is being changed in BASS, that's also being told right? Not by making a fun website and videos and stuff like that. No, just say: we're doing it like this. It's an administrative roll-out (Respondent 7)."* As said, this type of comparison was also made in another interview: *"I think that, looking back ... I have to say that I think that the implementation of Brightspace was very positive. That happened two years ago and there were different parties, including Brightspace themselves, which played a role in that. And that was also rolled out through the support services and the teachers were supported in that as much as possible, so all kinds of courses were given, meetings were organised, people were almost taken by the hand to explain how that eventually had to work. And if you compare that to MaaS, Brightspace is also the only platform that we use to support our education. Well, with MaaS you should do that the same kind of way and say something like: MaaS will be the only platform through which you can plan your business trips, but also claim your expenses (Respondent 5)."*

It must be said here that these comments are mainly applicable to a situation in which the functionality of Mobility as a Service is already very high, which probably is not the case with

GoAbout at this moment. A solution for this could be to implement Mobility as a Service in phases: *“maybe that (roll-out) could be done in phases, you could have a niche, you could invite people for a pilot. Okay, well, then I would still think: whatever you do, don’t bother people with it too much (Respondent 7).”*

Looking back at the beginning of this paragraph, with the quality of MaaS as a key condition for its success, it can be argued that the most successful way to implement MaaS is to fully go for it and stick with it, telling employees that that is the way to travel in the future. However, that can only be done once the quality of MaaS is at such a high level that it can compete with people’s current way of travelling for business, keeping in mind that efficiency is key. As this is probably not the case at the moment, at least not with the way it would have been organised in the pilot with GoAbout, Mobilitymixx et cetera, implementing it in phases might be an interesting option. In that case, the pilot could be seen as phase 1, voluntary use as phase 2, and when it turns out to have serious added value and the capacity is large enough to be able to compete with other travel modes, it could be fully implemented, which would be phase 3.

6.3. Campus & shared mobility

This paragraph discusses some practical considerations that have come up during the interviews, mainly regarding the campus and the use of shared mobility.

There were multiple points of attention that were brought up by the interviewed employees. First and foremost there is the fact that if and when Radboud decides to implement MaaS, this also has an impact on the campus and the use of the campus. In addition to the car-free campus which is being proposed for 2030 (Radboud University, 2020), choosing MaaS also influences the image of Radboud (Respondent 5). This point of view also leads to the first concern, namely whether having shared cars on campus is a necessity or whether it would be better to focus on shared bicycles and public transport. An employee argued that *“in combination with a car-free campus ... you shouldn’t want to have shared cars standing on campus. If you want to go off-campus, you’ll have to do that with a bicycle or by bus. And if you eventually, during your MaaS trajectory, the app tells you that you need to use a shared car at some point, that it’s necessary. Then the bicycle or bus will lead you to the place where that car is (Respondent 5).”* This was also shared by two other employees. *“For me, those are the two most important ones: public transport and the OV-fiets (shared bicycles) ... The taxi is also one. That would be the third, but a shared car, well, maybe, but I think that’s another step further. You come a long way with the train and bicycles (Respondent 9).”* And *“I don’t think the dimension ‘car’ is very practical in this. Because for me, that’s two different kinds of transport. You see ... the train, that’s easy to be combined with transport to and from campus. But with the car,*

that's a whole different way of travelling for me, it's not useful to combine that in Mobility as a Service (Respondent 11)."

These three quotes show that these employees think that the focus in MaaS should be on public transport and shared bicycles, especially regarding transport to and from the campus. Besides, adding to this, creating a place on campus to park shared cars is also a challenge, which is much harder and takes up more space than placing shared bicycles on campus (Respondent 11). *"I think that if you put three Greenwheels there (shared cars on campus) that are always gone, you know, or that you have to book weeks in advance, well, then it's not going to work and then you could just as well not do it. So, yes, that is, the practical implementation is not entirely clear for me yet (Respondent 11)."*

A third point that was made by this employee concerning shared cars is based on what was discussed earlier, namely the business trips that depart from home. The question here is how making trips from home would be arranged when MaaS would be fully implemented. Based on the fact that efficiency is such an important aspect of business trips, being able to travel from home would still be very much appreciated (Respondent 11). If using MaaS were to be obligated in the future, would travelling from home be impossible, would employees have to use MaaS for that as well, or could that still be done by using their own car?

Further concerns that were shared in the interviews had to do with a situation in which shared vehicles would already be placed on campus. First of all, a certain degree of coverage is needed for shared vehicles to be interesting and to be as efficient as people's own ways of transport. *"The point is that you need certain coverage, you see, if I have to walk 10 minutes first before I can have a bicycle, then I won't use a shared bicycle. You need, the ease of use is important, otherwise you won't use it (Respondent 2)."* Related to this is also the need for a well-functioning reservation system (Respondent 1; Respondent 2; Respondent 7). This is also something which will need to be thought about very well. In a normal situation, for example in a neighbourhood, GoAbout places as many shared cars as there are people with a GoAbout subscription (GoAbout, n.d.). However, you cannot place a shared car on campus for every employee that makes business trips with MaaS, so *"a good reservation system is crucial (Respondent 2)."* To determine the degree of coverage of shared vehicles across the campus, Radboud and the MaaS-platform will have to work together: *"I think you need to do that together because GoAbout is a commercial organisation, right, so obviously they have to determine things like: okay, how many vehicles do we put in place, what do we earn with that. But I think that Radboud, both Radboud's, both the hospital and the university, have a better image of where the big flows of people are and what places are easily accessible (Respondent 1)."*

Second, the shared mobility options need to be accessible. *"The spread of the parking places, so*

where you need to pick them up, that's something you'll have to look at very carefully (Respondent 2).” This quote specifically applies to on-campus shared vehicles, but if MaaS were to be fully implemented, maybe even obligated for business trips from home as well, then that would mean that a nationwide network of shared vehicles that are easily accessible is needed.

A third comment that was made about shared cars applied to the comfort of the cars. This refers to a situation in which people will be stimulated to use MaaS: *“By the way, I do think that if you, if you're really talking about cars and you have to share them, that you need to have a certain class of cars to make it interesting for employees ... you'll have to offer a certain level of comfort* (Respondent 2).”

A final aspect concerning shared vehicles and the campus that was discussed during the interviews was the network of other stakeholders, besides Radboud, that is needed to carry out Mobility as a Service. *“There's a whole network that you eventually need and, for that, you need more than just your campus. So, for the transport possibilities of the Radboud employees, we also need a network around us, where shared cars will be placed, where bicycles will be placed, where those will be moving ... So I think, by any means, you need to involve the municipality and maybe also the province. And thus, maybe also the campus, so not just the university, but also the HAN, and whatever other companies are located around us* (Respondent 5).” With regard to the car-free campus, *“the acceptance of the people around the campus”* also plays a role (Respondent 5). In other interviews, the municipality was mainly named as a stakeholder which plays an important role in creating the right conditions for MaaS, especially on campus. *“The municipality definitely is a party in that as well, because it also has an interest in these kinds of things. Especially if it contributes to a better environment ... I think you'll need allocated parking spaces. In any case, you need the municipality for that* (Respondent 2).”

These are the main thoughts of the interviewed employees when it comes to practical implications concerning shared mobility and the space that shared vehicles take up on campus. The different opinions on how MaaS should be implemented also come forward in the way they see the role of shared mobility and how that should be shaped concerning the idea for a car-free campus in 2030.

6.4. MaaS-platform

As a final part of the interviews, the employees were asked about the MaaS-platform. This mainly concerns the role they saw for a MaaS-platform in stimulating the use of MaaS, concerns they have which a MaaS-platform should keep in mind, and especially their expectations and requirements that a MaaS-platform has to live up to. Looking at the conceptual model, this paragraph relates to proposition 5. One of the concerns which was named in multiple interviews will be discussed

separately in a sub-paragraph as that is not a concern that entirely applies to the MaaS-platform, but this chapter was thought to be the best place to discuss this subject.

Multiple comments of the employees about the MaaS-platform concerned the basic functionality of the app. These were comments like: the app has to be easy to use, the app should be safe and reliable, data in the app must be up-to-date, for example meaning that disturbances during a trip should be notified as soon as possible, and that the app should run on both Android and IOS.

Two other functionality-related comments were specific improvements regarding the GoAbout app, as these were named by the respondent that already used GoAbout. These were the fact that once you have accidentally chosen the wrong subscription in the app, for example when you pick your personal subscription where you should have picked the business subscription, there is no way to change that. Then you have to send an email to GoAbout to convert that, which should be easier. Second, there was the point that the app keeps asking you to turn on your location and Bluetooth, which are mostly needed for shared vehicles, when you only want to check the app for trains. But *“other than that, it works perfectly (Respondent 1).”*

The comment about sending an email to GoAbout to convert the trip to the right subscription is also something that was named by another employee as a general requirement for the MaaS-platform. This employee argued that the MaaS-platform should offer a good service for when something goes wrong, such as checking in or out and getting reimbursed for such things.

Stepping away from the comments about functionality, the employees also discussed some general ideas they had about the MaaS-platform and MaaS-app. First of all, the app should show different alternatives for a trip based on time of arrival and costs, but also sustainability. For example, an option could be added with ‘the greenest option’, besides the shortest and cheapest. That way, employees could be motivated to use the most sustainable way of transport for their business trips. *“Just like being able to choose between fastest and shortest, you could also choose, you know, if you want to travel sustainably, choose this trip. Might take you ten minutes extra, but it’s the best one for the environment (Respondent 8).”*

Second, the app has to work in other public transport than trains as well. A QR-code in buses or trams is not user-friendly. This was also already mentioned in the evaluation report MaaS pilot SLIM Heyendaal (Haanstra et al., 2019). In that pilot, people noticed that conductors or bus drivers were unfamiliar with the GoAbout app, which sometimes led to issues. Besides, checking in with a QR-code on a bus is often not possible, meaning that there should be another option for that. *“I would like to know, since you were talking about a QR-code, but I don’t know if, for example, I can get into a bus with a QR-code, how that is arranged then (Respondent 5).”*

The third idea builds on the idea that MaaS would be implemented and that a nationwide network is

needed to provide a system that is as easy to use as the current way of travelling for business. Within such a network there should not be any bureaucratic complexity, making sure that the supply of travel modes really is integral. *"The whole public transport network must be included. So it cannot be that I suddenly, that the app says: well sorry, the subway of Rotterdam is not included (Respondent 7)."* Part of this bureaucratic complexity, for example, is that, according to this employee, the 'OV-fiets' should be included in the MaaS-platform, making sure that there are guaranteed shared bicycles at every location. *"It has to be able to offer the things that people really need. And of course, I am not at all interested in what shared bicycle system I'm using. So, yes, in that sense, I'm just a very normal, demanding user (Respondent 7)."*

A fourth suggestion that was made was to let the MaaS-platform correspond with Outlook, or with employee's agendas: *"that's something which I always find very pleasant, that there's some sort of export function like: put it in your agenda, and also with the travel time and, well, the relevant transfer points and you know, that's very pleasant (Respondent 8)."* Another respondent argued: *"I often use Outlook and we will be using that more and more, right, next year in January (2021) a process in which we will move on to Office365 will slowly start, meaning that the use of Office will be intensified. Well, let's connect that (MaaS) directly to Outlook. Yes, so that I, when I put things into my Outlook, that I can immediately plan from Outlook to Maas ... For example, currently, I experience this with Zoom and WebEx and those kinds of programmes. Well, the University doesn't allow those programmes to have direct access to my Outlook agenda. I understand that, that there are some sort of security issues, but for me as a user, I think that's bullshit. And that means that I have to do extra things, because I'm here using 3, 4, 5, 6, 7 programmes and none of them can communicate with my agenda. Well, the administration time increases (Respondent 5)."* This is the first time that security issues have come up. However, as was stated in paragraph 2.1.3., data security and privacy issues are a broader problem within smart mobility and MaaS. This subject came up in more interviews and will be discussed in the next paragraph.

The last, short suggestion or comment that was made concerning the MaaS-platform has to do with the ability to claim expenses through the platform. In claiming expenses, there needs to be flexibility when it comes to the cost centres. Depending on the faculty or department and people's job within those departments, some employees might need to claim costs for business trips in multiple cost centres: *"It depends on the structure of certain faculties to what extent people really use the same cost centre to claim their expenses, because it depends on the nature of their job. And for example, I have different roles within the faculty... and those are costs that need to be claimed at different places. So for me, that would be relevant, that there is some sort of flexibility in that. That you can say: well, normally there is a certain standard cost centre, but it would be pleasant if there's a function that you can adjust that for one or multiple trips (Respondent 8)."*

6.4.1. Data and privacy

The choice was made to discuss the subject of data and privacy in a separate paragraph because it is not just an issue for the MaaS-platform, but both the MaaS-platform and Radboud. Besides, it was discussed in multiple interviews.

Different aspects concerning MaaS-data came up in some of the interviews. First of all, the positive side of MaaS and the use of its data will be discussed. Using a MaaS-platform could make things easier for the people controlling the expenses that are claimed by the employees. When an employee plans a business trip while using the business subscription – which would be the way to plan a business trip with GoAbout in the pilot – it might not be necessary anymore to prove the ‘business nature’ of that trip, which would save time and effort for both the employees that have to claim their expenses and the people controlling the claimed expenses. Following this, the employee argued that employees immediately claiming their expenses could also *“make it easier to gain insight in the costs that are being made and for which destinations... I can imagine that it’s important for the university to want to have more real-time insight into the movements of the employees (Respondent 8).”* Another point, which stems from this increased insight, is the idea that data that comes from people using MaaS can be used to contribute to creating a tailored approach in stimulating people to use Mobility as a Service, which was discussed in paragraph 6.1.1. *“If, in a little while, the administration is automated in a better way, you can interrogate the people that you see are still very much using their private car (Respondent 5).”* This was also named by another employee, who argued: *“Maybe, you could deduce from MaaS who these people are [who still use their car when there’s a train leaving every ten minutes] and ask them targeted questions like: well, we see that you’re using the car very often, why is that? And then see if there’s something you can do to take away the obstacles or barriers for using the train (Respondent 8).”*

On the other hand, immediately after this quote, the employee also indicated that there might be certain issues with using data this way. First of all, it might not help in motivating people to use MaaS because of the high *“Big Brother level”* (Respondent 8). Second, this employee argued that *“you have to be very clear about the way that the data will be used ... you see, they (Radboud) are entitled to that data and at the moment they also have some of that data, but ... you are now going to supply all kinds of information about your movements on a silver platter and I think that there will also be some resistance amongst a lot of people about that (Respondent 8).”*

This point was also shared by another employee who also looked at the point of a tailored approach in motivating people to use MaaS from another angle. This will be illustrated by a relatively longer quote, to be able to capture this whole argument. *“You see, at the moment I can choose to go somewhere for my work and not claim the costs and then nobody at my department will know that I*

went there. And that will of course be impossible then because you're obligated to share your mobility data ... And you can ask yourself: is that a bad thing, because these are business trips that you're making. But well, let's see, yes, you will of course be held personally liable. I'm researching this so that's why I'm looking into this a little deeper. You will of course be held personally liable for your travel behaviour and that is, that's something different than what's happening at the moment (Respondent 11).” Furthermore, this employee argued that this concerns professional privacy which is at stake, which makes the way that the MaaS-data is being handled in the future something to think about even more.

Because of these statements, both employees were also asked about the extent to which Radboud, according to them, had the right to that data as it applies to trips being made during business hours and which are being paid for by Radboud. In principle, both of the employees thought that, to some extent, Radboud has the right to this data as it is data about business trips: *“I think so. I think, in principle, I think so. Yes, when the boss, when Radboud pays, then they may also know where I am, to a certain extent. But there has to be a possibility to turn it off as well* (Respondent 11).”

This issue, about data and privacy, is something which Radboud has to discuss internally, but also together with the MaaS-platform, as they will also have access to the data. *“In principle, maybe not that much will change, but it is of course, it's different when that can all be tracked on some app and for example an alarm bell can be set (when something seems wrong with the travel data). Yes, and besides, the data will probably become available to a different company as well and that might be a little weird* (Respondent 11).” This quote shows that the processing of the data is a subject that might be important for a lot of employees in accepting MaaS.

7. Conclusion

This study has aimed to answer the question: “What services are needed for Radboud University- and Radboudumc employees to be willing to use one central interface which carries out every aspect, such as planning, booking, and payment, of their domestic business trips?” To explore this, a qualitative study was carried out in which employees of Radboud University and Radboudumc were asked about what they need to see changed to be willing to use Mobility as a Service for their domestic business trips.

The results have shown that the interviewed employees were flexible in their transport mode choice for business trips in the past. A majority of the respondents used both public transport and the car for their past business trips. In general, most of the employees prefer to use public transport as they support the basic idea of travelling sustainably, but since they have a limited amount of time, efficiency is very important in making business trips. This also shows in the reasons why they use a certain mode of transport, as ‘efficiency’ and ‘accessibility’ are the most important variables that define the choice for a transport mode. The variables of the Technology Acceptance Model with components of the Theory of Planned Behaviour and Habit turned out to be less important than the practical considerations of ‘efficiency’ and ‘accessibility’. Based on the interviews, it can be concluded that the TAM-TPB-Habit variables are more influential in the transport mode choice for non-business trips.

A majority of the interviewees were positive about the concept of Mobility as a Service, stating that it is an interesting initiative that can help in making business trips more sustainable. However, looking at the need for efficiency in business trips, MaaS needs to have some sort of added value for it to be able to compete with the current way that employees make their business trips. This added value can be found in the process of expense claiming, which can be a time-consuming process, especially for Radboud University employees that make a lot of business trips. Other aspects that could add value to the process of making business trips are the variety of modalities in MaaS and the integral overview of a trip in a MaaS-app.

An important point to keep in mind that could hold back the future use of MaaS, is the fact that a lot of business trips depart from home. Adding to this that, due to the current situation with Covid-19, people will probably work from home more often and that the number of business trips will probably decrease because of this, could make the future use of MaaS less successful.

The most important subject that Radboud needs to decide on is how it wants to implement MaaS. According to most of the respondents, this should be done by stimulating the use in a positive way. That way, there would be some flexibility in transport mode choices, which could be useful for

business trips that depart from home. However, other employees argued that the implementation of any new development is most successful when an organisation fully commits to that new development, meaning that Radboud should choose MaaS and stick with it, making sure that every employee starts using it.

The role that the employees see for Radboud depends on the way that MaaS will be implemented. When Radboud wants to start by stimulating MaaS in a positive way, its most important goal is to create a high level of MaaS acceptance. This can only be achieved if car users and employees in high positions are also included in that. According to a majority of the employees, this can best be achieved by communicating about MaaS. The communication should be organised through a combined communication strategy for both Radboud University and Radboudumc.

On the other hand, if Radboud wants to implement MaaS and make sure that it will be used by everyone, it needs to make sure that, together with the MaaS-platform, there is a fully integrated MaaS network throughout the whole country. That way MaaS can also be used for business trips from home. Following up on creating a fully integrated MaaS network, there is the implementation of shared vehicles on campus. There needs to be a sufficient amount of shared vehicles on campus that also have to be easily accessible. On the other hand, Radboud needs to decide whether there is room for shared cars on campus. With the car-free campus that is being proposed for 2030, several employees argued that shared cars on campus are unnecessary.

Apart from cooperating on creating a fully integrated MaaS network, the employees also named other expectations for the MaaS-platform that need to be met. These expectations were mainly functionality-related, especially with regard to the MaaS-app. Furthermore, some ideas that could enhance the MaaS-acceptance were proposed in the interviews. The most important aspect in this is the way that the MaaS-platform and Radboud will process the data that comes from employees using MaaS. On the one hand, the data can be used to create a tailored approach in stimulating people to use MaaS, but on the other hand, there are privacy issues that will need to be sorted out by both parties to make sure that employees will trust MaaS.

This qualitative study has explored what is needed for Radboud employees to start using MaaS for their domestic business trips. Based on the interviews with employees, it can be concluded that MaaS needs to be able to compete with other transport modes in terms of efficiency to be successful. For this to be possible, Radboud and the MaaS-platform need to create a fully integrated network of mobility options, both on campus and throughout the country. Besides, Radboud needs to create support for MaaS among employees, which can best be done through a joint communication strategy for both Radboud University and Radboudumc. Altogether, the quality of MaaS will be decisive for its success.

8. Discussion

For this research, employees of Radboud University and Radboudumc were interviewed to understand what is needed for employees to be willing to use Mobility as a Service for their future domestic business trips. Based on the literature review and theoretical framework, five propositions were created to steer the analysis of this study. The first expectation that was displayed in the propositions was that the employees' choice for a travel mode for their past business trips was influenced by the variables of TAM-TPB-Habit. The results have shown that, although these variables did play a role in the interviewee's past business trips, there were other variables that played a more important role, such as 'efficiency' and 'accessibility' of the destination. This probably has to do with the limited amount of time that employees have in making their business trips. In general, the variables of TAM-TPB-Habit played a bigger role in the respondent's non-business trips.

This also plays a role regarding proposition 3, which determined that the TAM-TPB-Habit variables will influence the future use of MaaS. As MaaS can help make business trips more sustainable, 'attitude' and 'subjective norm' can play a bigger role in the modal choice for future business trips. However, based on the interviews with employees, only the fact that MaaS could make business trips more sustainable will not convince them to start using MaaS, meaning that the role of 'attitude' and 'subjective norm' will not be that decisive. MaaS needs to be able to compete with the current travel modes in terms of efficiency or there needs to be some other form of added value, for example claiming expenses more easily, to make people want to use it for their future business trips.

Proposition 2 was also influenced by the fact that efficiency is such a key part of business trips. Based on the literature review, it was expected that the modal choice for past business trips would correlate with the level of MaaS acceptance. However, as most of the interviewed employees do not stick to one type of travel mode, this was difficult to analyse. As was discussed in chapter 5, it can be argued that there is a correlation between the fact that most of the respondents preferred to use public transport in past business trips and their opinion on MaaS as most of them think that MaaS is an interesting concept. This could mean that the expectation in proposition 2 is plausible for the interviewed employees, but the correlation is not strong.

Propositions 4 and 5 display the exploratory nature of this study. Therefore, the results concerning these two propositions are open to a more interpretative discussion. The results chapters and the conclusion have shown the subjects that Radboud and the MaaS-platform need to work on to increase the level of MaaS acceptance. The central decision that needs to be made is the extent to which MaaS should be used for future business trips. Is the goal to add MaaS to the spectrum of transport modes that can be used for business trips and leave it at that or is it the goal that every employee eventually has to use MaaS for their business trips?

This central question can be compared to the discussion between motivating people to use MaaS but leaving some flexibility in transport modes or implementing MaaS like other past implementations and not bothering employees too much with it. The opinions of the interviewed employees on this have been discussed at length earlier on and will not be repeated here. However, there are multiple aspects that play a role in both sides of this decision that need to be discussed. The main aspect concerns the efficiency of MaaS and as a part of that, the degree of coverage of shared mobility options. MaaS has to be able to compete with other transport modes in terms of efficiency, accessibility and travel time for it to be interesting for business trips. For that to be true, a fully integrated MaaS-network is needed, with a sufficient number of shared vehicles, both on campus and throughout the country. At the moment with GoAbout, also looking at the comments of the respondent that already used the GoAbout app and the need to combine it with MobilityMixx, this is far from the case yet. GoAbout is still a new company which would make it difficult for them to provide Radboud with this network. This is why it might also be worth it to take a look at the NS-Businesscard since 'Greenwheels' and 'OV-fietsen' are part of this, which means that a network throughout the country is already available. Regarding this network, the plans to create a car-free campus by 2030 are important to keep in mind. This could mean that there either should not be any shared cars on campus as well, or these need to be placed somewhere nearby, which decreases the proximity of the vehicles, something that is important according to the interviewees.

The NS-Businesscard provides a link to the second aspect, the added value of MaaS and expense claiming. The fact that multiple employees argued that MaaS needs to provide some sort of added value to be an interesting alternative and the fact that some of the respondents already talked about other expense claiming options – and mentioning the NS-Businesscard in doing so – in the past shows that claiming expenses through a MaaS-platform could really work as a catalyst in creating a higher level of MaaS acceptance. Of course, the expense claiming process through a MaaS-platform must then be easier than the current process, which might be a challenge for Radboudumc but seems to be achievable at Radboud University. There is also a constraint regarding this point, namely the role that CIF and the whole financial system of the university, BASS, play in this. Based on the interview with the people from CIF, BASS will be used for several more years. That could hold back the use of MaaS if the goal is to make every employee use MaaS.

Third, there is the role of Covid-19 which leads to uncertainty around future business trips. A majority of the interviewed employees thought that the number of business trips will decrease and that people will work from home more regularly. Especially business trips can see large effects from Covid-19, as some of the respondents argued that making business trips is not an advantage of a job and that online meetings work pretty well. Except for building and maintaining a personal relationship, for example with a client, making business trips is mainly seen as annoying. Especially

trips to periodical meetings with the same group of people seem to be a form of business trips that could see its number decline in the future. It could be useful to see if this trend will develop further when Covid-19 is finished or whether everything will go back to normal. Fully committing to MaaS would be more logical when everything goes back to normal to make a bigger contribution to sustainability. Otherwise, stimulating employees to not make business trips at all could also be a way of being more sustainable.

A fourth and last point in this discussion is the use of data and the privacy of MaaS users. This has been discussed broadly in paragraph 6.4.1., but could definitely be withholding the acceptance of MaaS if it would not be taken care of properly. Radboud and the MaaS-platform need to determine how this data will be used and should be transparent in the communication to users about the data use to make sure that it does not affect the level of MaaS acceptance.

Based on the results, conclusion and this discussion, it can be recommended that the implementation of MaaS at Radboud takes place in phases, as was mentioned by one of the respondents in paragraph 6.2. This way, the MaaS trajectory could be started with MaaS as one of multiple transport modes with GoAbout as the MaaS-Platform. That would comply with how most of the interviewed employees see MaaS at the moment, but would also mean that Radboud still needs to work on the points that were discussed above. Later on, for example if a new financial system would be put into use and there is enough room and support for an integrated network, MaaS could be implemented like other past implementations, since the fact remains that any new development is most successful when an organisation fully commits to that development. It would be meaningful to decide on the phases beforehand.

Figure 16 represents a schematic overview of the discussion above.

The boxes and arrows represent the choice between MaaS as one of multiple transport modes or MaaS as the only mode of transport, and what needs to be done after that choice is made. The dashed arrows represent a situation in which the MaaS trajectory would be started by using it as one of multiple transport modes and fully implementing it later

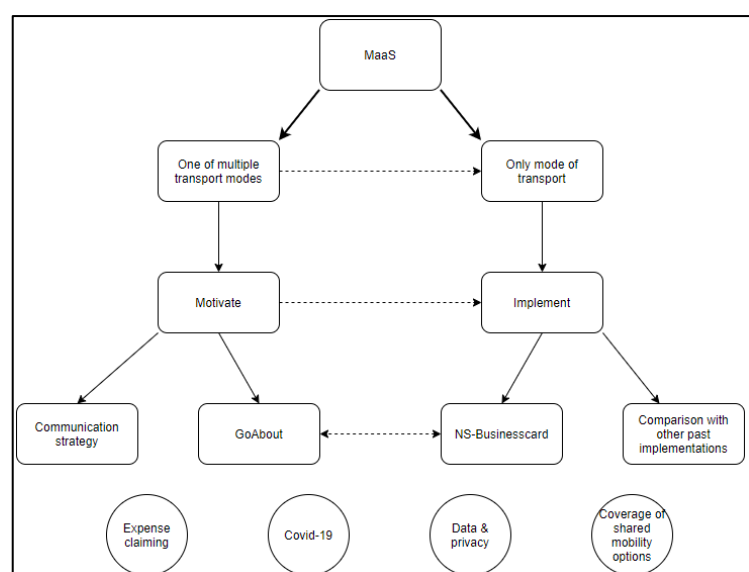


Figure 16 Schematic overview of decisions that need to be made (Source: Own work)

on. The circles represent the four aspects that play a role in both sides of this discussion.

8.1. Limitations & critical reflection

From the start of the Master's thesis period, the biggest limitation with multiple consequences has been the outbreak of Covid-19. Due to this, the original idea of a pilot in which people actually use MaaS over a certain period of time could not go through. At the start of the Master's thesis period, the main goal was to study the change of the employee's opinions once they would actually use MaaS. However, due to the pilot not going through, the scientific relevance had to be shifted from studying people's opinions on MaaS for business trips to filling a gap in the knowledge on MaaS because of the lack of knowledge there has been on MaaS in relation to business trips. This has made the study a lot more hypothetical, for example asking employees questions like: "If MaaS were at a level at which there would be a fully integrated network, what would be your opinion on the use of MaaS for business trips then?" Questions like these are much more hypothetical, especially when some of the respondents might not even grasp the whole idea of what MaaS is or can be, than questioning employees about their actual experiences with MaaS. These hypothetical questions could also be a limitation regarding the reliability of this study. Regarding the question above, respondents could have very easily said that they would use MaaS in the future because that would be the socially accepted or desirable answer. This response bias is something which always plays a bigger part in interviews than in surveys for example, but could be strengthened by the hypothetical nature of the study. Furthermore, Covid-19 has also been the reason that all the interviews had to take place online or by phone. This is not a big limitation, but in normal times, real-life interviews would have been preferred. A third and last limitation of this research lies in the selection of respondents. The search for respondents also took place online, as was described in chapter 3. Due to this, the dependence on other people to reach respondents increased. Besides, the reduction of cognitive dissonance that was discussed in paragraph 6.1.1. also plays a part in reaching out to employees this way. It is likely that employees who are already interested in MaaS or sustainability in general and use public transport for their business trips are more receptive of the idea to be interviewed about their business trips than employees who always use their car for business trips.

Reflecting on the results of this study, there were some outcomes that were not expected at the beginning. Looking at the choice for transport modes in the past, with the theoretical framework in mind, it was not expected that 'efficiency', 'accessibility' and 'practical considerations' would play such a big role in the choice for a transport mode. It turned out that, for the respondents of this study, the variables named in the theoretical framework played a bigger role in the choice for non-business trips instead. Following the fact that those three variables played such a big role, which led to employees choosing multiple modes of transport, also made the expected correlation between past transport modes and the likeliness of using MaaS in the future weaker for the interviewed

employees.

Regarding MaaS and the role of Radboud and the MaaS-platform in creating willingness to use MaaS, there were little expectations since this is an exploratory study. Consequently, the different opinions on a lot of the discussed aspects, such as expense claiming, MaaS as a concept, implementation of MaaS, and the role for shared mobility, made it challenging to create a clear overview of the most important arguments that were made in the interviews and a comprehensive conclusion.

Reflecting on my own role in this Master's thesis period, this process has made me understand the importance of separating the main subjects and opinions from the side issues. For quite a while, both during the coding process and the process of describing the results, separating the most important aspects from the less important ones was really difficult, because at the same time the goal is to give voice to every respondent and all the points that were discussed with the respondents as these points were important to them. However, as said above, wanting to give voice to every respondent while their opinions can be very different makes it difficult to provide a clear overview of those different opinions and at the same time creating a comprehensive representation of the results. That has been the main struggle throughout this process of writing the thesis. This has also been the main reason, besides the delay due to Covid-19, for why the writing of this thesis has taken me a longer time than was expected upfront. The fact that some of the network analyses in appendix 3 are unreadable show that a lot of codes have been used and that there were a lot of aspects which related to each other or influenced other aspects. This has been discussed with my supervisor, who encouraged me to reduce the amount of quotes by quantifying them into more overarching codes, but this remained difficult for me due to the feeling that every discussed aspect seemed important. Furthermore, this thesis process has taught me that doing the interviews, talking to employees about their business trips and opinions on MaaS has been the most exciting part of this process, while beforehand this was something which was looked up to the most.

8.2. Recommendations

A recommendation for the problem at hand in this research has already been brought up in the final part of the discussion. The recommendations in this paragraph comprise the recommendations for future research. These are both case-specific as well as theory related. Regarding the implementation of MaaS at Radboud, the first phase of the implementation is a subject that could be studied. For this, a pilot could still be useful to understand how employees value MaaS when they actually use it. The actual use of MaaS for business trips remains unstudied. The results of this study, such as the need for a network of shared mobility that is highly accessible, can be used ahead of this pilot to create an environment in which the results from the pilot will be more representative. Another aspect that can be studied regarding the first phase of the implementation of MaaS is the

communication strategy that needs to be created to inform employees about the ability to use MaaS for business trips. How that communication strategy can be built up best is something that needs to be studied to gain attention for MaaS and implement MaaS as successfully as possible.

Third, touching on both case specific and theory related aspects is a recommendation that builds on the tailored approach discussed in paragraph 6.1. A respondent argued that it could be useful to roll out a large survey, asking employees about their choices for transport modes for business trips.

Researching this could have multiple advantages, such as creating a tailored approach to make people think about their travel behaviour and consider using MaaS, testing whether 'efficiency' and 'accessibility' are really the most important variables in the transport mode choice for making business trips and maybe being able to generalise that, and building on further knowledge about the use of MaaS for business trips.

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Appendices

Appendix 1: Interview guide

Opening

Beste meneer, mevrouw,

Voordat we beginnen: heeft u er problemen mee als dit gesprek opgenomen wordt?

Bedankt dat u mee wil werken aan dit interview. Ik ben Daan Ackema, masterstudent Geografie, Planologie en Milieu met als specialisatie Urban and Regional Mobility. Dit interview gaat over de toekomst van het binnenlandse zakelijke reizen van werknemers van de Radboud Universiteit en het Radboudumc. Het wordt uitgevoerd vanuit het samenwerkingsverband Duurzaam Bereikbaar Heyendaal en daarbij wordt ik begeleid door Carlo Buise en Henk Meurs. In eerste instantie was het idee voor dit onderzoek om werknemers gedurende een pilotperiode gebruik te laten maken van GoAbout, een app die reizen plant volgens het principe van Mobility as a Service. Echter, vanwege de coronacrisis is het zakelijk reizen tot stilstand gekomen en kon de pilot in die vorm dus niet voortgezet worden. Daarom ga ik nu door middel van interviews met werknemers onderzoeken wat zij van het Radboud verwachten om in de toekomst gebruik te maken van MaaS/GoAbout voor hun binnenlandse zakelijke reizen.

Inleiding (zie enquête 0-meting)

Wat is uw leeftijd?

Waar woont u?

Op welke afdeling werkt u?

Wat is uw functie binnen deze afdeling?

Hoeveel dagen per week werkt u gemiddeld?

Huidig reisgedrag

Welke vervoersmiddelen gebruikt u normaal gesproken in het dagelijks leven en hoe vaak gebruikt u ieder van deze vervoersmiddelen?

Wat zijn de belangrijkste redenen dat u deze vervoersmiddelen gebruikt?

Heeft u een OV-abonnement en zo ja, welk abonnement? Gebruikt u voor uw OV reizen al een app?

Hoeveel zakelijke reizen maakte u gemiddeld voor de coronacrisis?

Welk(e) vervoersmiddel(len) gebruikte u hiervoor?

Waarom koos u voor dit/deze vervoersmiddel(len)? (Psychologisch/gebruiksgemak)

Overwoog u wel eens van vervoersmiddel te veranderen? Waarom wel/niet?

Kunt u een reden bedenken waardoor u in de toekomst wel zou veranderen van vervoersmiddel?

Hoe heeft u uw zakelijke reizen gedeclareerd en wat vond u van dat proces?

Had u voor dit interview al ooit van Mobility as a Service gehoord?

Wat vindt u van het concept van Mobility as a Service?

Zou u MaaS op dit moment overwegen te gebruiken voor zakelijke reizen? Waarom wel/niet?

Toekomstig reisgedrag

Indien MaaS niet overwogen op dit moment: wanneer zou u Mobility as a Service wel overwegen voor uw zakelijke reizen?

Wat is de reden dat u niet overweegt te wijzigen (Gewoonte)?

Indien MaaS wel overwogen: wat heeft u nog tegengehouden om MaaS daadwerkelijk te gebruiken?

Waarom zou u in de toekomst wel overwegen MaaS te gebruiken (TAM-TPB-Habit)?
(Psychologisch/gebruiksgemak)

Indien al gebruikmakend van MaaS: Wat kan er nog verbeterd worden om het gebruik van MaaS voor uw zakelijke reizen soepeler te laten verlopen?

Nu u weet wat MaaS inhoudt, zou u in de toekomst MaaS gebruiken voor uw zakelijke reizen? Waarom wel/niet?

Op welke manier is uw standpunt ten opzichte van het openbaar vervoer en deelvoorzieningen veranderd door de uitbraak van het coronavirus?

Hoe gaat deze crisis denkt u uw toekomstig reisgedrag beïnvloeden?

Diensten van RU en RUMC

Het Radboud heeft meerdere redenen om het toekomstige gebruik van Mobility as a Service te onderzoeken. Zo investeert de universiteit in het algemeen veel in verduurzaming, heeft het UMC als doelstelling om in 2030 energieneutraal te zijn, en zouden ook praktische zaken als het vergemakkelijken van declaraties van toegevoegde waarde kunnen zijn.

Wat voor rol ziet u weggelegd voor het Radboud in het mogelijk maken van een switch naar MaaS voor zakelijke reizen? Wat zijn andere partijen die hier volgens u een rol in spelen?

Hoe kan het Radboud ervoor zorgen dat de wil om MaaS te gebruiken bij u groter wordt?

Wat kan het Radboud volgens u praktisch doen om het gebruik van MaaS onder de aandacht te brengen bij de werknemers?

Diensten van MaaS-platform

Welke rol ziet u weggelegd voor het MaaS-platform in het mogelijk maken van een switch naar MaaS voor zakelijke reizen?

Als er een MaaS-app in gebruik wordt genomen, waar moet de app dan volgens u aan voldoen?

Zijn er andere praktische zaken die bij een overstap naar Mobility as a Service beter geregeld kunnen worden dan nu het geval is?

Bent u op dit moment door het interview en de deelname aan het onderzoek al anders gaan denken over uw manier van zakelijk reizen en het gebruik van MaaS in de toekomst? Indien ja, wat is er veranderd?

Afsluiting

- Dankwoord
- Vragen of ze interesse hebben in het uiteindelijke resultaat → opsturen → e-mailadres vragen

Appendix 2: List of respondents

This appendix shows an anonymised list of respondents that were interviewed during the process of data collection. The order is based on the date that the interview took place.

Respondent number	Interview date	Work position(s)	Radboud University/Radboudumc	Transcript number
1	23-09-2020	Environmentalist	Radboudumc	1
2	24-09-2020	Health and safety coordinator	Radboudumc	2
3	25-09-2020	Team leader environment	Radboudumc	3
4	06-10-2020	Safety expert	Radboudumc	4
5	08-10-2020	University teacher strategic change	Radboud University	5
6	09-10-2020	Professor of prevention in healthcare	Radboudumc	6
7	29-10-2020	Professor social geography & head of GPE department	Radboud University	7
8	04-11-2020	Director research centre & professor civil law	Radboud University	8
9	17-11-2020	Professor business administration	Radboud University	9
10	23-11-2020	Head of department & team leader financial department	Radboud University	10
11	01-12-2020	Associate professor analytical chemistry	Radboud University	11
12	09-12-2020	Occupational hygienist & team leader health and safety	Radboudumc	12

Table 6 List of respondents (Source: Own work)

Appendix 3: Network analyses

To show the way in which all the codes are related to each other, the network analyses were put in the appendix. As was touched upon in paragraph 3.3, the fact that these networks do not provide a clear overview which makes it unreadable is why they have not been discussed in chapters four to six. It is put in this appendix to show that the analysis has been done and to make visible how the different subjects – every colour represents a subject – are related to each other. From what can be seen and was discussed in the critical reflection, dividing the text into different paragraphs was quite hard since it felt like every subject was related to every other subject in one way or another.

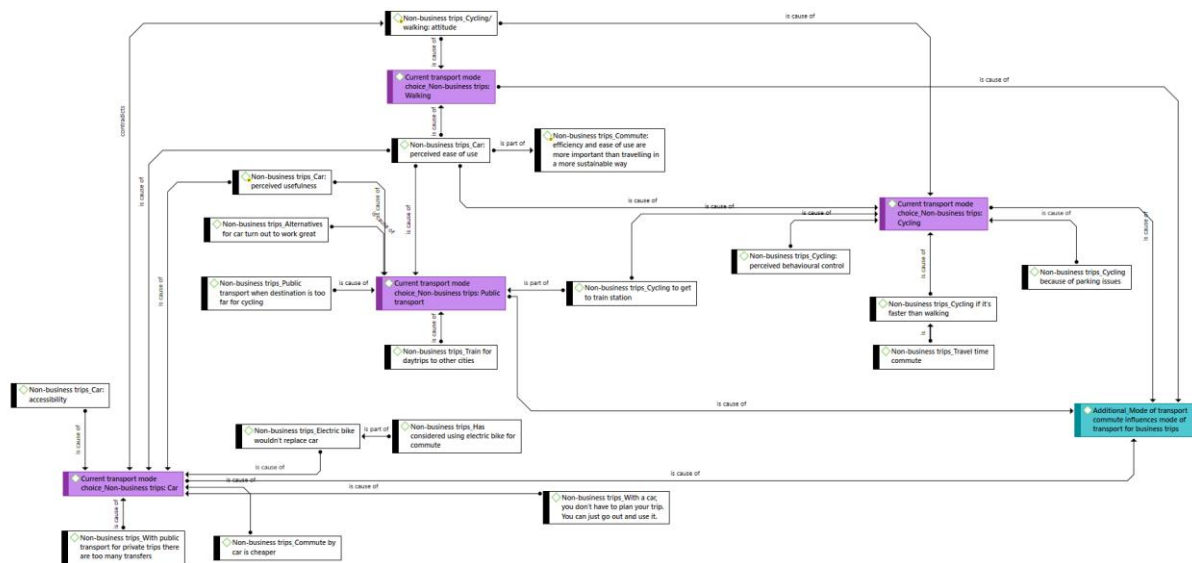


Figure 17 Network analysis transport modes for non-business trips (Source: Own work)

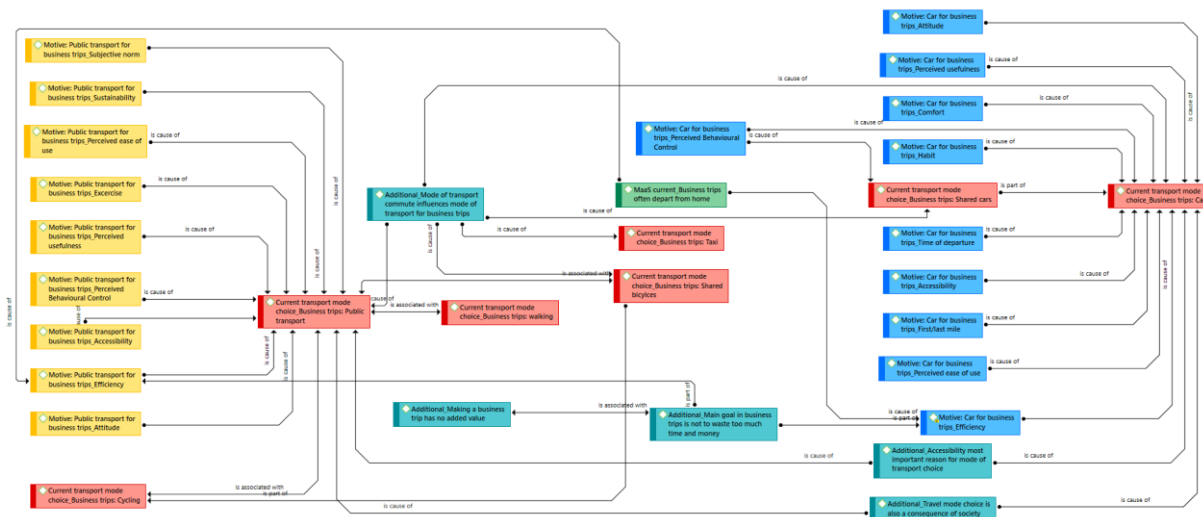


Figure 18 Network analysis transport modes for business trips (Source: Own work)

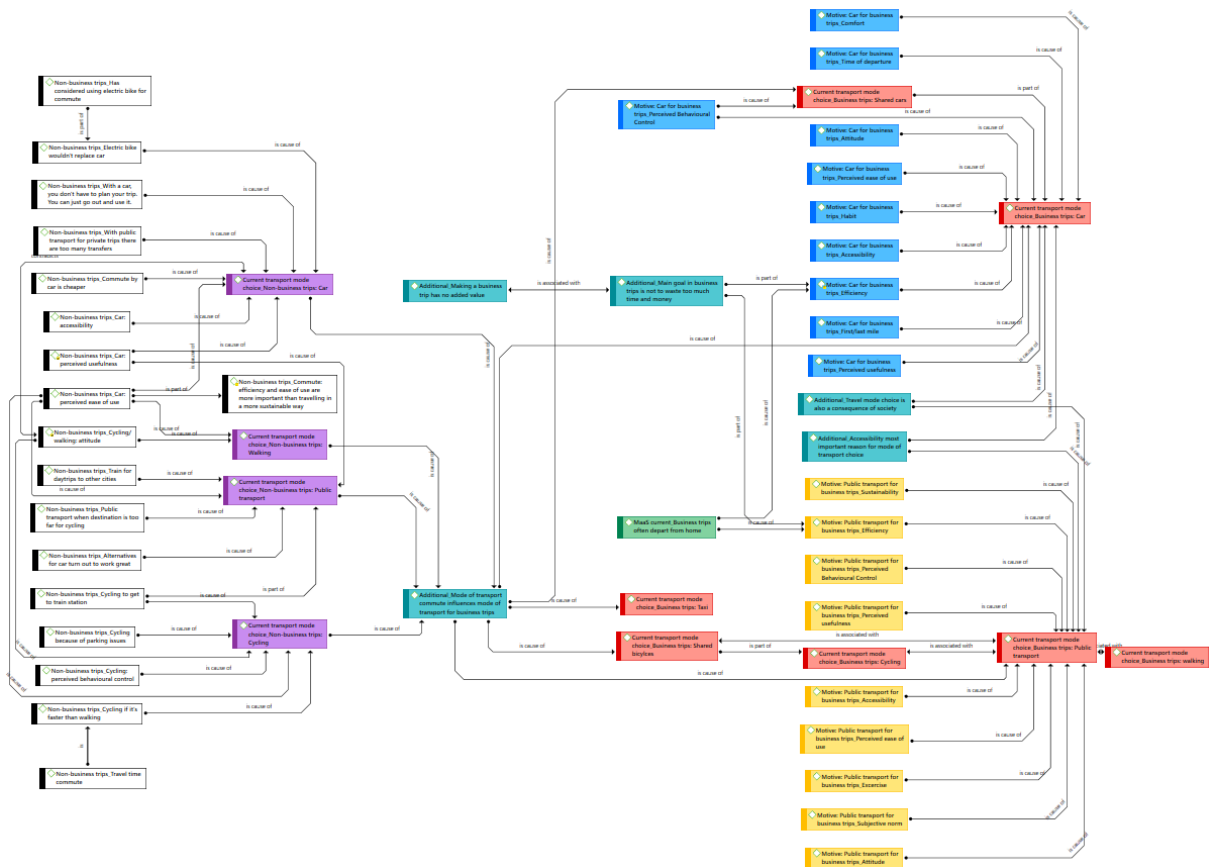


Figure 19 Network analysis transport modes (Source: Own work)

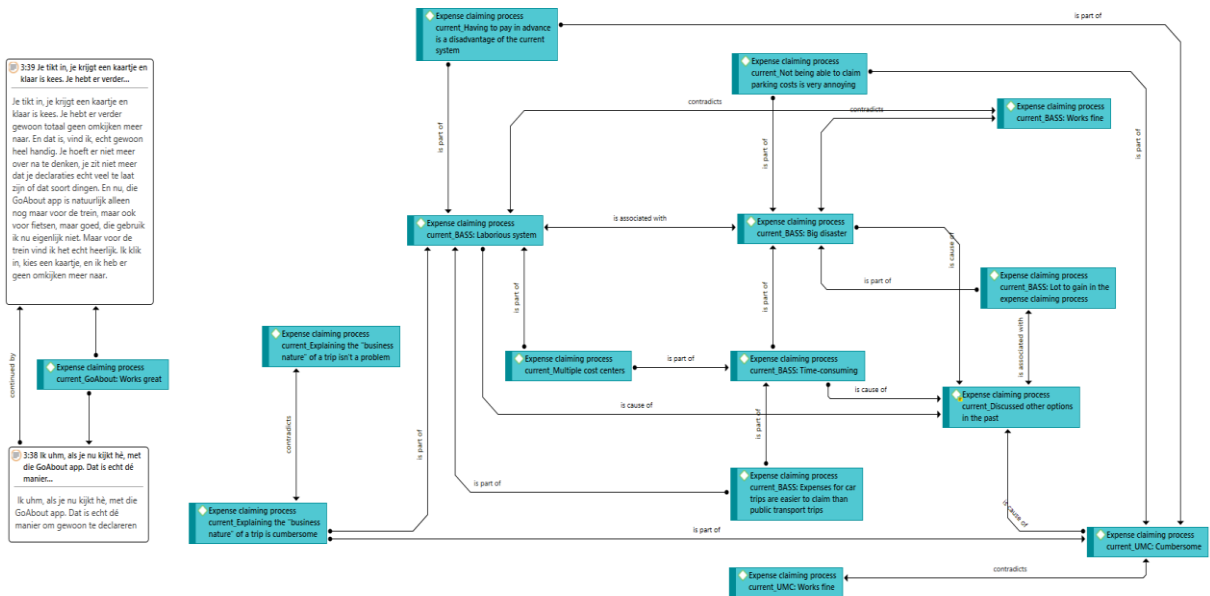


Figure 20 Network analysis expense claiming process (Source: Own work)

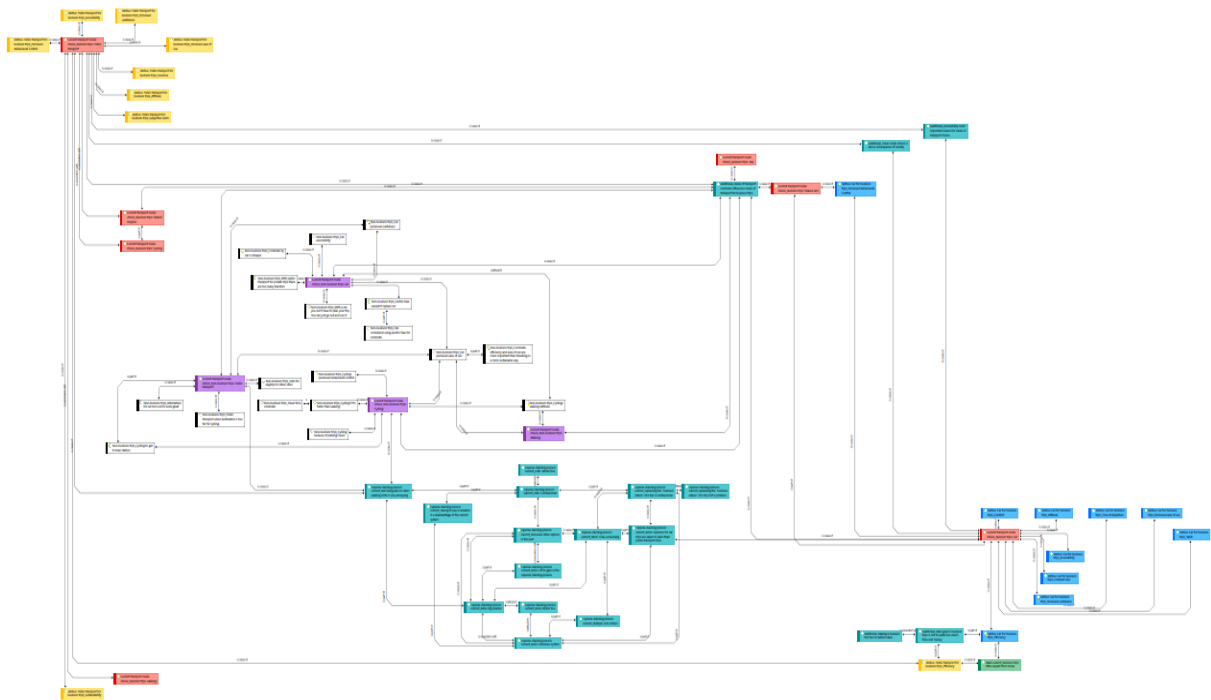


Figure 21 Network analysis transport mode choices and expense claiming process (Source: Own work)

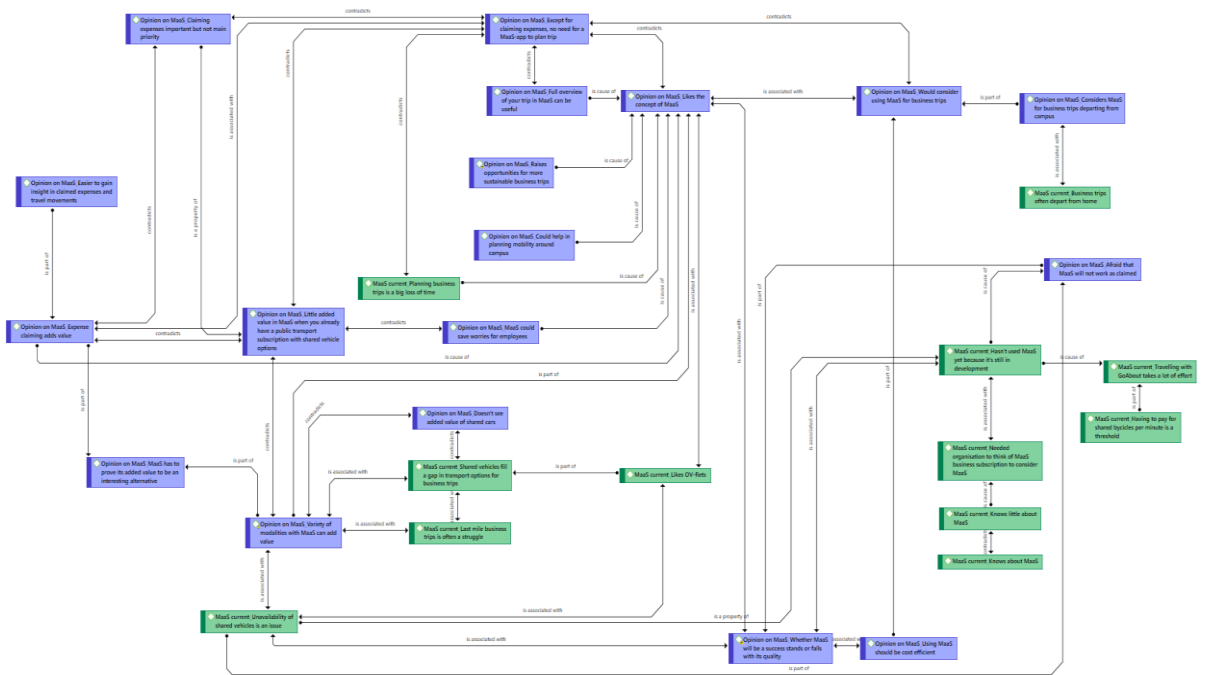


Figure 22 Network analysis thoughts on MaaS (Source: Own work)

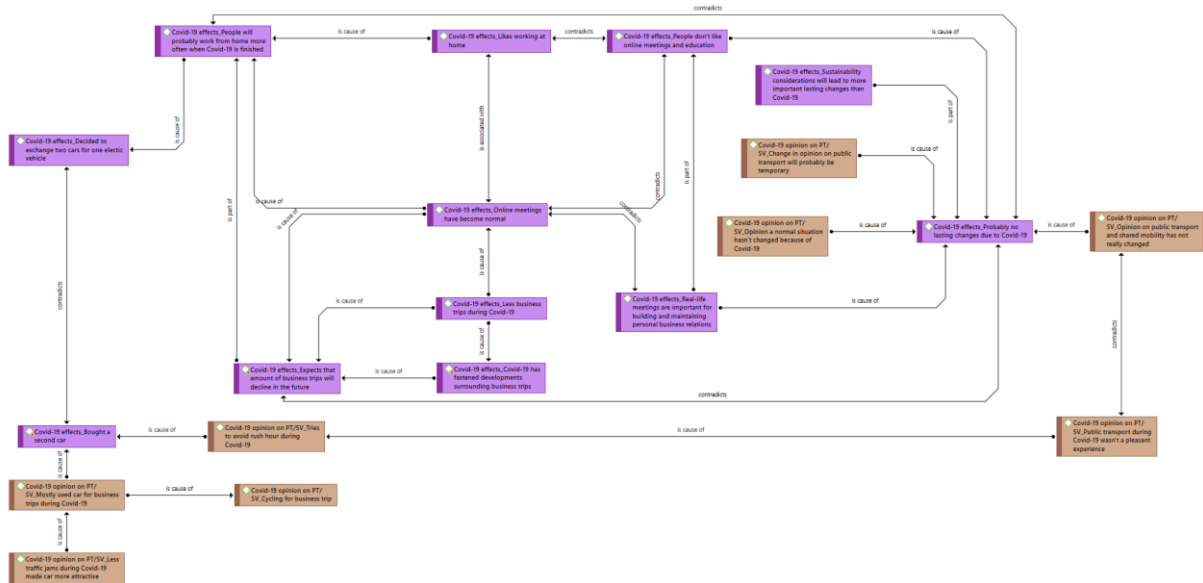


Figure 23 Network analysis impact of Covid-19 (Source: own work)

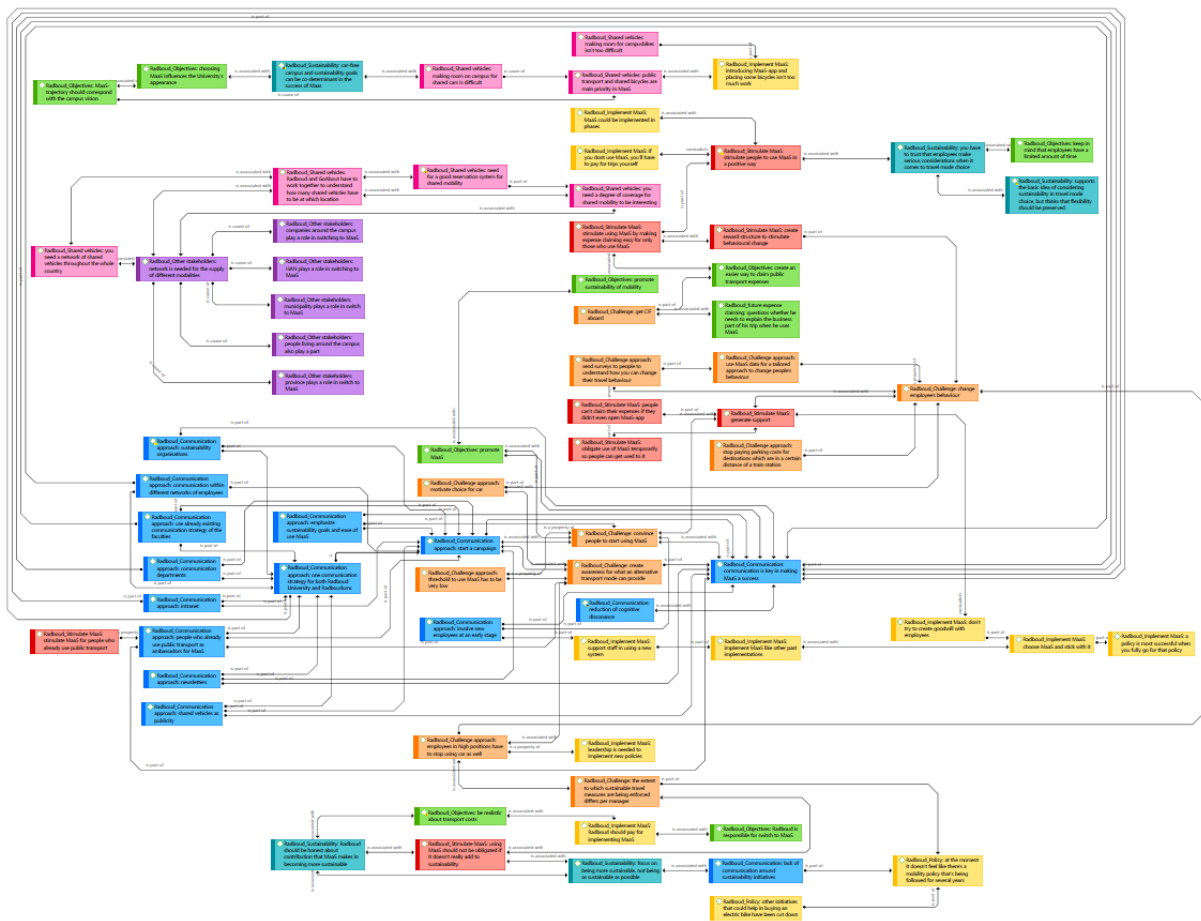


Figure 24 Network analysis Radboud's role (Source: own work)

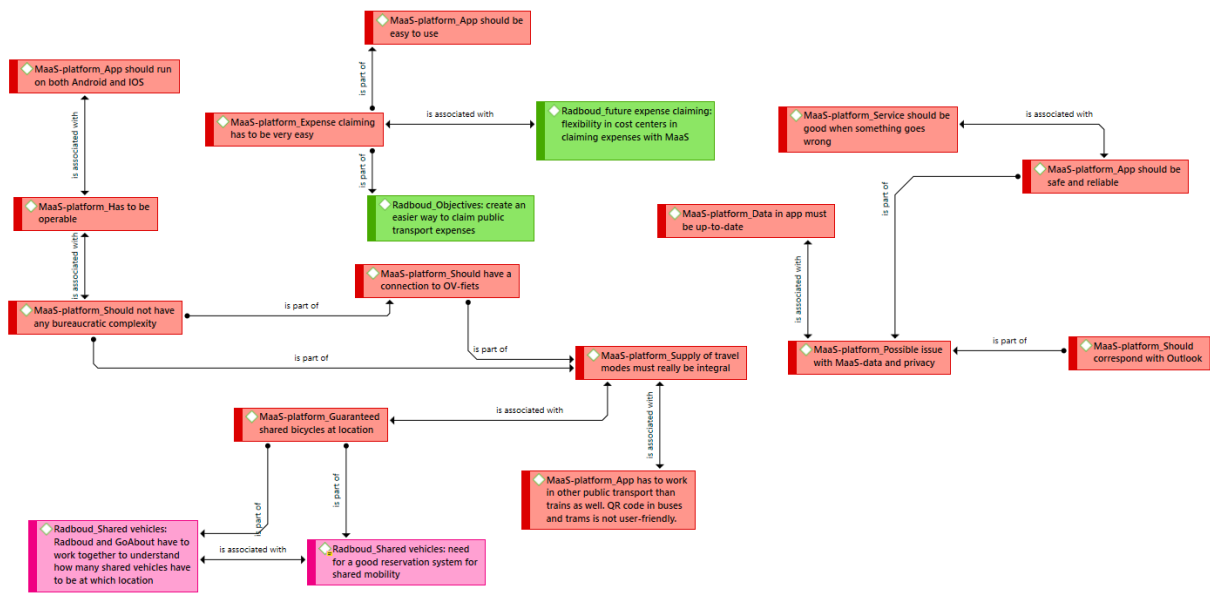


Figure 25 Network analysis MaaS-platform (Source: Own work)

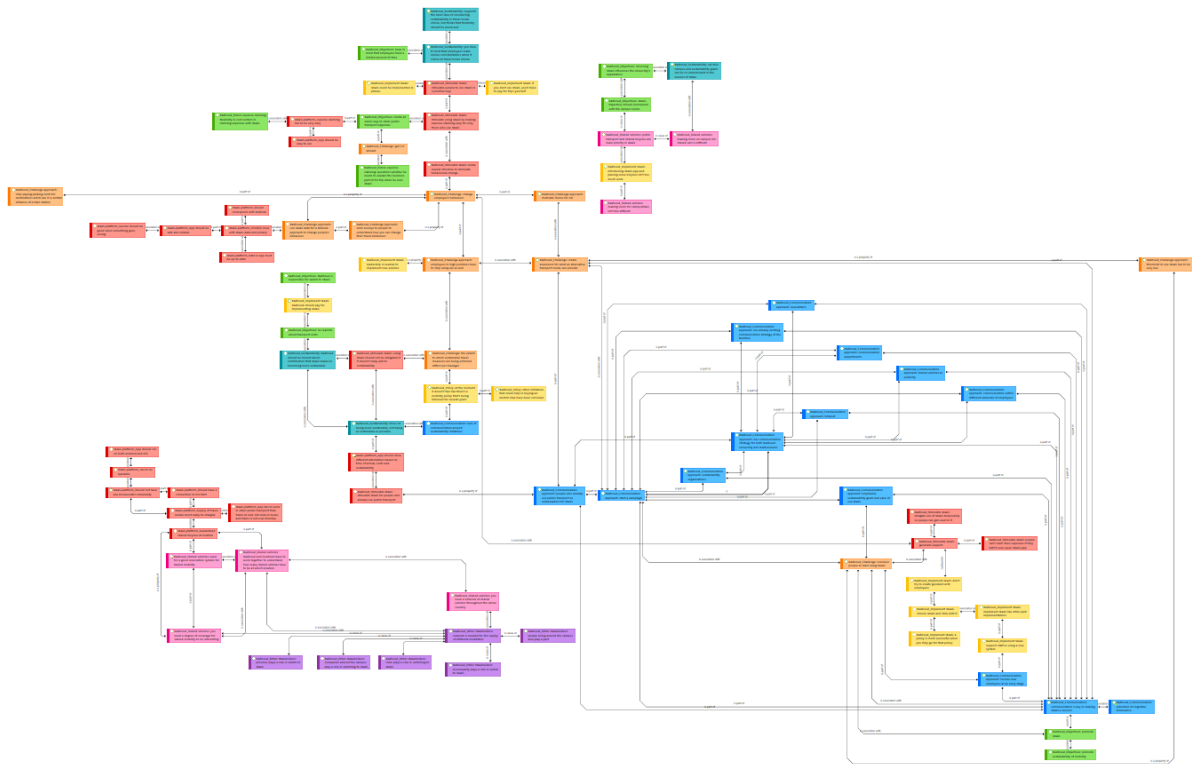


Figure 26 Network analysis Radboud's role and MaaS-platform (Source: own work)

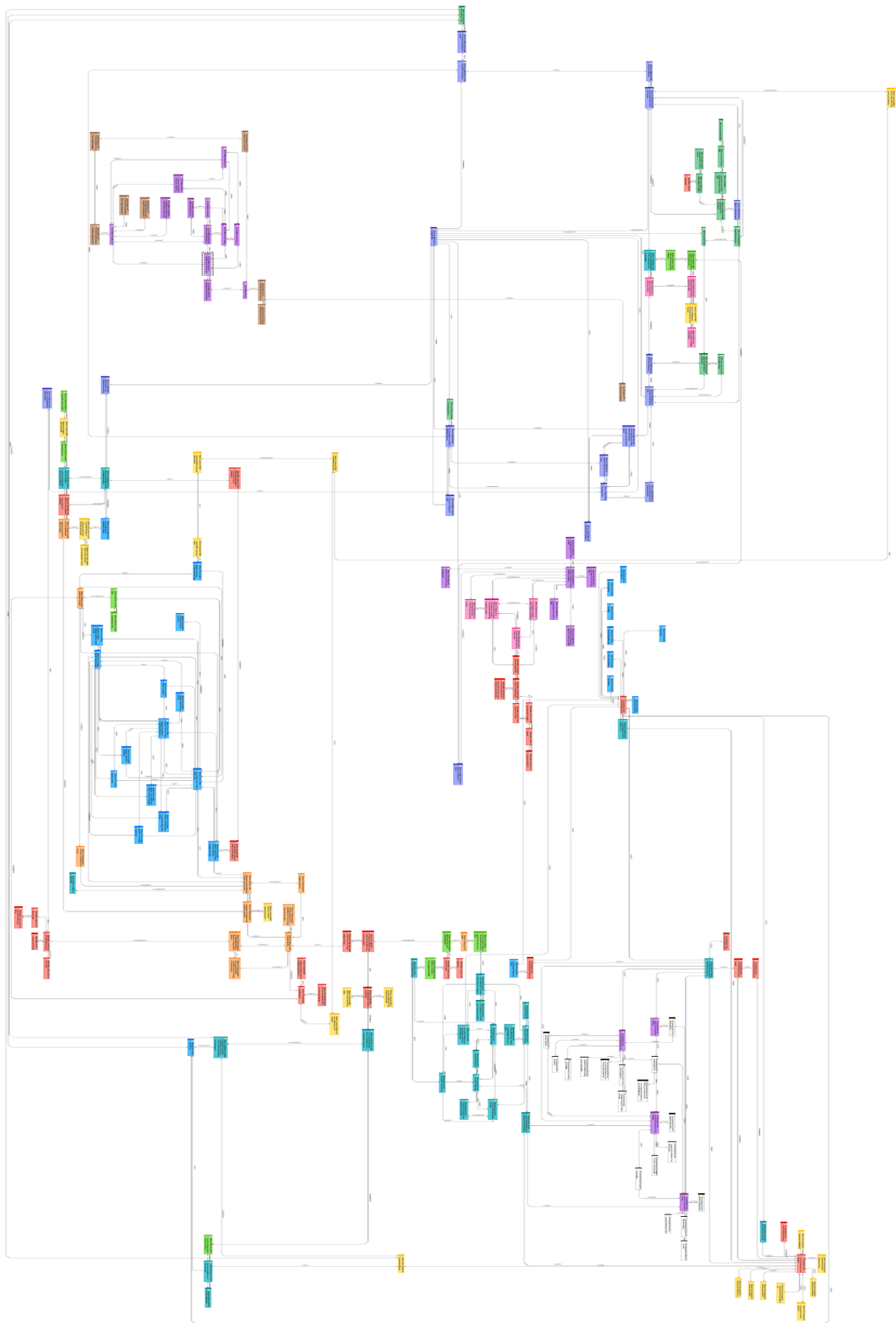


Figure 27 Complete network analysis including every subject (Source: Own work)

Appendix 4: Code Book

Below is a list of Codes that was used during the analysis of the results of this study. Comments represent thoughts that occurred during coding or points that seemed important for the analysis. Groundedness of the codes shows the amount of times the codes has been used and density shows the amount of links a code has to other codes. Code groups represent all the groups of codes that a code was placed in during the analysis.

Code	Comment	Grounded	Density	Code Groups
# Area of discipline		4	0	
# Area of interest		3	0	
# Introduction_Campus sustainability		4	0	
# Introduction_Netwerk Duurzame Ontwikkeling		2	0	
# Introduction_Sustainability		4	0	
# Job department		11	0	
# Job description		22	0	
# Place of residence_Municipality Nijmegen		8	0	
# Place of residence_Outside Nijmegen		3	0	
# Public transport subscription_Dal Voordeel subscription		5	0	
# Public transport subscription_No		7	0	
ADDITIONAL		0	0	
Additional_Accessibility most important reason for mode of transport choice		4	2	Business trips Motive: Car for business trips Additional thoughts Motive: Public transport for business trips
Additional_Being in a traffic jam is also a delay		1	1	Additional thoughts
Additional_Main goal in business trips is not to waste too much time and money		1	4	Business trips Motive: Car for business trips Additional thoughts Motive: Public transport for business trips

Additional_Making a business trip has no added value		2	1	Business trips Motive: Car for business trips Additional thoughts Motive: Public transport for business trips
Additional_Mode of transport commute influences mode of transport for business trips		2	9	Business trips Non-business trips Motive: Car for business trips Additional thoughts Motive: Public transport for business trips
Additional_Nijmegen difficult place to travel from		1	0	Additional thoughts
Additional_Practical need is central	- Sustainability considerations shouldn't outweigh practicality	3	0	Additional thoughts
Additional_Public transport always has a time disadvantage		1	0	Additional thoughts
Additional_small travel agency for sustainable transport		1	0	Additional thoughts
Additional_Travel mode choice is also a consequence of society		1	2	Business trips Motive: Car for business trips Additional thoughts
AMOUNT OF BUSINESS TRIPS		0	0	
Amount of business trips_High		8	0	
Amount of business trips_Low		2	0	
Amount of business trips_Medium		2	0	
AMOUNT OF WORKING DAYS		0	0	
Amount of working days_0,8 fte job		2	0	
Amount of working days_0,9 fte job		1	0	
Amount of working days_Full-time job		7	0	
APP PUBLIC TRANSPORT		0	0	
App public transport_9292		4	0	

App public transport_9292 is a deficient app		3	0	
App public transport_GoAbout		2	0	
App public transport_GoAbout pleasant app		1	0	
App public transport_Google Maps		3	0	
App public transport_Google Maps pleasant app		1	0	
App public transport_NS		7	0	
App public transport_Unspecified app		3	0	
COVID-19 EFFECTS		0	0	
Covid-19 effects_Bought a second car	Verschil met auto's inleveren is opvallend. De ene levert auto's in omdat ze verwachten dat het in de toekomst anders blijft, meer online. De ander koopt een extra auto omdat het openbaar vervoer niet bevalt tijdens Covid-19. Gevolg van slechte ervaringen OV. Terwijl andere een gevolg is van meer thuis werken.	1	3	Covid-19 effects Covid 19
Covid-19 effects_Covid-19 has fastened developments surrounding business trips	Geen internationale congressen meer bijv.	4	2	Covid-19 effects Covid 19
Covid-19 effects_Decided to exchange two cars for one electric vehicle		1	2	Covid-19 effects Covid 19
Covid-19 effects_Expected that amount of business trips will decline in the future	Increase in online activities will lead to decrease amount of business trips	10	5	Covid-19 effects Covid 19

Covid-19 effects_Less business trips during Covid-19		9	3	Covid-19 effects Covid 19
Covid-19 effects_Likes working at home		6	3	Covid-19 effects Covid 19
Covid-19 effects_Online meetings have become normal		14	6	Covid-19 effects Covid 19
Covid-19 effects_People don't like online meetings and education		3	4	Covid-19 effects Covid 19
Covid-19 effects_People will probably work from home more often when Covid-19 is finished		2	5	Covid-19 effects Covid 19
Covid-19 effects_Probably no lasting changes due to Covid-19		5	8	Covid-19 effects Covid 19
Covid-19 effects_Real-life meetings are important for building and maintaining personal business relations		2	3	Covid-19 effects Covid 19
Covid-19 effects_Sustainability considerations will lead to more important lasting changes than Covid-19		1	1	Covid-19 effects Covid 19
COVID-19 OPINION ON PT/SV		0	0	
Covid-19 opinion on PT/SV_Change in opinion on public transport will probably be temporary		1	1	Covid 19 Covid-19 opinion on PT/SV
Covid-19 opinion on PT/SV_Cycling for business trip		2	1	Covid 19 Covid-19 opinion on PT/SV
Covid-19 opinion on PT/SV_Less traffic jams during Covid-19 made car more attractive		1	1	Covid 19 Covid-19 opinion on PT/SV
Covid-19 opinion on PT/SV_Mostly used car for business trips during Covid-19		7	3	Covid 19 Covid-19 opinion on PT/SV
Covid-19 opinion on PT/SV_Opinion a normal situation hasn't changed because of Covid-19		10	1	Covid 19 Covid-19 opinion on PT/SV
Covid-19 opinion on PT/SV_Opinion on public transport and shared		7	2	Covid 19 Covid-19 opinion on PT/SV

mobility has not really changed				
Covid-19 opinion on PT/SV_Public transport during Covid-19 wasn't a pleasant experience		4	2	Covid 19 Covid-19 opinion on PT/SV
Covid-19 opinion on PT/SV_Tries to avoid rush hour during Covid-19		1	2	Covid 19 Covid-19 opinion on PT/SV
CURRENT TRANSPORT MODE CHOICE_BUSINESS TRIPS		0	0	Business trips Current transport mode choice_Business trips Business trips current
Current transport mode choice_Business trips: Car		9	15	Business trips Current transport mode choice_Business trips Business trips current
Current transport mode choice_Business trips: Cycling		7	2	Business trips Current transport mode choice_Business trips Business trips current
Current transport mode choice_Business trips: Public transport		14	16	Business trips Current transport mode choice_Business trips Business trips current
Current transport mode choice_Business trips: Shared bicycles		2	3	Business trips Current transport mode choice_Business trips Business trips current
Current transport mode choice_Business trips: Shared cars		2	3	Business trips Current transport mode choice_Business trips Business trips current
Current transport mode choice_Business trips: Taxi		1	1	Business trips Current transport mode choice_Business trips Business trips current
Current transport mode choice_Business trips: walking		1	1	Business trips Current transport mode choice_Business trips Business trips current

CURRENT TRANSPORT MODE CHOICE_NON-BUSINESS TRIPS		0	0	
Current transport mode choice_Non-business trips: Car		11	9	Non-business trips
Current transport mode choice_Non-business trips: Cycling		12	8	Non-business trips
Current transport mode choice_Non-business trips: Public transport		5	8	Non-business trips
Current transport mode choice_Non-business trips: Walking		2	3	Non-business trips
EXPENSE CLAIMING PROCESS CURRENT		0	0	
Expense claiming process current_BASS: Big disaster		1	6	Expense claiming process
Expense claiming process current_BASS: Expenses for car trips are easier to claim than public transport trips		3	4	Expense claiming process
Expense claiming process current_BASS: Laborious system		5	7	Expense claiming process
Expense claiming process current_BASS: Lot to gain in the expense claiming process		1	2	Expense claiming process
Expense claiming process current_BASS: Time-consuming		5	5	Expense claiming process
Expense claiming process current_BASS: Works fine		3	2	Expense claiming process
Expense claiming process current_Difference between University and UMC		1	0	Expense claiming process
Expense claiming process current_Discussed other options in the past	NS-Businesscard belangrijk hierin Meest genoemde code --> duidt op het feit dat er behoefte is aan verandering	7	5	Expense claiming process
Expense claiming process current_Doesn't claim own travel expenses		1	0	Expense claiming process

Expense claiming process current_Explaining the "business nature" of a trip is cumbersome		6	6	Expense claiming process
Expense claiming process current_Explaining the "business nature" of a trip isn't a problem		1	1	Expense claiming process
Expense claiming process current_GoAbout: Works great		2	0	Expense claiming process
Expense claiming process current_Having to pay in advance is a disadvantage of the current system		1	2	Expense claiming process
Expense claiming process current_Multiple cost centers		2	3	Expense claiming process
Expense claiming process current_Not being able to claim parking costs is very annoying		4	5	Expense claiming process
Expense claiming process current_UMC: Cumbersome		4	5	Expense claiming process
Expense claiming process current_UMC: Works fine		5	1	Expense claiming process
MAAS CURRENT		0	0	Business trips current
MaaS current_Business trips often depart from home		9	4	Business trips Current transport mode choice_Business trips MaaS current Business trips current
MaaS current_Hasn't used MaaS yet because it's still in development		2	5	MaaS current Business trips current
MaaS current_Having to pay for shared bicycles per minute is a threshold		1	1	MaaS current Business trips current
MaaS current_Knows about MaaS		6	1	MaaS current Business trips current
MaaS current_Knows little about MaaS		5	2	MaaS current Business trips current
MaaS current_Last mile business trips is often a struggle		1	2	MaaS current Business trips current
MaaS current_Likes OV-fiets		2	3	MaaS current Business trips current

MaaS current_Needed organisation to think of MaaS business subscription to consider MaaS		1	2	MaaS current Business trips current
MaaS current_Planning business trips is a big loss of time		1	2	MaaS current Business trips current
MaaS current_Shared vehicles fill a gap in transport options for business trips		1	4	MaaS current Business trips current
MaaS current_Travelling with GoAbout takes a lot of effort		2	3	MaaS current Business trips current
MaaS current_Unavailability of shared vehicles is an issue		4	5	MaaS current Business trips current
MAAS-PLATFORM		0	0	
MaaS-platform_App has to work in other public transport than trains as well. QR code in buses and trams is not user-friendly.		2	1	MaaS-platform
MaaS-platform_App should be easy to use		6	1	MaaS-platform
MaaS-platform_App should be safe and reliable		2	2	MaaS-platform
MaaS-platform_App should run on both Android and IOS		1	1	MaaS-platform
MaaS-platform_App should show different alternatives based on time of arrival, costs and sustainability	Add a "Greenest" choice	3	2	MaaS-platform
MaaS-platform_Data in app must be up-to-date		3	1	MaaS-platform
MaaS-platform_Expense claiming has to be very easy		3	3	MaaS-platform
MaaS-platform_GoAbout: improvements		3	1	MaaS-platform
MaaS-platform_Guaranteed shared bicycles at location		1	4	MaaS-platform
MaaS-platform_Has to be operable		2	2	MaaS-platform
MaaS-platform_Possible issue with MaaS-data and privacy		9	5	MaaS-platform

MaaS-platform_Service should be good when something goes wrong		3	1	MaaS-platform
MaaS-platform_Should correspond with Outlook		2	1	MaaS-platform
MaaS-platform_Should have a connection to OV-fiets		1	2	MaaS-platform
MaaS-platform_Should not have any bureaucratic complexity		1	3	MaaS-platform
MaaS-platform_Supply of travel modes must really be integral		2	4	MaaS-platform
MOTIVE: CAR FOR BUSINESS TRIPS		0	0	Business trips Motive: Car for business trips Business trips current
Motive: Car for business trips_Accessibility		11	1	Business trips Motive: Car for business trips Business trips current
Motive: Car for business trips_Attitude		3	1	Business trips Motive: Car for business trips Business trips current
Motive: Car for business trips_Comfort		3	1	Business trips Motive: Car for business trips Business trips current
Motive: Car for business trips_Efficiency	Incl. ^[SEP] travel time ^[SEP] practical benefits outweigh societal benefits ^[SEP] using many different transport modes is annoying	23	4	Business trips Motive: Car for business trips Business trips current
Motive: Car for business trips_First/last mile		1	1	Business trips Motive: Car for business trips Business trips current
Motive: Car for business trips_Habit		1	1	Business trips Motive: Car for business trips Business trips current
Motive: Car for business trips_Perceived Behavioural Control		11	2	Business trips Motive: Car for business trips Business trips current

Motive: Car for business trips_Perceived ease of use		3	1	Business trips Motive: Car for business trips Business trips current
Motive: Car for business trips_Perceived usefulness		3	1	Business trips Motive: Car for business trips Business trips current
Motive: Car for business trips_Radboud doesn't pay for public transport subscription		2	0	Business trips current
Motive: Car for business trips_Time of departure		3	1	Business trips Motive: Car for business trips Business trips current
MOTIVE: PUBLIC TRANSPORT FOR BUSINESS TRIPS		0	0	Business trips Business trips current Motive: Public transport for business trips
Motive: Public transport for business trips_Accessibility		7	1	Business trips Business trips current Motive: Public transport for business trips
Motive: Public transport for business trips_Attitude		12	1	Business trips Business trips current Motive: Public transport for business trips
Motive: Public transport for business trips_Efficiency		12	4	Business trips Business trips current Motive: Public transport for business trips
Motive: Public transport for business trips_Exercise		2	1	Business trips Business trips current Motive: Public transport for business trips
Motive: Public transport for business trips_Perceived Behavioural Control		6	1	Business trips Business trips current Motive: Public transport for business trips
Motive: Public transport for business trips_Perceived ease of use		2	1	Business trips Business trips current Motive: Public transport for business trips

Motive: Public transport for business trips_Perceived usefulness		9	1	Business trips Business trips current Motive: Public transport for business trips
Motive: Public transport for business trips_Subjective norm		4	1	Business trips Business trips current Motive: Public transport for business trips
Motive: Public transport for business trips_Sustainability		2	1	Business trips Business trips current Motive: Public transport for business trips
NON-BUSINESS TRIPS		0	0	
Non-business trips_Alternatives for car turn out to work great		1	1	Non-business trips
Non-business trips_Car: accessibility		3	1	Non-business trips
Non-business trips_Car: perceived ease of use		6	5	Non-business trips
Non-business trips_Car: perceived usefulness	Practicality	6	2	Non-business trips
Non-business trips_Commute by car is cheaper		1	1	Non-business trips
Non-business trips_Commute: efficiency and ease of use are more important than travelling in a more sustainable way	Kan gekoppeld worden aan de practical need en flexibility	4	1	Non-business trips
Non-business trips_Cycling because of parking issues		3	1	Non-business trips
Non-business trips_Cycling if it's faster than walking		1	2	Non-business trips
Non-business trips_Cycling to get to train station		1	2	Non-business trips
Non-business trips_Cycling/walking: attitude	- Active mobility ^{SEP1} Prefer cycling ^{SEP1} Because of health	15	3	Non-business trips
Non-business trips_Cycling: perceived behavioural control		3	1	Non-business trips
Non-business trips_Electric bike wouldn't replace car		1	2	Non-business trips

Non-business trips_Has considered using electric bike for commute		1	1	Non-business trips
Non-business trips_Public transport when destination is too far for cycling		1	1	Non-business trips
Non-business trips_Train for daytrips to other cities		2	1	Non-business trips
Non-business trips_Travel time commute		3	1	Non-business trips
Non-business trips_With a car, you don't have to plan your trip. You can just go out and use it.		2	1	Non-business trips
Non-business trips_With public transport for private trips there are too many transfers		1	1	Non-business trips
OPINION ON MAAS		0	0	
Opinion on MaaS_Afraid that MaaS will not work as claimed		3	3	Opinion on MaaS
Opinion on MaaS_Claiming expenses important but not main priority		1	3	Opinion on MaaS
Opinion on MaaS_Considers MaaS for business trips departing from campus		1	2	Opinion on MaaS
Opinion on MaaS_Could help in planning mobility around campus		1	3	Opinion on MaaS
Opinion on MaaS_Doesn't see added value of shared cars		4	3	Opinion on MaaS
Opinion on MaaS_Easier to gain insight in claimed expenses and travel movements		2	2	Opinion on MaaS
Opinion on MaaS_Except for claiming expenses, no need for a MaaS-app to plan trip		10	7	Opinion on MaaS
Opinion on MaaS_Expense claiming adds value		7	6	Opinion on MaaS
Opinion on MaaS_Full overview of your trip in MaaS can be useful		1	2	Opinion on MaaS

Opinion on MaaS_Interview has changed opinion on MaaS - would use it in the future		1	0	Opinion on MaaS
Opinion on MaaS_Likes the concept of MaaS		10	11	Opinion on MaaS
Opinion on MaaS_Little added value in MaaS when you already have a public transport subscription with shared vehicle options		6	5	Opinion on MaaS
Opinion on MaaS_MaaS could save worries for employees		4	2	Opinion on MaaS
Opinion on MaaS_MaaS has to prove its added value to be an interesting alternative		7	2	Opinion on MaaS
Opinion on MaaS_Participating in interview hasn't changed opinion on MaaS		1	0	Opinion on MaaS
Opinion on MaaS_Raises opportunities for more sustainable business trips	Ook shift eigendom-gebruik Kan mensen helpen te kiezen voor MaaS/OV	8	2	Opinion on MaaS
Opinion on MaaS_Using MaaS should be cost efficient		2	2	Opinion on MaaS
Opinion on MaaS_Variety of modalities with MaaS can add value	Useful for: - First/last mile ^[SEP] Carpooling ^[SEP] Short trips (e.g. from Radboudumc to CWZ)	10	7	Opinion on MaaS
Opinion on MaaS_Whether MaaS will be a success stands or falls with its quality	Cruciaal --> eigenlijk het middelpunt van de hele analyse. Staat aan de basis van de vraag implementeren/ motiveren, je kan pas implementeren als het kwalitatief goed genoeg is.	3	7	Opinion on MaaS

Opinion on MaaS_Would consider using MaaS for business trips		9	4	Opinion on MaaS
RADBOUD_CHALLENGE		0	0	
Radboud_Challenge approach: employees in high positions have to stop using car as well		2	4	Radboud: challenge Radboud's Role
Radboud_Challenge approach: motivate choice for car		2	2	Radboud: challenge Radboud's Role
Radboud_Challenge approach: send surveys to people to understand how you can change their travel behaviour		1	2	Radboud: challenge Radboud's Role
Radboud_Challenge approach: stop paying parking costs for destinations which are in a certain distance of a train station		1	1	Radboud: challenge Radboud's Role
Radboud_Challenge approach: threshold to use MaaS has to be very low		2	2	Radboud: challenge Radboud's Role
Radboud_Challenge approach: use MaaS data for a tailored approach to change people's behaviour		6	3	Radboud: challenge Radboud's Role
Radboud_Challenge: change employee's behaviour		14	7	Radboud: challenge Radboud's Role
Radboud_Challenge: convince people to start using MaaS		5	7	Radboud: challenge Radboud's Role
Radboud_Challenge: create awareness for what an alternative transport mode can provide		3	7	Radboud: challenge Radboud's Role
Radboud_Challenge: get CIF aboard		4	2	Radboud: challenge Radboud's Role
Radboud_Challenge: the extent to which sustainable travel measures are being enforced differs per manager		1	3	Radboud: challenge Radboud's Role
RADBOUD_COMMUNICATION		0	0	
Radboud_Communication approach: communication departments		4	3	Radboud: communication Radboud's Role

Radboud_Communication approach: communication within different networks of employees		4	3	Radboud: communication Radboud's Role
Radboud_Communication approach: emphasize sustainability goals and ease of use MaaS		2	3	Radboud: communication Radboud's Role
Radboud_Communication approach: intranet		1	3	Radboud: communication Radboud's Role
Radboud_Communication approach: involve new employees at an early stage		1	3	Radboud: communication Radboud's Role
Radboud_Communication approach: newsletters		1	3	Radboud: communication Radboud's Role
Radboud_Communication approach: one communication strategy for both Radboud University and Radboudumc		1	10	Radboud: communication Radboud's Role
Radboud_Communication approach: people who already use public transport as ambassadors for MaaS		1	5	Radboud: communication Radboud's Role
Radboud_Communication approach: shared vehicles as publicity		2	3	Radboud: communication Radboud's Role
Radboud_Communication approach: start a campaign		1	13	Radboud: communication Radboud's Role
Radboud_Communication approach: sustainability organisations	Green Office Centre for Green Information Technology	3	3	Radboud: communication Radboud's Role
Radboud_Communication approach: use already existing communication strategy of the faculties		3	3	Radboud: communication Radboud's Role
Radboud_Communication: communication is key in making MaaS a success		6	16	Radboud: communication Radboud's Role
Radboud_Communication: employees tend to get an information-overload pretty quickly		2	0	Radboud: communication Radboud's Role

Radboud_Communication: keep in mind that some people aren't that familiar with new ways of transport		1	0	Radboud: communication Radboud's Role
Radboud_Communication: lack of communication around sustainability initiatives		4	2	Radboud: communication Radboud's Role
Radboud_Communication: reduction of cognitive dissonance	Met 'standaard' communicatie bereik je niet de mensen die je wil bereiken. Advertenties tegen roken bereiken vooral niet-rokers.	1	1	Radboud: communication Radboud's Role
Radboud_future expense claiming: flexibility in cost centers in claiming expenses with MaaS		2	2	Radboud: future expense claiming Radboud's Role MaaS-platform
Radboud_future expense claiming: questions whether he needs to explain the business part of his trip when he uses MaaS		2	2	Radboud: future expense claiming Radboud's Role
RADBOUD_IMPLEMENT MAAS		0	0	
Radboud_Implement MaaS: a policy is most successful when you fully go for that policy		1	2	Radboud: implementing and stimulating MaaS Radboud's Role
Radboud_Implement MaaS: choose MaaS and stick with it		8	3	Radboud: implementing and stimulating MaaS Radboud's Role
Radboud_Implement MaaS: don't try to create goodwill with employees		3	2	Radboud: implementing and stimulating MaaS Radboud's Role
Radboud_Implement MaaS: if you don't use MaaS, you'll have to pay for trips yourself		1	1	Radboud: implementing and stimulating MaaS Radboud's Role
Radboud_Implement MaaS: implement MaaS like other past implementations		9	2	Radboud: implementing and stimulating MaaS Radboud's Role
Radboud_Implement MaaS: introducing MaaS-app and placing some		1	2	Radboud: implementing and

bicycles isn't too much work				stimulating MaaS Radboud's Role
Radboud_Implement MaaS: leadership is needed to implement new policies		1	1	Radboud: implementing and stimulating MaaS Radboud's Role
Radboud_Implement MaaS: MaaS could be implemented in phases		1	1	Radboud: implementing and stimulating MaaS Radboud's Role
Radboud_Implement MaaS: Radboud should pay for implementing MaaS		1	2	Radboud: implementing and stimulating MaaS Radboud's Role
Radboud_Implement MaaS: support staff in using a new system		1	2	Radboud: implementing and stimulating MaaS Radboud's Role
RADBOUD_OBJECTIVES		0	0	
Radboud_Objectives: be realistic about transport costs	It's not realistic to think that you can always just use any mode of transport without being held responsible for the costs by your superior. For example, you can't use a taxi for every business trip you make, because it's way more expensive than using your own car or public transport. Probably the same with MaaS.	3	2	Radboud: objectives Radboud's Role
Radboud_Objectives: choosing MaaS influences the University's appearance		2	2	Radboud: objectives Radboud's Role
Radboud_Objectives: create an easier way to claim public transport expenses		1	3	Radboud: objectives Radboud's Role MaaS-platform
Radboud_Objectives: keep in mind that employees		2	2	Radboud: objectives Radboud's Role

have a limited amount of time				
Radboud_Objectives: MaaS-trajectory should correspond with the campus vision		6	3	Radboud: objectives Radboud's Role
Radboud_Objectives: promote MaaS		1	3	Radboud: objectives Radboud's Role
Radboud_Objectives: promote sustainability of mobility		1	1	Radboud: objectives Radboud's Role
Radboud_Objectives: Radboud is responsible for switch to MaaS		1	1	Radboud: objectives Radboud's Role
RADBOUD_OTHER STAKEHOLDERS		0	0	
Radboud_Other stakeholders: companies around the campus play a role in switching to MaaS		1	1	Radboud: other stakeholders Radboud's Role
Radboud_Other stakeholders: HAN plays a role in switching to MaaS		1	1	Radboud: other stakeholders Radboud's Role
Radboud_Other stakeholders: municipality plays a role in switch to MaaS		3	1	Radboud: other stakeholders Radboud's Role
Radboud_Other stakeholders: network is needed for the supply of different modalities		3	9	Radboud: other stakeholders Radboud's Role
Radboud_Other stakeholders: people living around the campus also play a part		1	1	Radboud: other stakeholders Radboud's Role
Radboud_Other stakeholders: province plays a role in switch to MaaS		2	1	Radboud: other stakeholders Radboud's Role
RADBOUD_POLICY		0	0	
Radboud_Policy: at the moment it doesn't feel like there's a mobility policy that's being followed for several years		1	3	Radboud's Role Radboud: policy
Radboud_Policy: mostly travels second class because first class is just not necessary		1	0	Radboud's Role Radboud: policy

Radboud_Policy: other initiatives that could help in buying an electric bike have been cut down		1	1	Radboud's Role Radboud: policy
RADBOUD_SHARED VEHICLES		0	0	
Radboud_Shared vehicles: making room for campusbikes isn't too difficult		1	1	Radboud: shared vehicles & campus Radboud's Role
Radboud_Shared vehicles: making room on campus for shared cars is difficult		1	3	Radboud: shared vehicles & campus Radboud's Role
Radboud_Shared vehicles: need for a good reservation system for shared mobility	Hoe ga je dit aanpakken. GoAbout zet normaal evenveel auto's neer als abonnees in een woonwijk. Daar is dit niet mee te vergelijken.	4	3	Radboud: shared vehicles & campus Radboud's Role MaaS-platform
Radboud_Shared vehicles: public transport and shared bicycles are main priority in MaaS		8	3	Radboud: shared vehicles & campus Radboud's Role
Radboud_Shared vehicles: Radboud and GoAbout have to work together to understand how many shared vehicles have to be at which location		1	5	Radboud: shared vehicles & campus Radboud's Role MaaS-platform
Radboud_Shared vehicles: shared cars need to have a certain level of comfort		1	0	Radboud: shared vehicles & campus Radboud's Role
Radboud_Shared vehicles: shared cars on campus could increase carpooling		2	0	Radboud: shared vehicles & campus Radboud's Role
Radboud_Shared vehicles: you need a degree of coverage for shared mobility to be interesting		11	4	Radboud: shared vehicles & campus Radboud's Role
Radboud_Shared vehicles: you need a network of shared vehicles throughout the whole country		1	2	Radboud: shared vehicles & campus Radboud's Role
RADBOUD_STIMULATE MAAS		0	0	
Radboud_Stimulate MaaS: create reward structure to		3	2	Radboud: implementing and

stimulate behavioural change				stimulating MaaS Radboud's Role
Radboud_Stimulate MaaS: generate support		1	5	Radboud: implementing and stimulating MaaS Radboud's Role
Radboud_Stimulate MaaS: obligate use of MaaS temporarily so people can get used to it		1	1	Radboud: implementing and stimulating MaaS Radboud's Role
Radboud_Stimulate MaaS: obligating the use of MaaS is difficult in some situations		2	0	Radboud: implementing and stimulating MaaS Radboud's Role
Radboud_Stimulate MaaS: people can't claim their expenses if they didn't even open MaaS-app		1	1	Radboud: implementing and stimulating MaaS Radboud's Role
Radboud_Stimulate MaaS: stimulate MaaS for people who already use public transport		1	2	Radboud: implementing and stimulating MaaS Radboud's Role
Radboud_Stimulate MaaS: stimulate people to use MaaS in a positive way	Don't stop paying for other modes of transport/no silly regulations	14	4	Radboud: implementing and stimulating MaaS Radboud's Role
Radboud_Stimulate MaaS: stimulate using MaaS by making expense claiming easy for only those who use MaaS		1	3	Radboud: implementing and stimulating MaaS Radboud's Role
Radboud_Stimulate MaaS: using MaaS should not be obligated if it doesn't really add to sustainability		3	3	Radboud: implementing and stimulating MaaS Radboud's Role
RADBOUD_SUSTAINABILITY		0	0	
Radboud_Sustainability: car-free campus and sustainability goals can be co-determinant in the success of Maas	Belangrijk	2	3	Radboud: sustainability Radboud's Role
Radboud_Sustainability: focus on being more sustainable, not being as sustainable as possible		1	5	Radboud: sustainability Radboud's Role
Radboud_Sustainability: Radboud should be honest about contribution that		6	3	Radboud: sustainability Radboud's Role

MaaS makes in becoming more sustainable				
Radboud_Sustainability: supports the basic idea of considering sustainability in travel mode choice, but thinks that flexibility should be preserved	Link naar reizen vanaf huis en efficiëntie	6	4	Radboud: sustainability Radboud's Role
Radboud_Sustainability: you have to trust that employees make serious considerations when it comes to travel mode choice		3	3	Radboud: sustainability Radboud's Role

Table 7 Code book (Source: Own work)