

Mobility choices in less urbanized areas

A case study on the influence of parking policies on mobility choices within the municipality of Vijfheerenlanden.



Photo by own work



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Master's thesis Spatial Planning
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Preface

In front of you lies the master's thesis Mobility choices in less urbanized areas: a case study on the influence of parking policies on mobility choices of people in less urbanized areas. This thesis has been written within the period of the 5th of February until the 29th of July 2024. With this thesis, I will finish my master's program of spatial planning at Utrecht University.

During my period as a bachelor's and master's student at Utrecht University, I always had a great interest in the general concept of mobility. I am always fascinated by how people move themselves within our contemporary society, especially those who live in less urbanized areas. Within less urbanized areas, I have experienced that mobility differs greatly from that of people who live in cities, and that inspired me to write my master's thesis about the mobility choices of people in less urbanized areas.

During the process of writing my master's thesis, I did an internship at Keypoint Consultancy in Utrecht. I would first of all like to thank Keypoint Consultancy for taking me in as an intern and providing me with great experiences and help during the process of writing my thesis. I would like to thank Ramon and Ward in particular, for helping me and providing feedback during my internship. Furthermore, I would like to thank my thesis supervisor Tuba İnal Çekiç for providing me with feedback during the process of writing my thesis.

I wish you much pleasure reading.

Tim Vermast

Utrecht, 30th of July 2024

Summary

Car usage has been on the rise in the Netherlands for the past 20 years. This rise in car usage is especially visible in less urbanized areas in the Netherlands, where more people are becoming car-dependent. To regulate car usage and influence the mobility of people, parking policies are widely used as a steering mechanism. Within this thesis, the influence of those parking policies within the municipality of Utrecht is investigated to determine how much influence they have on the mobility choices of people in less urbanized areas, who claim to be becoming more and more car-dependent.

To determine the influence of parking policies, a qualitative approach has been taken in combination with an analysis of the current existing policies regarding the municipality of Utrecht. Within this research, a qualitative approach has been explicitly chosen, because previous research regarding mobility and parking policies has mostly taken a quantitative approach, and a qualitative approach can get a deeper understanding of the mobility choices people make. At first, government officials from the province and municipality of Utrecht, and the municipality of Vijfheerenlanden were interviewed to determine what their visions are on parking policies and car dependency. These interviews have been based on the current policies regarding mobility and parking of the respective governmental institutions. After those interviews, residents from the municipality of Vijfheerenlanden were interviewed. They were asked about their motivations for using the car, the influence the current parking policies of the municipality of Utrecht have on them, and how they would react to a future situation regarding parking policies.

The parking policies within the municipality of Utrecht do not seem to have a significant influence on the mobility choices of people within the municipality of Vijfheerenlanden. Because people experience a high degree of car dependency, which is mainly caused by the lack of suitable alternative mobility choices, people will still use the car even though parking policies make it more difficult or expensive. However, as seen from the interviews with the government officials and the residents, people are aware of the parking policies and do alter their mobility behavior. The increase in P+R usage was the most common reaction to parking policies within the municipality of Utrecht, parking the car further away from the destination to save money or avoiding the municipality of Utrecht as a whole were also certain adjustments in behavior people took due to the presence of parking policies.

Parking policies are suitable as a steering mechanism to influence the mobility choices of people; however, they do not seem to have the desired effect for people living in a less urbanized area like Vijfheerenlanden. To decrease car usage, alternative mobility options like public transport need to be improved and seem to have a larger effect on mobility choices.

Key concepts:

Mobility, mobility choices, travel behavior, parking policies

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§1 Introduction

Car usage in the Netherlands has increased in the past 20 years. Since the year 2000, the number of cars has increased from 400 per 1000 inhabitants in 2000, to 499 per 1000 inhabitants in 2022 (Zijlstra et al., 2022). These figures are expected to grow in the upcoming 10 years. Car ownership is a vicious circle, according to Zijlstra et al. (2022), because the increasing number of cars will lead to more car usage, fewer car alternatives, and more car dependency, which will eventually lead to more car usage and ownership. When someone has a car, he or she is more likely to only use the car for trips he or she would not make without a car. Zijlstra et al. (2022) further add that 64% of people in the Netherlands who live in less urbanized areas claim to be increasingly dependent on cars.

Car usage has a lot of disadvantages for society and the environment. Traffic congestion, air pollution, and CO² emissions are some examples of problems that are caused by cars (Lowe, 1990). Due to the problems cars are causing, a lot of municipalities in the Netherlands have policies to discourage car usage. A couple of these measures are: priced parking, parking permits, and park-and-ride systems (CROW, 2017). According to Simićević et al. (2013), implementing parking policies can indeed reduce the usage of cars in city centers. However, a problem arises with the increasing trend of car ownership and the growing dependence on cars. It is relevant to look at these less urbanized areas because parking policies could have different effects on people who claim to be dependent on cars. This research aims to provide insights into how effective parking policies are for people who are getting more car-dependent. This research will use a case study within Vijfheerenlanden in the province of Utrecht. The municipality of Vijfheerenlanden is considered to be a less urbanized area within the province of Utrecht because the majority of people live in less urbanized areas (*CBS Statline*, 2023).

A less urbanized area of the province of Utrecht is explicitly chosen because, according to Bastiaansen and Breedijk (2022), there are large differences in accessibility between cities and less urbanized areas within the province of Utrecht. The case of a place where alternatives to the car could seem feasible but are generally not makes this an ideal case study area. Because there are fewer mobility options, more insights could be given into how people travel based on the case where the car is the most dominant mobility option and where people experience car dependency. This research will consist of an analysis of the current policies and strategies regarding car parking, with a combination of questions asked to car owners on how they base their mobility patterns regarding parking policies. The results give insights into what motivates people to use cars, which can result in a better understanding of the planning of compact and sustainable cities. This is because cars mostly do not contribute to more sustainable and compact cities (Lowe, 1990).

This results in the following research question:

To what extent do parking policies in the municipality of Utrecht contribute to the mobility choices of car owners in the municipality of Vijfheerenlanden?

The following sub-questions will be addressed:

1. What are the motivations of the residents of Vijfheerenlanden to use the car as a mobility option?
2. What are the opinions of the residents of Vijfheerenlanden on parking policies in Utrecht?
3. What are the visions for car mobility of the respective government institutions, and what kind of role do parking policies play?

The first sub-question will provide background information on why the residents of Vijfheerenlanden use the car as a mobility option in the first place. The findings for this sub-question will provide support for the main research question about mobility choice.

The second sub-question will provide information on how the residents of Vijfheerenlanden experience the parking policies of the city of Utrecht. The answer to this sub-question will therefore provide information on how this relates to parking policies.

The third sub-question will further dive into the concept of parking policies. This sub-question will answer what the parking policies specifically are within the municipality of Utrecht and how the respective government institutions want to influence the residents of Vijfheerenlanden's mobility choices.

The respective government institutions named in the third sub-question are the municipalities of Utrecht and Vijfheerenlanden and the province of Utrecht. These government officials were chosen because they have the most influence on the mobility of the residents of Vijfheerenlanden. This will be further explained within the methodology section.

§1.2 Research gap

Although there has been a lot of research already conducted about current measures and their effects and mobility choices, little to no research has been conducted yet on the connection between car ownership and more car dependency within the Netherlands. Looking at the paper from Vidović and Simević (2023), it is observable what the impact of specific parking prices is, but this has been conducted in a highly urban area in Serbia. This is certainly a different situation compared to a less urbanized area within the Netherlands. Also, looking at the paper of Yan et al. (2018), they state that certain parking policies can indeed not easily persuade people who live in low-density, less urbanized areas to use other modes of transportation other than the car. If we look at the research of Tyrinopoulos and Antoniou (2012), we can see that information is lacking in less urbanized areas. Their analysis was conducted in an urban area in Greece but was not very specific on different parking policies. But if we tie this back to the report of CROW (2017), people who own a car are nevertheless making more trips compared to when they would not own a car. In less urbanized areas, where alternatives are fewer compared to more urbanized areas, and there is greater car dependency and an increased number of trips, it is crucial to evaluate the effectiveness of parking policies for residents in these regions in the Netherlands. This type of research is mostly focused on more urban areas compared to less urbanized areas.

§1.3 Structure of research

This research uses qualitative methods as well as an analysis of current existing policies about mobility and parking. The qualitative methods are in-depth interviews, interviewing government officials specialized in mobility, as well as car-owning residents of Vijfheerenlanden. These methods were chosen because, as seen from previous similar research, qualitative approaches have not been previously used within research about parking policies and mobility choices. To get a deeper understanding of the currently existing parking policies, an analysis of the current policies was chosen. As stated by Clifton and Handy (2003), qualitative approaches to mobility choices can offer in-depth information that can be crucial to deeply explaining those mobility choices.

Each section has a short introduction on its own, providing what the section will contain and how it follows up on the previous sections. A brief overview of the current structure will be presented in the next paragraph.

At first, there is a section that provides a theoretical background which discusses relevant concepts, and an overview of previous research. These two parts will form the basis for a conceptual model, which will be presented afterward. The theoretical background and the conceptual model form the basis for this research.

After this section, the methods of this research will be discussed, which will contain the research design, a description of the case study area, a description of the people that were interviewed, an overview of the selected policy documents, a description of the research process, and finally a section about the methodological analysis.

All of this will be followed up by the results section, which discusses the findings of the interviews and the policy documents. This is followed by the discussion section, which critically evaluates the findings compared to the literature and will provide an answer to the sub-questions previously addressed.

At the end of this research, there is a conclusion that will provide an answer to the main research question, discuss limitations and implications for future research, and explain the validity and reliability of this research.

§1.4 Abbreviated terms

From now on during this research, some terms will be abbreviated. The abbreviated terms will be explained here:

- Vijfheerenlanden → refers to the entire municipality of Vijfheerenlanden
- Residents → refers to the interview respondents who reside within the municipality of Vijfheerenlanden
- P+R → refers to the parking policy of Park & Ride

§2 Theoretical background

This section will explain at first the concepts that form the base of this research, which is followed by an overview of the current state of the literature regarding parking policies and mobility choices. This second part will also discuss the methods that were used within the existing literature, which will provide a base for the methodology section later on.

These two parts will form a conceptual model, which is presented at the end of this section. This conceptual model will summarize the process of this research and what the relationships between the different concepts are.

§2.1 Concepts

This part of the theoretical background will provide an overview of the most relevant concepts found within the currently existing literature.

§2.1.1 Introduction to the concept of mobility

Mobility is something that concerns various parts of science. Within human geography, mobility is a broad concept that includes aspects like migration, transport, imperial expansion, and globalization (Merriman, 2009). It is something that has existed throughout human history. Without mobility, it is hard to get to work, access the nearest source of food, or establish social relationships. Humans move themselves every day from as little as walking out of bed or traveling to work (Adey, 2017). Because we always have to travel to certain places, mobility has become an increasingly important part of our lives. Mobility has also evolved a lot throughout the ages of human history because we are now able to travel and communicate faster and faster over longer distances (Merriman, 2019). Today urban planners are constantly trying to ensure that the mobility of citizens is at a high level and that goods and services are accessible (Bertolini & Dijst, 2003). However, there is a difference between the concepts of accessibility and mobility. They are distinguished by considering what counts as an improvement. An improvement in mobility means that there is an increase in the territory that can be reached for a given investment of time and money. An improvement in accessibility means that there is an increase in the number of destinations that can be reached for a given investment of time and money (Levine et al., 2019).

Mobility is of great influence on how contemporary urban areas are shaped. Before World War II, neighborhoods were mainly built with higher densities, mixed zoning, and walkable trips in mind. After World War II, neighborhoods have become increasingly more sprawled which was caused by increased usage of cars (Badland & Schofield, 2005).

Within the Netherlands, there are multiple mobility options. Hilbers et al. (2020) have defined the following mobility options:

- Car driver
- Car passenger
- Train
- Bus/tram/metro
- Cycling
- Walking
- Other

There are multiple reasons why people make a certain mobility choice. Handy (1996) explains that the design of the (urban) area, as well as someone's lifestyle or living situation, can influence the mobility choice someone makes. The next three parts will therefore dive into these aspects of mobility choice, as well as an overview of factors that can influence a single mobility choice.

§2.1.2 Motivations to make a mobility choice

Looking at the mobility options defined by Hilbers et al. (2020), multiple reasons can be the deciding factor to make a certain mobility choice.

Zooming in on public transport, which includes the mobility options train and bus/tram/metro, it can be observed that multiple factors influence commuter satisfaction. When services of public transport are reliable, and not too crowded, people have sustainability motives, and the degree of urbanization is relatively high, people are more likely to use public transportation as their mobility choice (Cantwell et al., 2009; Tyrinopoulos and Antoniou, 2012). When public transportation is not reliable or overcrowded, people will easily get stressed and are more likely to use another mobility choice (Cantwell et al., 2009).

Zooming in on car travel, which includes the mobility choices of the car driver and car passenger, the main reasons for this mobility choice are convenience, a sense of freedom and independence, enabling an active life, a symbol of status, importance in caring for others, enjoyment and pleasure in driving, lack of knowledge about other modes, and as a tool to fulfill aesthetic needs for undirected travel (Berg et al., 2015; Tyrinopoulos and Antoniou, 2012). Gardner and Abraham (2007) have found that, according to interviews with people, there are five main reasons people prefer the car as a mobility option. These five reasons are journey time concerns, minimizing effort, personal space concerns, minimizing monetary costs, and desire for control.

Car ownership is also influenced by population density, municipality size, local access to shopping and other facilities, and accessibility to public transport (Dargay & Hanley, 2004). Furthermore, existing car ownership greatly contributes to more dominant car mobility and less likeliness of using other mobility choices (CROW, 2017).

Within the Netherlands, the car is the most dominant mobility choice, with 32.7% of the movements as a driver and 10.4% of the movements as a passenger in the year 2021. Cycling remains the second most used mobility choice, with 28% of all movements being by bike (CBS, n.d.).

Zooming in on active modes of transportation, which include cycling and walking, they can differ a lot from car travel and public transportation. Walking and cycling are mainly used for shorter trips compared to car travel and public transportation (Fishman, 2015). Individual characteristics (physical ability or bike ownership), household characteristics (having children mostly discourages walking and cycling), weather characteristics, quality of infrastructure, and work conditions, contribute to the mobility choice of walking and cycling. Walking and cycling are also commonly used in combination with public transport (Ton et al., 2019).

§2.1.3 Influence of area characteristics on mobility choice

Mobility choices and challenges can differ from urban environments compared to more rural, suburban, or peri-urban locations. Tatum et al. (2019) further add that factors like the lack of a direct connection to the location of interest, lack of suitable infrastructure or provision by public transport, and high traffic volumes can determine the mode choice someone takes to make a certain trip. It is therefore mostly seen that people in less urbanized areas tend to have different mobility patterns compared to people in more urbanized areas. People in less urbanized areas generally use the car more as their dominant form of transport compared to people living in more urbanized areas (De Vos, 2015). However, land use is not solely responsible for determining the mobility choice someone makes. The origin of travel, destination of travel, and what kind of activity someone travels to also impact the mobility choice someone makes (Zhang, 2004). So, changes in land use can influence someone's mobility choice, but it is not the only thing that can influence the mobility choice.

Urban density is of great influence on whether people are car-dependent, but it is far from the only factor that can influence car dependency. Enhancing density has to be combined with other policies like promoting alternative mobility options and rising fuel costs to decrease car dependency (Saeidizand et al., 2022). Urban density alone is thus not solely responsible for car dependency. Wiersma et al. (2015) further add that apart from urban density, the following factors influence car dependency in the Netherlands:

1. Settlement size, when a settlement has a population of less than 100.000, there is generally less favorable infrastructure for alternative mobility options
2. Network of infrastructure, this generally concerns the available infrastructure for alternative mobility options, the proximity of train stations, and the amount of road congestion
3. Monocentricity/polycentricity, a more monocentric city has generally a more favorable bicycle or public transportation infrastructure compared to a polycentric city. A larger city center offers mostly more mobility options to that center compared to a smaller center. Monocentric cities tend to have larger city centers with services and shopping areas more concentrated in one place. Polycentric cities have a smaller city center and services and shopping areas more scattered around the city.

Wiersma et al. (2017) further add that within less urbanized areas car dependency is likely to increase in the future. Distances are likely to increase due to decreasing populations and the eventual decrease of local services and jobs. With larger distances to travel it is likely that people are getting increasingly more dependent on the car because alternative mobility options are less feasible across larger distances and more jobs are accessible by car.

§2.1.4 Influence of someone's living situation on mobility choice

Someone's personal living situation can also be of influence on their mobility choice. Lifestyle choices like family formation, participation in the labor force, and an individual's orientation toward leisure can greatly influence travel behavior and

mobility choices (Handy, 1996). Asgari and Jin (2022) have concluded that someone's travel habits are also of influence on mobility choice. When someone has created a habit of choosing a certain mobility option, it can be less likely that someone will use another mobility option, even when the circumstances can change.

When looking at different personal characteristics and mobility, Götz and Ohnmacht (2016) have found that personal preferences like being culture-oriented or sporty are factors able to determine a mobility choice. Furthermore, they found out that men and older people are more likely to use cars more often compared to younger people and women. Moreover, when people have children, who especially participate in leisure activities, car usage among parents tends to increase (Hjorthol & Fyhri, 2009).

§2.1.5 Parking policies

Parking policies have different reasons to exist in our current world and are used for different reasons regarding our current travel behavior. Marsden (2006) names five main objectives parking policies typically have:

- Generate a strong and vibrant economy supported by an efficient transport system
- Better accessibility
- A clean and high-quality urban environment
- A safe and secure environment
- A more equitable society

Parking policies can therefore consist of measures to increase or decrease car use. Urban planners typically set minimum parking requirements to meet the peak demand for parking at each type of land use (Shoup, 1997). Looking at the research of Vidović and Simićević (2023), increased pricing of parking can stimulate the use of other modes of transportation, but can also cause people to park close by at different parking places which are less optimal for the city. This effect can also be called spillover parking, where a certain parking restriction can spill over to a place where different regulations apply. Spillover parking can cause problems like traffic congestion, taking parking spaces from other users, or environmental externalities. To effectively prevent spillover parking, parking policies have to be implemented on surrounding streets to take the desired effects (Inan et al., 2019). Antonsen et al. (2017) confirm this statement by addressing that implementing parking policies has to be done using a holistic approach. Surrounding neighborhoods and residents need to be involved when implementing parking policies.

According to Mingardo et al. (2015), parking policies are mostly reactive within Europe. Parking policies are often implemented when governments want to change a certain situation. Parking policies therefore mostly lack an integral vision. Pierce and Shoup (2013) confirm the benefits of proactive parking policies. Their research has shown that implementing the wrong parking prices in certain areas can cause multiple problems like cruising for parking and loss of customers for retail companies. When parking policies are implemented with a clear strategy, those mentioned disadvantages can be avoided.

§2.2 Previous research

Within this section, the current state of the literature regarding parking policies and mobility choices will be analyzed. Several scientific articles will be discussed on what the findings are and which methods were used. When looking at similar articles about parking policies and mobility choice, four different categories of research were distinguished. This section will first discuss articles that talk about the relationship between mobility choices and parking policies in an international context, after that, the other parts will dive in more specifically on certain aspects of mobility choices and parking policies. The last part will provide an overview of specific qualitative research that has focused on parking policies and/or mobility choices.

§2.2.1 Literature focused on mobility choices and parking policies

Looking at previous research regarding mobility choice and parking policies, parking policies are key elements for making mobility more sustainable and can influence mode choice. According to Stojanovski (2022), promoting lower parking requirements can decrease automobile travel, but the design of the city and trip lengths can also greatly contribute to the mode choice of transport. Parking policies can thus be seen as a form of demand management (Bernardino & Van Der Hoofd, 2013). Silva (2013) further adds that land use policies and transport systems can greatly constrict current mobility patterns, and the urban structure greatly contributes to the mobility choice someone makes. When there is a lack of intervention within urban planning, cities will most likely develop with an orientation around car transport, and intervening within urban planning can therefore control the number of cars. Within their simulation model, based on variables like travel distance, public transport price, and fuel price, parking policies can contribute to better traffic management and regulate demand for parking (Bernardino & Van Der Hoofd, 2013). Within the research of Stojanovski (2022) and Silva (2013), a GIS analysis was made to predict travel patterns and Silva (2013) also used expert interviews to determine how her model applied to designing urban structures for more sustainable mobility.

§2.2.2 Literature focused on parking prices

Other research is mainly focused on how parking prices and not parking policies as a whole can influence someone's mobility choice. Looking at research from Vidović and Simićević (2023) and Dell'Olio et al. (2019), parking prices can influence the demand for parking. These studies were done via surveys and the latter also included a model and focus groups. Both studies had the goal of discovering more knowledge about discouraging car usage. Both articles show that even with relatively small changes in parking prices (starting at a pricing increase of 20% per hour), people are willing to choose another mobility option. From the research of Vidović and Simićević (2023), it also became clear that a small percentage of 6.4% of people would even change their destination if they considered the parking price too high.

Using a multinomial logit model for people traveling to work by car in Portland, Hess (2001) discovered that implementing a parking price in combination with decreasing transit travel time will decrease the number of people who will travel alone to work by car. Khordagui (2019) adds to this case that an increase in parking prices by 10% can reduce car traffic by 1-2 percent with consideration of traveling to work in the US state of California. These studies, although focused on a car-dominant area like the United States, prove a point that a parking policy like the increase of parking prices can contribute to less usage of cars.

Marsden (2006) concluded from a literature review that parking policies regarding commuters are rarely implemented in isolation. He also stated that out-of-pocket costs are more important to drivers than in-vehicle costs. This means that costs people have to make out of their vehicle, like parking costs or increased walking times compared to in-vehicle costs like traffic congestion.

§2.2.3 Literature focusing on the Netherlands

Looking at specific literature regarding the Netherlands, there has not been as much scientific research done yet compared to other areas like the United States. One article from Mingardo et al. (2022) explains that there are large differences in policies regarding short duration (2-3 hours) and long-duration parking (4-8 hours). They analyzed three parking policies consisting of pricing only, pricing and time restrictions, and daily tickets only. They used two datasets with mobile parking transactions and found out that parking price alone does not have a large influence on parking behavior, although it does have some influence. Urban attractiveness and maximum duration have more influence on the parking behavior of people. Their research area consisted of the cities of Tilburg, Delft, Groningen, Utrecht, Amsterdam, and Den Haag.

Research from De Groote et al. (2016) shows that a long waiting list for obtaining a parking permit in Amsterdam reduces car ownership compared to neighborhoods where waiting lists are shorter. They did their research using a statistical analysis based on municipal datasets regarding car ownership.

More research on parking policies and mobility choices within the Netherlands has been done in the style of (governmental) reports. One report in particular from CROW (2017) investigates the impacts of specific parking policies within the Netherlands. They concluded that mobility choices were mostly affected by stimulating alternatives, stimulating employers to make parking less attractive, and raising parking prices are the most effective in influencing someone's mobility choice. Their research was based on existing literature, governmental data, and examples from practice. Within this report of CROW (2017), the following parking policies in the Netherlands were identified:

- | | |
|--|-------------------------------|
| 1. Regulating capacity | 10. Paid parking |
| 2. P+R | 11. Parking permits |
| 3. Multiple usage | 12. Time limits |
| 4. Shared cars | 13. Parking norms |
| 5. Valet parking | 14. Long parking |
| 6. Real-time information about occupancy | 15. Target group segmentation |
| 7. Numberplate registration | 16. Stimulating alternatives |
| 8. Mobile parking | 17. Discourage second car |
| 9. Reserved parking | 18. Approaching employers |
| | 19. Marketing |

From the report of Zijlstra et al. (2022) it is visible that within more urbanized areas, parking policies are more prevalent compared to less urbanized areas. People in urbanized areas are more motivated to use alternative mobility options while people in less urbanized areas are getting more and more dependent on their cars and are less likely to use other mobility options. The research of Zijlstra et al. (2022) was done using an analysis of existing literature and statistical data.

This shows that there is not a lot of scientific research conducted within the Dutch context compared to that of other countries. Most research that was conducted, has also been done in a report style as advice for government institutions.

§2.2.4 Qualitative research on mobility choice

There has been some research conducted using qualitative methods, however, these studies were not focused on parking policies but only looked at general mobility choices. Within this part, the most similar articles based on mobility choices with qualitative research will be discussed.

Schneider (2013) looked at mobility choices in San Fransisco. He first conducted a survey where some respondents were eventually interviewed. With the results of the interviews, he wanted to test a model to influence people's mobility choices who used the car as a dominant mobility choice. From this research, it became clear that other mobility options need to be improved and promoted to break habitual travel patterns by car.

Beirão and Cabral (2007), conducted interviews among public transport users, car users, and people who used both mobility options in the city of Porto. They analyzed how people perceive car mobility and what is needed to stimulate a mobility choice to public transport. The results from this research suggest that to decrease car mobility and increase public transport usage, the services of public transport need to be designed in a way that accommodates the levels of service required by customers and by doing so, attracts potential users. They also stated that individual characteristics can influence someone's mobility choice, like lifestyle or type of journey.

Gardner and Abraham (2007) conducted interviews with regular private car commuters within the city of Brighton and Hove. They concluded that there are

five main motivations people have for using the car as their mobility option. Their respondents gave the following five motivations during the interviews:

- Journey time concerns
- Minimizing effort
- Personal space concerns
- Minimizing monetary costs
- Desire for control

§2.3 Conceptual model

This section will first provide a table that displays the most important findings from the theory previously presented. Figure 1 is the conceptual model that was formed after analyzing the current relationships between the concepts. Table 1 will provide an overview and more explanation of the variables that are present within the conceptual model. After the conceptual model, there will be a further explanation of which connections there are within the currently existing literature.

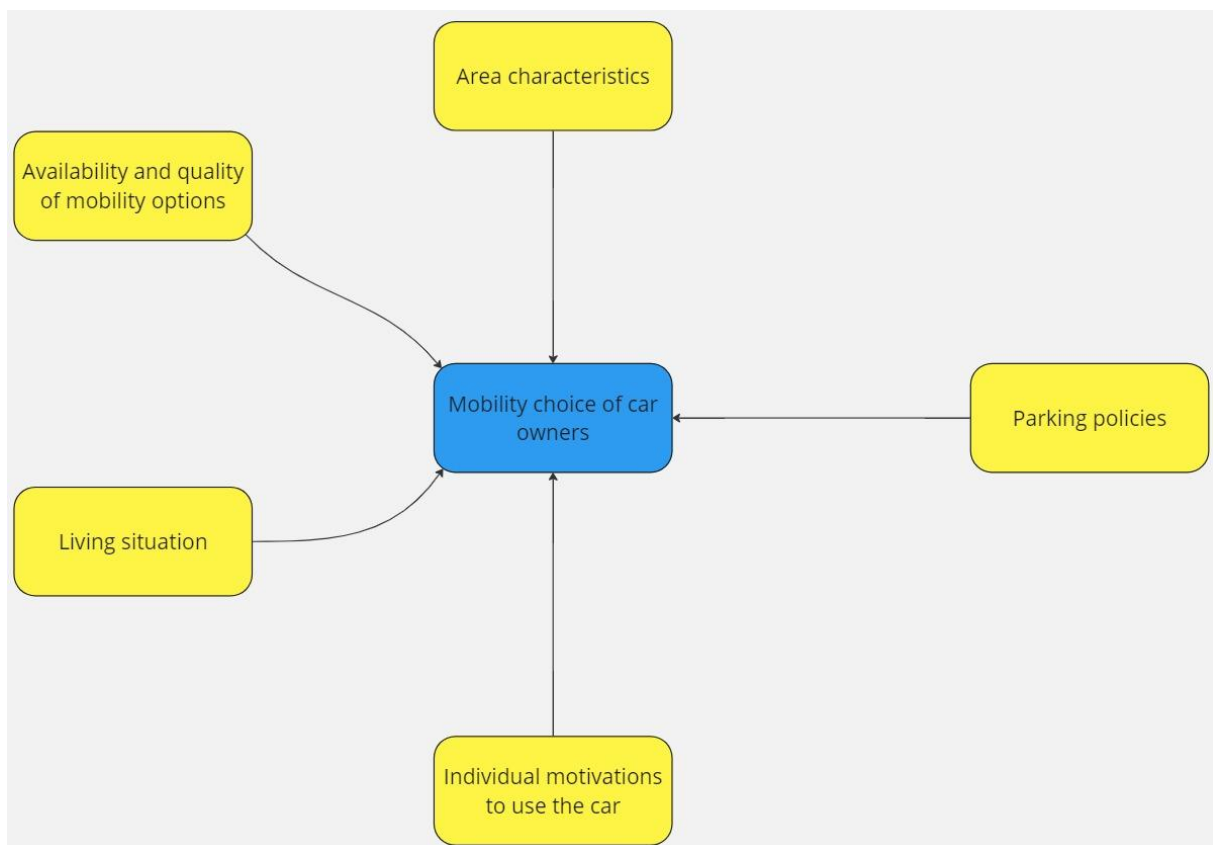


Figure 1: Conceptual model

Individual motivations for using the car	Characteristics of the area	Living situation	Availability and quality of mobility options
Convenience, minimizing effort	Settlement size	Family formation	Infrastructure network
Sense of freedom and independence, desire for control	Land use, access to destinations	Participation in the labor force	Availability and quality of public transport network
Enabling an active life	Polycentricity/ monocentricity	Orientation towards leisure	Availability and quality of active mobility network
A symbol of status	Urban density	Travel habits	Availability and quality of car network
Importance of caring for others			
Enjoyment and pleasure in driving			
Lack of knowledge about other mobility options			
Fulfill aesthetic needs for undirected travel			
Journey time concerns			
Minimizing monetary costs			
Personal space concerns			

Table 1: Explanation of concepts within the conceptual model

As seen from the conceptual model in Figure 1, the relationship between parking policies and the mobility choice of car owners is sought. After examining the literature, it became clear that not only parking policies can influence someone's mobility choice, but the concepts of individual motivations to use the car, characteristics of the area, living situation, and the availability and quality of mobility options can influence it as well. For this reason, the other variables will be investigated as well and will be explained down below.

Individual motivations to use the car as a mobility option do have an influence on the mobility choice someone makes. As seen from the research discussed within §2.1.3, there are various personal motivations why someone uses the car as a mobility choice. Apart from parking policies, this shows that numerous other factors can influence the mobility choice of a car owner.

The characteristics of the area have also been shown to influence the mobility choice of car owners. It has been explicitly chosen to make a separate variable for the availability and quality of mobility options. Although an aspect like

infrastructure network is a part of the characteristics of the area, after analyzing the literature and the previous research the importance of a separate variable became clear.

The living situation of someone has also been shown to influence the mobility of car owners. As seen from the research from Handy (1996), it can be a standalone variable that does influence the mobility choice.

§3 Methodology

This section will give an overview of the methods that have been chosen, as well as a description of the case study area this research has taken place. This research uses a qualitative approach with two different ways of interviewing and an analysis of existing parking and mobility policies. At first, interviews with experts regarding mobility in the province and municipality of Utrecht, and the municipality of Vijfheerenlanden have taken place. At last, nine interviews with residents from the municipality of Vijfheerenlanden have taken place.

This section will firstly describe why the qualitative approach in combination with the analysis of policies has been taken. After that, the case study area will be described, which is followed by further information about both types of interviews and their respective response groups. At last, there will be a section that discusses the process of analysis.

§3.1 Research design

At first, it has been chosen to analyze the parking and mobility policies that influence the municipality of Utrecht and the residents themselves. There has been explicitly chosen to analyze these policies because there is a small amount of research yet conducted about parking policies within the Netherlands compared to that of other countries. The analysis of these policies will provide a basis for the interviews with the government officials.

Qualitative research with interviews has been explicitly chosen because, as seen from previous research, there is a scarce amount of qualitative research within this field of work. Most previous research has been conducted using GIS-analyses, statistical analyses, or in some cases surveys. Research with qualitative methods can therefore contribute to this field of work that has never been done before. Acquiring in-depth motivations about mode choice, with the combination of the views of local governments can contribute greatly to the existing literature on mobility and provide a different view compared to what has been researched before. Because travel behavior is a complex phenomenon, qualitative research can contribute to a better understanding of these complexities due to our fast-changing world (Clifton & Handy, 2003). Using a quantitative approach is not suitable to get an in-depth understanding of a mobility choice, which is something that is required for this research. Furthermore, the article of Gardner and Abraham (2007) has shown that a qualitative approach to research about mobility choices can provide new insights that people can bring that are not expected at first glance.

A qualitative method can get a subjective experience of an individual and a deep understanding of something, which is especially useful regarding this research because the experiences of individuals are useful for answering the research question (Mars et al., 2016). Qualitative research can therefore offer more depth compared to quantitative methods, however, there can be a trade-off with the amount of breadth qualitative research about mobility choices has (Beirão and Cabral, 2007).

The objectives of this research are to get an in-depth understanding of why people use a certain mobility option and what the influence of parking policies can be. As seen from the conceptual model in figure 1, there will be looked at what the influence of a parking policy can be on the mobility choice of a car owner. The personal motivations for using the car and the characteristics of the area someone lives in have been considered on how and why this influences a certain mobility choice. Furthermore, someone's personal situation has also been taken into account, due to the expectations that it influences a mobility choice, but is not connected to parking policies. There has been explicitly sought after how the residents experience their living situation and the characteristics of the area they live in. As seen from the theory, people can experience characteristics of their living situations and areas in different ways. It has shown that certain orientations towards leisure can influence a mobility choice.

The interviews with the government officials have at first the objective to answer the third research question, as well as a deep understanding of what the parking policies and their goals are, the analysis of the parking and mobility options will provide a base for the interviews with the government officials.

§3.2 Case study area

The research area consists of Vijfheerenlanden which is located within the province of Utrecht. Figure 6 shows the location of the municipality within the province of Utrecht. This part will further discuss relevant statistics about Vijfheerenlanden, an overview of the mobility situation within Vijfheerenlanden, at the end a motivation on why this selected area is suitable for this research.

§3.2.1 Statistics of Vijfheerenlanden

Vijfheerenlanden has formed itself since the year 2019 from the 3 previous smaller municipalities of Vianen, Zederik, and Leerdam. The municipality consists of two cities, fourteen villages, and 23 hamlets (*Vijfheerenlanden | Plaatsengids.nl*, 2020). Vijfheerenlanden has 60.052 residents where 32.340 people live in less urbanized or non-urbanized areas (*CBS Statline*, 2023). Vijfheerenlanden has an area of 153 km² which gives it an average population density of 392 people per square kilometer (*KasdastraleKaart*, 2024). As discussed in the introduction, Vijfheerenlanden is considered a less urbanized area. According to CBS (2024), there are five levels of urbanization based on the number of addresses per km²:

1. Very highly urbanized - 2500 or more addresses per km²
2. Highly urbanized - 1500 to 2500 addresses per km²
3. Moderately urbanized - 1000 to 1500 addresses per km²
4. Less urbanized - 500-1000 addresses per km²
5. Not urbanized – less than 500 addresses per km²

Figure 2 shows the current distribution of urbanization within the municipality. It is observable that the majority of people live in non-urbanized or moderately urbanized areas with a small number of people who live in highly urbanized areas. The highly urbanized area mainly consists of the cities of Leerdam and Vianen, while other settlements within the municipality have a lower level of urbanization. Figure 3 shows the largest five towns within Vijfheerenlanden with their respective

number of residents. It is observable that Leerdam and Vianen stand out with the number of residents within their respective settlements. The other settlements within the municipality are considerably smaller and less urbanized. When talking about residents, it is observable that within Vijfheerenlanden the age distribution is relatively even across age groups. Figure 4 shows a pie chart with the current distribution of age within Vijfheerenlanden. When looking at Figure 5, it is observable that there is not a single type of household that stands out relatively. The average number of people per household stands at 2.4 (CBS Statline, 2024).

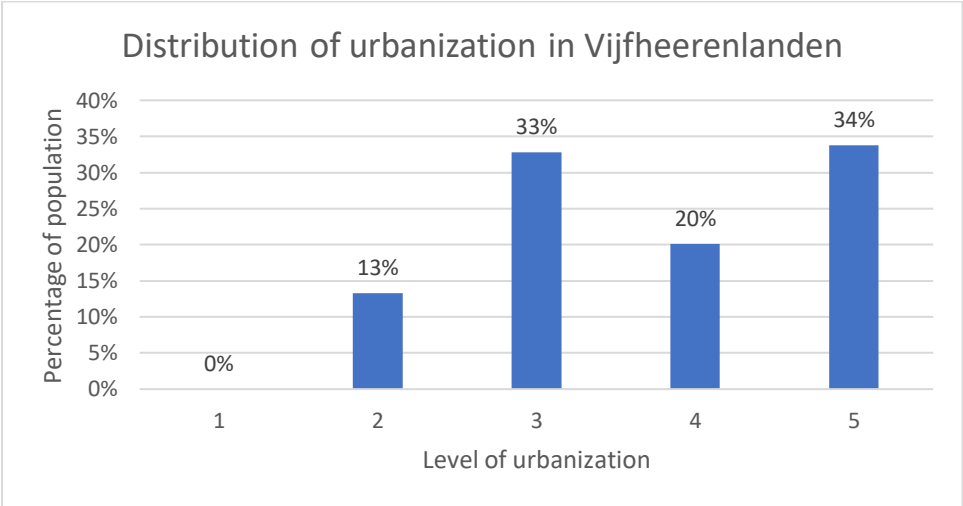


Figure 2: Distribution of Urbanization within Vijfheerenlanden (CBS statline, 2023)

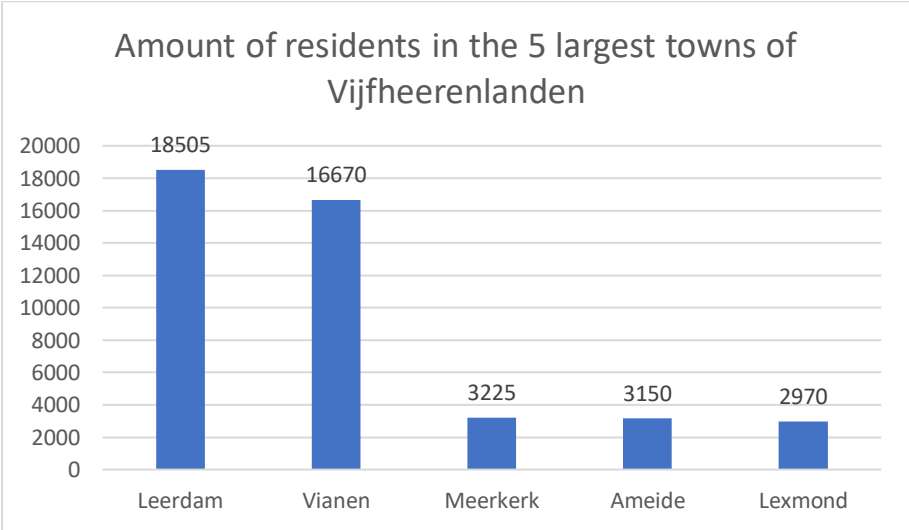


Figure 3: The 5 largest towns within Vijfheerenlanden (CBS statline, 2023)

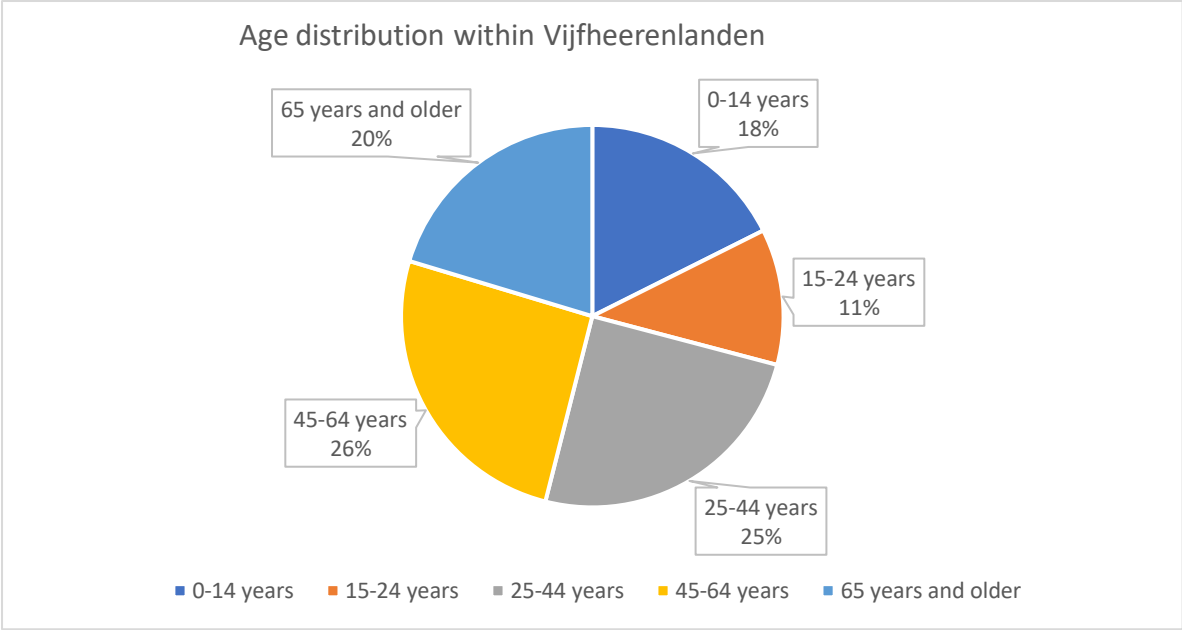


Figure 4: Distribution of age within Vijfheerenlanden (CBS statline, 2023)

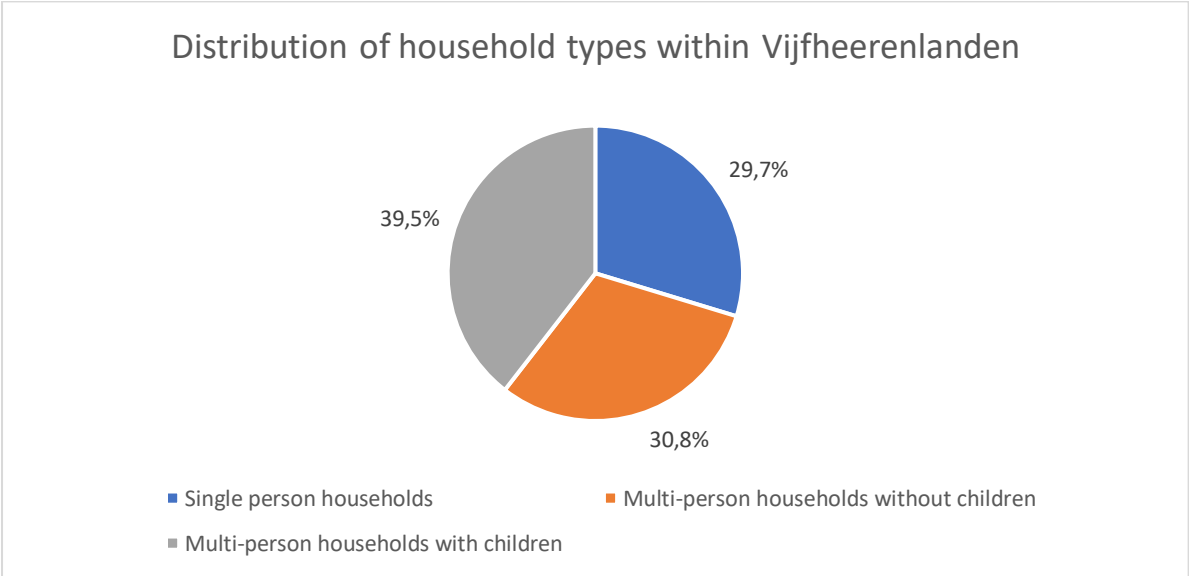


Figure 5: Distribution of household types within the Vijfheerenlanden

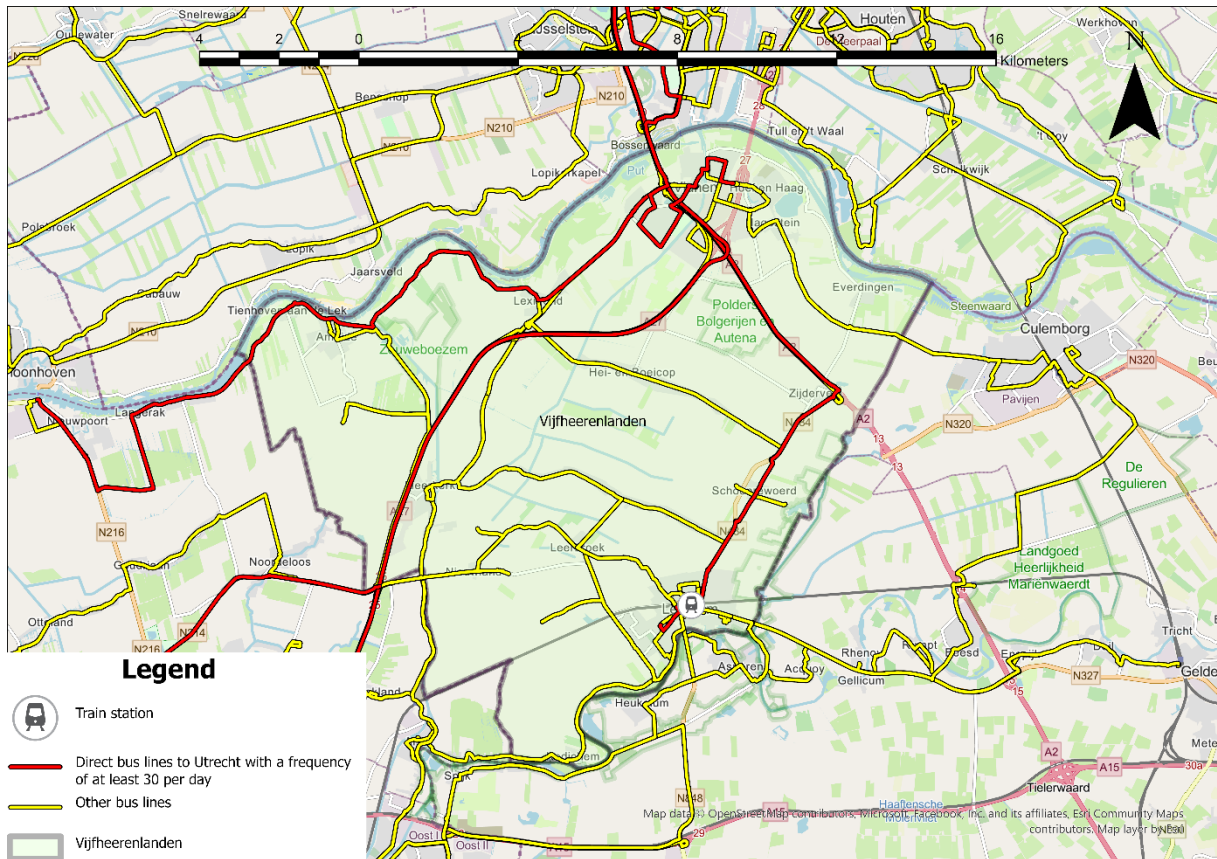


Figure 7: Map with bus lines within Vijfheerenlanden

§3.2.3 Reason for case study selection

This research will consist of a case study within Vijfheerenlanden. For this specific research is chosen for a case study for several reasons. Case studies are useful to investigate larger samples, in this case, the relationship of less urbanized areas to a larger city within the Netherlands, while at the same time offering depth, which can be useful during this case of qualitative research (Flyvbjerg, 2011). The area of Vijfheerenlanden is explicitly chosen because of the large number of people there who live in less urbanized areas. Vijfheerenlanden is a diverse area because, as seen from the description of the research area, has different levels of accessibility by public transport across the municipality.

§3.3 Research process

This section will describe the process of the selected methods. Within this section, the relevant policy documents will be noted, as well as the people that were interviewed. Furthermore, a description and explanation of these specific methods are provided to get an understanding of how the desired information was obtained.

§3.3.1 Policy analysis

As stated within §3.1, the analysis of the mobility and parking policies that concern the municipality of Utrecht as well as the residents have the goal to provide a base for the expert interviews to get an understanding of what the parking policies are within this research. There have been looked at policy documents regarding the municipality of Utrecht, the province of Utrecht, the larger urban area of Utrecht,

as well as the municipality of Vijfheerenlanden. The following policy documents were analyzed, and explained with a small description of the respective contents:

Municipality of Utrecht

- Mobiliteitsplan 2040 → describes the plans for policies about mobility until the year 2040
- Parkeervisie → describes ambitions about car and bicycle parking within the municipality of Utrecht
- Aanpak betaald parkeren → describes the policies about the process to make the municipality of Utrecht a paid parking zone as a whole
- Omgevingsvisie → a general document about the ambitions for the whole living environment of the municipality of Utrecht

Province of Utrecht

- Beleidsuitwerking P+R provincie Utrecht → provides a guideline for the parking policy of P+R for the whole province
- Mobiliteitsvisie Provincie Utrecht → describes ambitions and policies the province has about mobility in general
- Concept bereikbaarheidsprogramma 2024-2029 → describes ambitions the province has about accessibility and mobility within the years 2024-2029

Large city area of Utrecht

- Mobiliteitsvisie grootstedelijk Utrecht → ambitions about mobility for the larger urban area of Utrecht which contains the following municipalities: Utrecht, De Bilt, Zeist, Nieuwegein, Houten, IJsselstein, Vianen (part of Vijfheerenlanden), Stichtse Vecht, and Bunnik

Municipality of Vijfheerenlanden

- Mobiliteitsvisie 2040 → describes the plans for policies about mobility until the year 2040
- Omgevingsvisie Vijfheerenlanden → a general document about the ambitions for the whole living environment of Vijfheerenlanden

All of these policy documents are also mentioned in the literature list at the end of this research.

§3.3.2 Expert interviews

Expert interviews can give information that is not possible to acquire when interviewing individuals or residents. Expert interviews can provide information about decision-making processes (Döringer, 2020). This could be especially useful when talking about policymaking, which makes this an ideal method to acquire useful information regarding the desires and current views on car mobility. The expert interviews thus give a governmental perspective on this subject and a deep meaning about certain decisions behind policymaking. A semi-structured in-depth approach was chosen to obtain new knowledge and slightly divert from the topic to gain additional knowledge (Johnson & Rowlands, 2012).

The interviews were recorded and transcribed and after each interview, the respondents were asked if they would like to remain anonymous or would have problems with referencing to the transcripts.

The experts that were interviewed consisted of government officials who are specialized in the fields of mobility and parking. Two people from the province of

Utrecht were interviewed, one from the municipality of Utrecht, and one from Vijfheerenlanden. The government officials from the province of Utrecht were interviewed at the same time. After emailing the general facilities within the previously mentioned layers of government, direct contacts were given with the relevant government officials. Table 2 offers a schematic view of who was interviewed and on what dates they were interviewed.

There has been explicitly chosen for these three government institutions because they have the most influence on the mobility of the residents of Vijfheerenlanden. The municipality of Utrecht has the most influence on the parking policies within its municipality, whereas the province of Utrecht provides consulting roles regarding mobility and parking. Furthermore, the municipality of Vijfheerenlanden also has a substantial role in the mobility of its residents. The interviews with the government officials have had the goal of getting extra information about the current policies regarding mobility and parking.

Function	Institution	Date	Setting
Program-manager mobility & project manager U-net	Province of Utrecht	17-04-2024	In-person
Policy officer for mobility	Province of Utrecht	17-04-2024	In-person
Advisor mobility on parking policies	Municipality of Utrecht	18-04-2024	In-person
Policy advisor on traffic	Municipality of Vijfheerenlanden	17-05-2024	Online

Table 1: Overview of expert interviews

§3.3.3 Resident interviews

Interviewing residents can provide certain local knowledge that is otherwise hard to obtain. Local knowledge is context-bound, community-specific, and non-systematic because it is generated from the ground up through social practices in everyday life (Lloyd, 2014). Obtaining community-specific knowledge is crucial because it can reveal certain knowledge that is not available using other types of research methods. The perspective of the residents can give a detailed description of their motives regarding mobility choices and can be compared with the perspective of the experts.

The same semi-structured in-depth approach was taken with the residents as the expert interviews, as seen in §3.3.2. The same approach to anonymity and privacy was also taken.

The respective residents are all car owners who reside within Vijfheerenlanden and make trips to the city of Utrecht on a basis of at least two times per month. Car owners are explicitly chosen because, as seen from the literature, they are more likely to make frequent car trips and are less likely to use other mobility options. The residents were found using the social media platform Facebook, where within different groups a post was made soliciting for people interested in an interview. The interviews with the residents took place between the 6th and the 24th of May 2024. In total nine interviews were conducted, where there was explicitly chosen for this number of interviews to find a balance between as much information as

possible and theoretical saturation. After nine interviews it was concluded that there could be no new information so the search for new respondents was halted. There has also been an emphasis on the location of the residents from Vijfheerenlanden. There has been an explicit search to find people in as many different towns as possible, to provide results that apply to the whole area of Vijfheerenlanden. Figure 8 shows the current residences of the interviewed people from Vijfheerenlanden. Table 3 shows a descriptive overview of the residents with personal indicators.

Respondent	Residence	Home-situation	Age
A	Vianen	Living with partner and child(ren)	51
B	Hei- en Boeicop	Living in own home on parents' land	31
C	Schoonrewoerd	Living together with a partner	59
D	Schoonrewoerd	Living together with a partner	61
E	Leerdam	Living together with a partner	62
F	Meerkerk	Living together with a partner	58
G	Ameide	Living with partner and child(ren)	43
H	Ameide	Living together with sister	61
I	Tienhoven aan de Lek	Living together with a partner	54

Table 2: Description of interviewed residents of Vijfheerenlanden

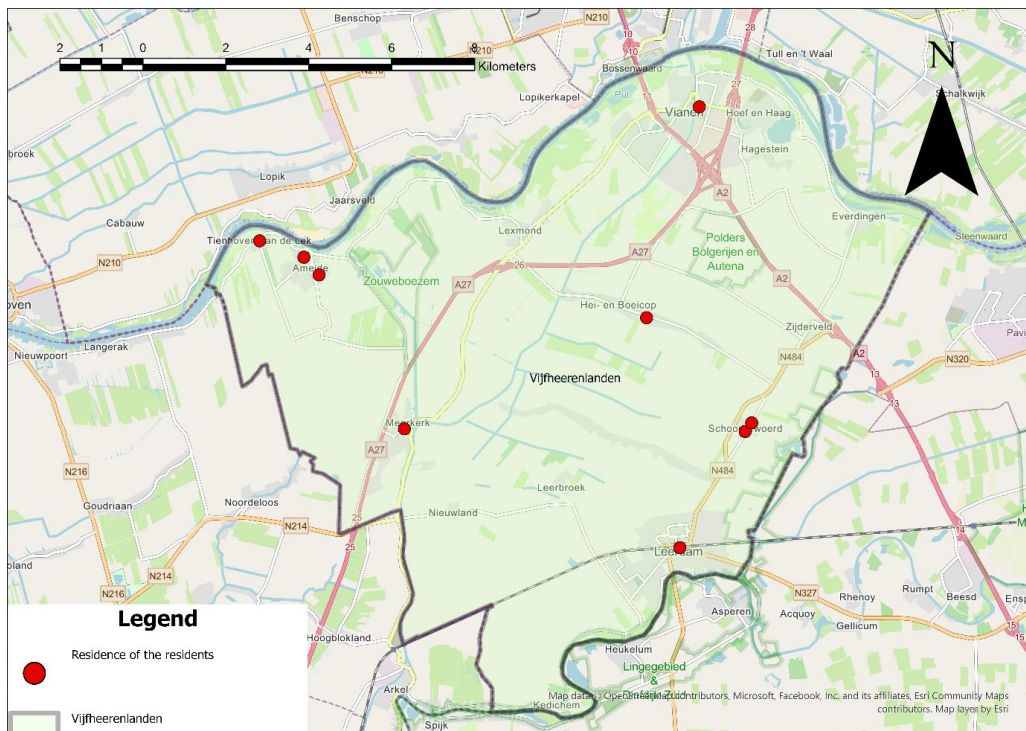


Figure 8: Residence of the residents of Vijfheerenlanden

§3.4 Analyzing of data

After the interviews were conducted, they were transcribed using the automatic transcribing function within Microsoft Word and Teams. After the transcriptions were automatically transcribed, the transcripts were checked and improved while listening to the interviews a second time. After the transcribing of the interviews, the interviews were coded with the use of the program NVivo.

A code is essentially a label that assigns a symbolic meaning to the descriptive or inferential information compiled during a study. Codes are primarily used to retrieve and categorize similar data chunks so the specific data can be quickly pulled out and analyzed (Miles et al., 2014). With the help of these codes, a structured thematic analysis was performed. The codes within the interviews are based on the variables and concepts mentioned within §2.3. After each code, it is mentioned in which of type of interview it was mentioned. The interviews were coded using the following list of codes:

- Reasons to travel (resident interviews)
- Planning of the area and design of infrastructure (expert interviews)
- Lifestyle and habits (resident interviews)
- Available mobility options with the experiences (resident interviews)
 - Public transport
 - Cycling
 - Car travel
- Explanation behind parking policies (expert interviews)
- Experience of nearby services or frequent destinations (resident interviews)
- Perceptions of parking policies (resident interviews)

§4 Results

This section will be divided into the following 4 themes according to the conceptual model:

- Parking policies
- Motivation to use the car
- Availability & quality of mobility options
- Characteristics of the area
- Living situation

The first theme of this section will look at what the parking policies are within the municipality of Utrecht and how the government officials exercise them to influence the mobility choices of the residents.

Furthermore, because the residents were asked directly how they perceive the parking policies within the municipality of Utrecht, the current perception of parking policies will therefore be analyzed, as well as the hypothetical situation that was presented within the interviews.

This theme will form the basis for the rest of the results section because this will provide the basis for the link between parking policies and mobility choices.

The second theme of this section will dive into the motivations the residents gave to use the car as a mobility option. The results from this part will therefore contribute to how much this variable influences the overall connection between parking policies and the mobility choice of car owners. The focus will be on what the residents themselves gave as answers to the concept of motivations to use the car specifically.

The third theme of this section will look at how the living area of the residents influences the relationship between parking policies and mobility choices. This theme will focus on how the residents experience their surroundings and will dive into how this impacts their mobility choices in relation to parking policies.

The fourth theme of this section will look at the living situation of the residents. This theme will provide the possible link between the living situation and the mobility choice. It will focus on how certain personal aspects of life which the residents have explained themselves will influence the mobility choice.

It has to be noted that all interviews have taken place in Dutch. Therefore, all the quotes that are presented within this section are directly translated from Dutch to English.

§4.1 Parking policies

This theme will look at two aspects of parking policies. First of all, there will be an overview of which parking policies are the most important within the municipality of Utrecht and what the government officials expect them to have as an influence on the mobility choices of people. The second part of this theme will provide an overview of what current perceptions of the residents on parking policies within the municipality of Utrecht.

§4.1.1 Determining the parking policies in the municipality of Utrecht

As seen from §2.2.3, there are in total nineteen different parking policies. However, as analyzed from the policy documents, not every parking policy is present or plays a large role within the municipality of Utrecht. The following seven parking policies were found to be the most important ones:

- Regulating capacity
- P+R
- Shared cars
- Paid parking
- Parking permits
- Time limits
- Parking norms

After determining the most important parking policies, the government officials were asked to further elaborate on these policies. Table 4 provides a schematic view of the aforementioned parking policies, provided with a quote that acts as an explanation of how this parking policy plays a role within the overall concept of parking policies.

Parking policy	Quote(s)	Interview
Regulating capacity	<i>"Where we are developing new areas, very few new parking spaces are being added and we are mainly focusing on other forms of mobility" "For example, we want to eliminate parking spaces in the city, a half to one percent a year"</i>	Municipality of Utrecht
P+R	<i>"We actually need everything, so we see P+R as a subset of the whole package that might make quite a bit of sense for well, certain relationships" "Well, people who then can no longer go into the city must be able to park elsewhere and that could be the P+R, for example"</i>	Province of Utrecht Municipality of Utrecht
Shared cars	<i>"Utrecht is a forerunner when it comes to the numbers of users of shared cars so there is definitely enthusiasm for this"</i>	Municipality of Utrecht
Paid Parking	<i>"When we introduce paid parking somewhere, we do also look at what special functions there are in the area and we do engage with parties to indeed hear what paid parking means to them"</i>	Municipality of Utrecht
Parking permits	<i>"Of course, paying money for something that has been free until now doesn't make anyone happy. What we see so far is that once people experience a lot of parking pressure and have trouble parking the car, that's when the residents say, please do us paid parking, I'll pay a couple of tens a year to be able to park the car in front of the door."</i>	Municipality of Utrecht
Time limits	<i>"There does not necessarily have to be paid parking all day, but from, say, 6:00 to 11:00 to get those commuters away where customers can also park"</i>	Province of Utrecht
Parking norms	<i>"We also do indeed have conversations with municipalities about parking policies, don't we? About parking norms, they could apply to new developments. Ultimately, it's up to the municipality, but we do try to see if we can perhaps help to make more agreements about that or if municipalities are more aware of that"</i>	Province of Utrecht

Table 4: Quotes explaining the emphasized parking policies

The main goal the municipality and province of Utrecht had with parking policies was inhibiting the growth of car mobility within the municipality and the province as a whole. This is something that became clear within the policy documents as well as the interviews with the government officials. This is best summarized with the following quote from the interview with the municipality of Utrecht:

"Yes, in principle, we do not want any more cars. This is because the city is naturally going to grow in terms of the number of residents, as well as visitors and employees. This means that, relatively speaking, car usage per visitor or resident must decrease. So, in that sense, you could say that we are indeed looking for a reduction in car traffic, but in absolute numbers, we at least do not want it to increase."

As became clear within the policy documents of the municipality of Utrecht and the interview with the municipality of Utrecht, parking policies differ between different parts of the municipality. The P+R facilities are complementary to the many parking policies in the city center itself. This is also explained by the quote from the province of Utrecht seen in Table 4. In this way, the center is still easily accessible for people who, for example, do not want to pay a lot for parking or avoid problems looking for a parking spot. Figure 9 provides an overview of the current locations of the P+R facilities within the municipality of Utrecht.

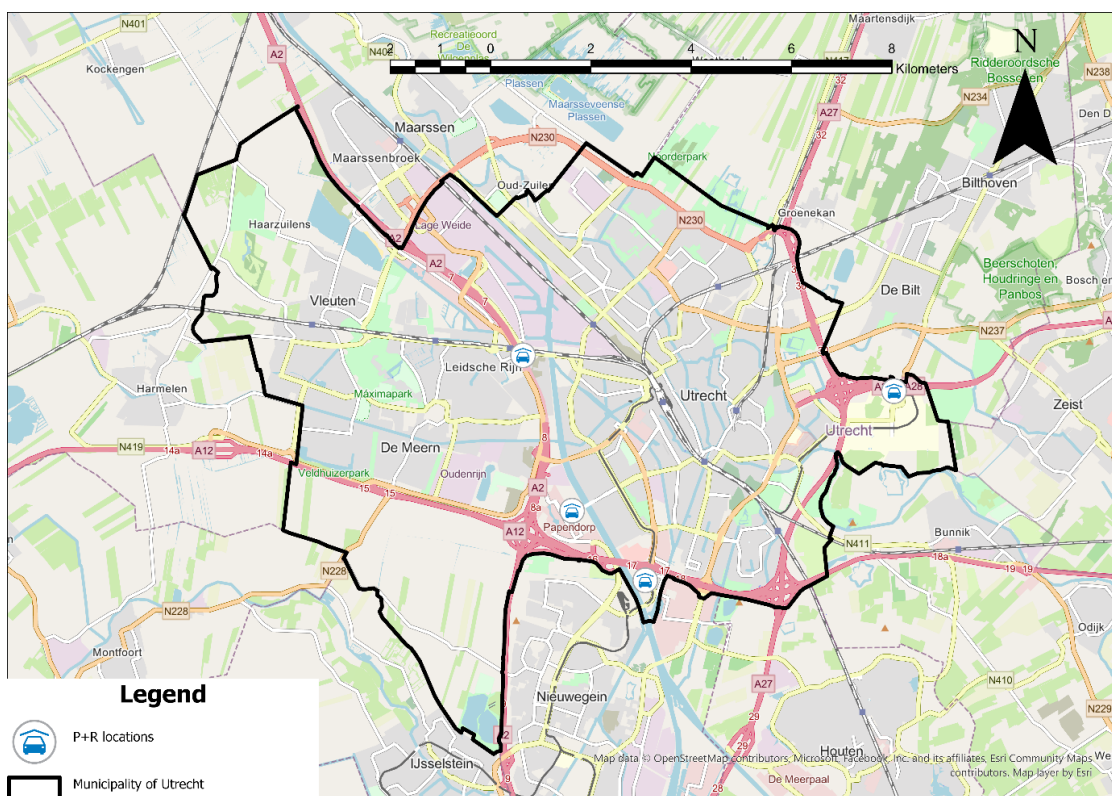


Figure 9: Location of P+R facilities within the municipality of Utrecht

As seen from Table 4, there are a lot of similarities and overlaps between the different parking policies. Looking at the case of time limits and parking permits, those policies are always in combination with paid parking. Within the municipality of Utrecht, a permit to park the car depends on the area of the city, and time limits

are regulated by parking prices, where within certain times parking is paid or parking is free for a limited period. Figure 10 provides an overview of the current plans regarding paid parking within the municipality of Utrecht. As seen, the plans are to make the whole municipality a paid parking zone by 2034. It will be done in different phases where the dark yellow areas will be paid parking in 2024-2025, the light blue areas in 2026-2030, and the dark blue areas in 2031-2034. The lighter yellow areas are the areas where paid parking is already the case. The areas where it costs money to park the car are also the areas where a paid parking permit is needed.

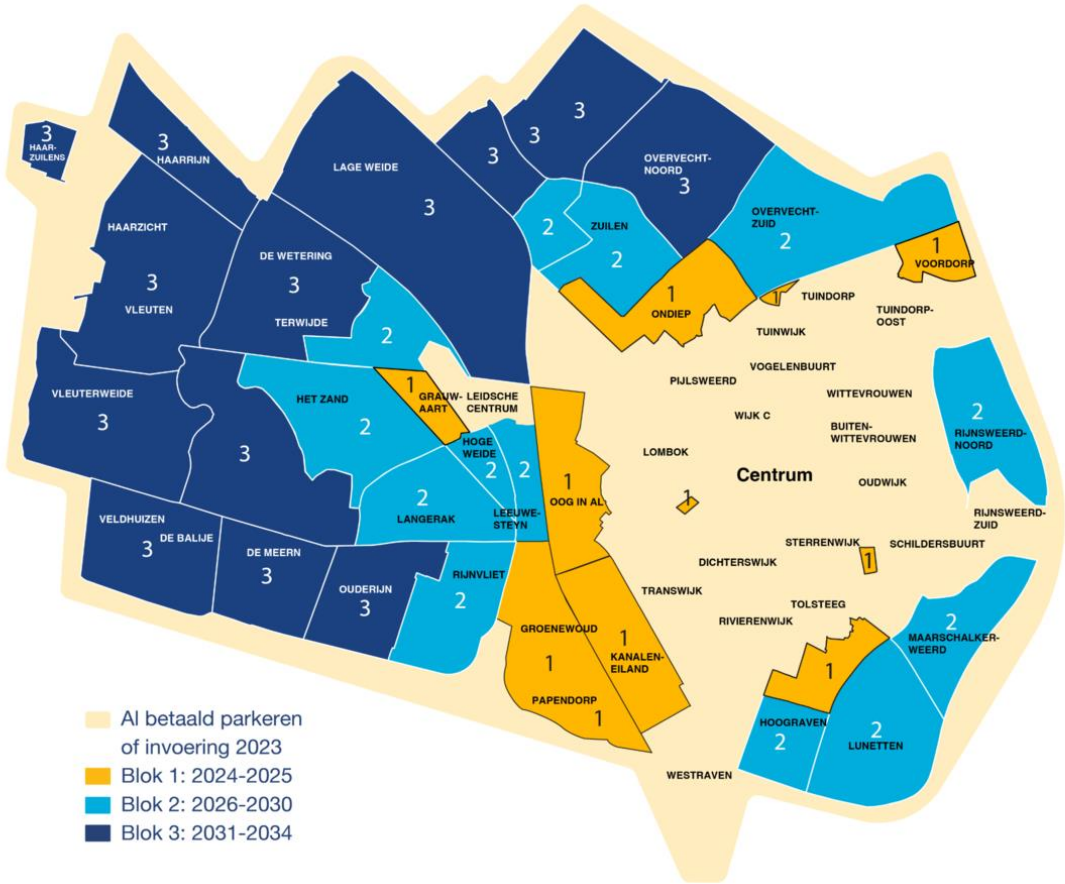


Figure 10: Paid parking areas and future paid parking areas within the municipality of Utrecht (Gemeente Utrecht, 2023)

From this data it can be concluded that there are a select number of policies that have an emphasis within the municipality of Utrecht. Almost all policies are in combination with paid parking and it was observed that there are still many things that are going to change within the municipality of Utrecht. Some examples of this were the reduction of parking spaces, more emphasis on P+R and gradually implementing paid parking across the whole municipality.

§4.1.2 Perception of current parking policies

The residents were asked what their perceptions were about the current parking policies that exist within the municipality of Utrecht.

Only resident F was not concerned with parking policies when parking their car within the municipality of Utrecht. All the other residents were always concerned about parking and looking for mostly the cheapest spot near their destination. Looking at the most emphasized policies, paid parking and P+R were mostly mentioned by the residents when asked how they currently perceive parking policies within the city of Utrecht. However, there were differences what the exact destination within the municipality of Utrecht would be. The city center of Utrecht was not experienced as an easy or enjoyable place to drive and park the car. Other areas within Utrecht were not mentioned in the same way as the center of Utrecht was. The P+R was therefore experienced as a convenient way to park the car when travelling to the city center of Utrecht. An example of this is shown by the following quote from resident A:

"For example, if I go by car to Utrecht, I won't be so quick to park in the center, but then I will first go there so a P+R and then the last bit by public transport if I want to go by car."

The main motivation the residents gave when using P+R was the lower costs it could offer compared to parking within the city of Utrecht. The extra amount of time the P+R took was not seen as a problem and the public transport connections from the P+R to the destinations were experienced positively. Resident B even stated that she often travels by car to Vianen and uses public transport from there on when travelling to Utrecht. She stated that parking was easy and free near the bus station of Vianen and connections to the municipality of Utrecht were easily done from there and experienced as more pleasant compared to driving the whole way.

Another action that the residents came up with was parking the car further away from the destination in order to save costs on parking. As said before, the P+R is a popular way to save costs and hassle when travelling to the city center, but when residents had to travel to other parts of the municipality, parking further away was seen as an option. This was caused by the fact that the public transport connections to other parts of the city were not experienced in a positive way, as well as the fact that the experienced walking distances were not too long outside of the city center. This is explained by the following quote of resident D:

"There is a certain part of the neighborhood where there is paid parking and then I often put my car a little further away in a place where you don't have to pay. Then I'll walk a short distance from there."

Avoiding the municipality of Utrecht was also seen as option, but it depended on the activities the residents would do. If there were activities that were not unique to the city of Utrecht, avoiding the city of Utrecht was seen as a serious option. The following two quotes from residents C and G support this phenomenon:

"If the same movie is playing in Gorinchem? If I don't have to go to the city of Utrecht, I'll go to Gorinchem."

"But yes if I can choose between Utrecht or Breda? It's like, what am I looking for, what am I going to do? Yes but then the preference is more likely to be Breda, for example, also in terms of parking costs."

This information shows that the current parking policies within the municipality of Utrecht are experienced as expensive compared to other municipalities within the Netherlands. The residents were taking clear actions in their travel behavior due to the parking policies that are present within the municipality of Utrecht.

§4.2 Motivations to use the car

This section will look at what direct motivations the residents gave about using the car as a mobility option. This part will solely stick to the benefits the residents gave when talking about using the car.

The main motivations the residents gave to use the car as a mobility option were travel speeds, convenience, and a sense of freedom and independence. Importance in caring for other was briefly mentioned, but did not carry on with the same importance as the other motivations mentioned. In all of the nine interviews, the residents highlighted that other modes of transport take too much time compared to the car when travelling to the municipality of Utrecht, hence the motivation of travel speeds given by the residents. The residents stated that the cycling distances were generally considered too long, while public transport was experienced as taking too long.

Resident B said the following about the travel speeds of the car:

"Yes actually, if you don't have a car here, then your travel time becomes a lot longer and also a bit more complicated."

Resident G said the following about the convenience the car brings:

"The convenience of the car is, you get in when you want and you go home when you want."

Resident E said the following about the sense of freedom and independence about car travel:

"Because yes, you know, you always have to watch the time and I want to feel free. Suppose I'm in Rotterdam and a friend calls and says, "Hey, you want to come over? I just like that about the car."

This shows the residents attach value to owning and using a car. However, the by far most emphasized factor the residents gave was the fact that the car took less time compared to the other mobility options. There was a willingness among the residents to use different mobility options, but the aspect of time conserving remained the most prevalent reason to use the car instead of other mobility options.

Although not as explicitly mentioned as the conserving of time, sense of freedom and independence and convenience, still remained important motivations to use the car. One example from resident A was that the car was convenient when there were different appointments on different locations during the day. The fact that the car could provide flexibility when the journey would change at the last moment contributed to the motivation of using it as a mobility option. She mentioned that she often had to do other things after work and that the flexibility of travelling by car made it possible to do that.

Furthermore, resident C stated that the car was the perfect mobility option for taking a large amount of goods from different destinations. She highlighted that taking a large amount of goods with you is easier by car compared to cycling or public transport. When she went out shopping, she mainly used the car when she needed to travel to multiple shops with a large amount of goods, where cycling was the preferable option when a small amount of goods was necessary.

Although only car owners were interviewed within this research, the interviews with the residents as well as the interview with the government officials of Vijfheerenlanden made it clear that car ownership is considered a must for the residents of Vijfheerenlanden. The government official of Vijfheerenlanden further stated that he experienced an increase in car usage during the past 10 years, while he also stated that practically every household within Vijfheerenlanden has access to at least one car. Resident B shared the same about owning a car and the necessities it provides when talking about mobility. This is supported by the following quote:

"But yes, it's just the case here that the moment you have a driver's license and the ability, you often buy a car. Yes, then you often go by car because public transportation is inferior."

§4.3 Availability and quality of mobility options

This section will look at what the experiences of the residents were about the available mobility options within Vijfheerenlanden and when traveling to Utrecht. The first part will zoom in on public transport, the second part will focus on active forms of mobility, while the last part will look at the availability and quality of the car network.

§4.3.1 Public transport

When looking at the current state of public transport within Vijfheerenlanden, the experiences differed among the residents. The residents who lived in Vianen, Schoonrewoerd, and Leerdam experienced the public transport network in a better way compared to the other residents. The other residents mentioned that public transport was not considered a comfortable way to travel, because they experienced low levels of reliability, long travel times, infrequent service, far away located bus stops, and inconvenient times of service.

The fact that the residents from Vianen, Schoonrewoerd, and Leerdam experienced public transport in a better way compared to the other residents had to do with the fact that the residents experienced a direct, convenient, and fast bus line that

travels directly to the municipality of Utrecht. Resident C emphasized this as follows:

"The nice thing about Schoonrewoerd is that line 85 goes directly to Utrecht Centraal, so it ends at the on the south side of the train station."

This shows that experiences from public transport can differ significantly between different villages within Vijfheerenlanden. When looking at the residents who do not live within Vianen, Schoonrewoerd, or Leerdam, the situation was indeed experienced in a whole different way. This is supported by the following quotes from residents I and B:

"If I want to go to a bus stop, I have to cycle at least 15 minutes."

"No, no, in that regard I think of, oh, then I might prefer to get on the bus when traveling to work, in the afternoon I could take the bus back home, but I can't leave on the bus in the morning because it's not running yet."

The fact that public transport was experienced in such a bad way by the residents who did not live in Vianen, Schoonrewoerd, or Leerdam, gave the main motivation to use the car when traveling to the municipality of Utrecht. There was a clear willingness to use public transport as a mobility option, but it was not experienced as a comfortable and convenient way to travel. The residents also experienced that the quality of the public transport network has decreased significantly since the Covid-19 pandemic. Before the pandemic, there was a more positive outlook on using public transport as a mobility option.

This shows that the quality and availability of the public transport network is a significant factor when considering a mobility option. It is also hard to provide an answer to the overall experience of how the residents experience public transport within Vijfheerenlanden, as there were clear differences among the experiences of the residents. Nevertheless, it can be stated that the network and quality of public transport is suboptimal.

§4.3.2 Active forms of mobility

When looking at the active forms of mobility of walking and cycling, the experiences of the residents were not perceived in a bad way, but using these active forms of mobility was not feasible when traveling to the municipality of Utrecht.

As seen before in §4.2, cycling to the municipality of Utrecht was considered a trip too far to be feasible by bike and especially by foot. Travel times would be too long compared to other mobility options, even though the infrastructure network was not experienced negatively. Unlike public transport, there were no regional differences within Vijfheerenlanden about the quality and availability of the cycling and walking network. The government officials from the province of Utrecht stated that they try to emphasize longer-distance cycling travel and experienced more people doing it in the past 15 years. However, this was not shared by the residents,

as they did not state to have increased their long-distance cycling travels in the past 15 years. Resident C had the following to say about cycling to the municipality of Utrecht for work-related reasons:

"But that's an hour there and an hour back, then you're already later at work in the morning because you spend more travel time. So you leave later in the evening and you have to bike for another hour. Yeah, then I'm past my hunger before I get back home. That's a little impractical."

This shows that although the cycling infrastructure is experienced in a good way, distances were still too long to make it a feasible mobility option for everyday trips. However, cycling and to some extent, walking were the favorite mobility options within the respective village of the residents.

The quality and availability of active forms of mobility are therefore experienced universally in a good way among the residents. The main concern about this mobility choice lies within the fact that distances are experienced as too long.

§4.3.3 Car mobility

When the residents were asked how their experiences were about the quality and availability of the car infrastructure, a single shared experience was met. The residents experienced no significant problems with traveling by car, except when traveling to the city center of Utrecht. Although traffic jams and other delays by car did occur regularly, it was not perceived as a problem, as explained by resident C:

"It is easier for me to relax in my car in any traffic jam to Schoonrewoerd. Nice with some music on the radio compared to sitting in that bus with someone next to me that I don't know."

Traveling to the city center of Utrecht by car was experienced as slow, difficult, and unpleasant. This has to do with the perceived presence of a lot of one-way and small streets, which were experienced negatively. Resident D explained it as follows when traveling to the city center of Utrecht by car:

"I avoid the center of Utrecht to go to by car. It's A, because of the many one-way streets and B because of the small and hard-to-reach parking lots."

To travel to the city center by car, the P+R was one of the options mentioned by the residents. As stated before within §4.1.2 the P+R was experienced positively by the residents and therefore used when traveling to the city center by car. The P+R locations were experienced as easily accessible by car to then travel further away to the city center of Utrecht by public transport.

As also seen from §4.1.2, avoiding the city of Utrecht and traveling to another city within the Netherlands was also an option. Although only two residents mentioned avoiding the city of Utrecht, it certainly shows that the availability and quality of the car network within Utrecht is perceived in a worse way compared to the other cities of Gorinchem, Tiel, and Breda.

This shows that the quality and availability of the car network partly depend on parking facilities at the destination. If the parking facilities are experienced negatively, the residents tend to avoid traveling by car to that certain area, where the option of using the P+R seems to be the best solution. Furthermore, as seen from §4.3.1 and §4.3.2, choosing the car as a mobility option is mainly due to the poor experiences of other mobility options when traveling to the city center of Utrecht. The residents experience therefore no other feasible options than to use the car.

§4.4 Influence of the area characteristics

As seen from Figure 8 within §3.3.3, the residence of the residents differed as they lived in multiple villages across Vijfheerenlanden. This section will focus on how the residents perceive their direct living area in relation to mobility choices.

When people had to make trips for general grocery shopping, only resident B from Hei-en Boeicop was not able to do daily grocery shopping within the respective village they live in. Resident F supported this positive experience of doing grocery shopping within their village with the following quote:

"No, I don't need to leave the village for anything. Only maybe for clothes, a new dishwasher, or a washing machine I have to go to the city. But apart from that you can get everything here".

When traveling within the village, active forms of mobility were experienced as the favorite way to travel. They were seen as favorable options due to the convenience, enjoyment, and health benefits they could offer. However, when traveling out of their village, these benefits became of less importance as car travel was preferred.

The government official from Vijfheerenlanden has stated that he experienced more car dependency in the past 10 years within the municipality due to the decrease in the number of services that are nearby to all of the residents. Due to this phenomenon, he stated that car dependency has increased due to the larger distances people have to travel. Although the residents themselves did not actively suggest that they had to travel longer distances during the past 15 years, they all stated that they were car-dependent due to the long travel distances and poor infrastructure of public transport. This car dependency was explained by resident G as follows:

"We both do need the car for work, but should my work be a little closer, you could, for example, get rid of one car and cycle to work."

The residents therefore showed a clear relationship between longer travels and car usage. If the area someone lives in therefore provides services and work nearby, car travel would not be a necessity compared to traveling further away to the destinations. Furthermore, the residents again experienced a poor level of public transport availability, which further strengthened the argument of experiencing car dependency.

§4.5 Living situation

This last part of the results section will focus on the experiences and differences between the residents based on their respective living situations. Table 3 from §3.3.3 has shown that there are differences between the residents.

Even though there were differences between the living situations of the residents, the interviews did not suggest that there were major differences in mobility choices. Certain purposes for trips could however incidentally change the mobility choice. When going for leisure activities, planning to drink alcohol was a reason to change the mobility choice. As driving under the influence of alcohol was not desirable, taking public transport was for that specific purpose not a problem. However, when other leisure activities were planned, public transport was not seen as a desirable way to travel, because of the previously mentioned poor experienced state of the public transport network.

There were no experienced differences between the residents who were living with children or had other family formations at home. Nevertheless, when people traveled to the municipality of Utrecht with multiple people, the car was explicitly seen as the favorite mobility choice due to the saving of costs compared to that of public transport.

When traveling to work, all the residents stated that they preferred to use the car as a mobility option. There were also no observable differences just like the family formation.

This shows that the living situations of the residents do not seem to influence the mobility choices they are making. The only thing that was possible to exert influence was the type of leisure activities that were done. This could suggest however that the residents have certain travel habits that are not impacted by the living situation or the other concepts mentioned within the conceptual model.

§5 Discussion

This section will critically evaluate the results of the previous section against the current existing literature presented in the theoretical background section. No new information will be given within this section and the structure will be the same as the previous results section. It will contain the following parts:

- Perception of parking policies
- Motivations to use the car
- Availability and quality of mobility options
- Influence of the area characteristics
- Living situations

§5.1 Perception of parking policies

After identifying the current parking policies within the municipality of Utrecht using the policy documents and the findings of the interviews with the government officials, it became clear what the goals of the parking policies are. The main goal of the parking policies is to provide a steering mechanism to influence the amount of car usage within the municipality of Utrecht, where the government official of the municipality of Utrecht stated that they want to inhibit the growth of cars within the municipality. This aligns with the article of Marsden (2006), where was stated that the main goal of parking policies was to provide an efficient transport system. However, the residents were concerned about the parking policies that were present within the municipality of Utrecht, they did not seem to completely change their mobility choices. The main concerns the residents had were the high prices and low availability of parking within the city center of Utrecht.

Looking back at the article from Vidović and Simićević (2023), where was seen that little changes in parking prices can influence someone's mobility choice, parking policies within the city of Utrecht are therefore not encouraging all people to choose a different mobility option. It has to be stated that this applies to people from less urbanized areas, people who live in other more urbanized areas may react differently compared to those from less urbanized areas. However, it was observable that the residents changed their behavior around parking and mobility. Where parking further away from the destination to save costs, using a P+R, or avoiding the municipality of Utrecht as a whole were mentioned. This way of changing the behavior around mobility was not explicitly mentioned in the literature. The residents showed different behavior than was previously researched.

Reflecting on the articles by Mingardo et al. (2015) and Pierce and Shoup (2013), it is seen that parking policies within the city of Utrecht are mostly not reactive and are based on a proactive policy. This was seen within the policy analysis, as well as during the interviews with the government officials. This is mostly explained by the fact that the policies are made for the long term. Furthermore, as seen from the interviews, the municipality of Utrecht did have conversations with the residents of the municipality regarding parking policies, so this aligns with the findings from the previously discussed articles.

When looking back at the conceptual model, it is certainly visible from the interviews that parking policies can influence behavior around mobility, but a direct link from parking policies to mobility choice seems to be not as direct as mentioned within the literature.

§5.2 Motivations to use the car

Looking back at the theory about motivations to use the car, there were eleven reasons why people would use the car as a mobility option. From the interviews with the residents, it became clear that not every motivation was mentioned, as well as the fact that not every motivation had the same influence on choosing the car as a mobility option. The main motivation the residents gave was the amount of time the car would save compared to other mobility options, which was only briefly mentioned in the article by Gardner and Abraham (2017).

Convenience, a sense of freedom and independence, and the importance of caring for others were also mentioned as motivations for why people used the car as a mobility option. This was also mentioned within multiple articles, so this aligns with the current existing literature. Other factors within the literature were not mentioned by the residents, so not every motivation within the currently existing literature is of importance to the residents.

When looking back at the conceptual model, there is a clear link between motivations to use the car and mobility choices. The residents appreciated travelling by car and it was of certain influence why the specific mobility choice of taking the car was made.

§5.3 Availability and quality of mobility options

Within the literature, there was a specific mention that the infrastructure network of a certain mobility option is a factor of influences why someone uses that mobility option. As seen from the interviews with the residents, this seemed to be the case. The network of public transport was not appreciated by every resident, and the distances to cycle outside of the village were also experienced as too long.

When looking at all the different concepts from the conceptual framework, this concept seems to have the largest influence on the mobility choices of the residents. The residents showed openness to using other mobility choices, but it was not on par compared to traveling by car. The literature clearly showed a link that the quality of other mobility options was of influence to the mobility choice of someone, the link was not as strong as mentioned by the residents.

§5.4 Influence of the area characteristics

The literature suggested a strong link between the mobility choice and the area characteristics someone lives in. Although only people from less urbanized areas were interviewed and it is not possible to compare these findings to interviews with people from more urbanized areas, the exact living area within Vijfheerenlanden did influence the mobility choice of the residents.

When there are enough services within the village and the travel distances are thereby short, active modes of mobility are favorable. The variables of settlement size, land use, and access to destinations seem to influence the mobility choice. It was unfortunately not possible to analyze the variable of polycentricity/monocentricity because not a single village within Vijfheerenlanden was experienced as polycentric. Urban density did not seem to influence within Vijfheerenlanden, because as long as the access to destinations was considered good, urban density did not seem to matter.

This shows that the concept of area characteristics has a clear influence on the mobility choice of the residents. The proximity of frequently visited destinations influences the mobility choices of the residents. This would suggest that if there were more frequently visited destinations within the respective village, active forms of mobility would even gain a larger usage.

§5.5 Living situation

The literature suggested that the living situation of someone was of great influence on the mobility choice of someone. Although the living situations differed among the residents, it did not seem to have a lot of influence on the mobility choices. The only variable that was able to influence the mobility choices was the orientation towards leisure. The kind of leisure activity that was planned was able to influence the mobility choice.

§6 Conclusion

Within this research, the following research question has been addressed:
To what extent do parking policies in the municipality of Utrecht contribute to the mobility choice of car owners in the municipality of Vijfheerenlanden?

The following three sub-questions have been addressed in combination with the main research question:

1. What are the motivations of the residents of Vijfheerenlanden to use the car as a mobility option?
2. What are the opinions of the residents of Vijfheerenlanden on parking policies in Utrecht?
3. What are the visions for car mobility of the respective government institutions and what kind of role do parking policies play?

A qualitative approach in combination with an analysis of policy documents has been executed to investigate the motives and experiences of parking policies and mobility choices.

When looking at the main motivations for a mobility choice, the answer from the residents was mainly based on the poor state of alternative mobility options other than the car. The residents attached great value to traveling by car, but the main reason remains that public transport was not experienced as a feasible alternative. The residents mainly appreciated the convenience and the travel speeds the car would offer. There is a great usage of active mobility options, but that was not feasible when traveling longer distances, such as traveling to the municipality of Utrecht from Vijfheerenlanden.

The residents certainly do have their opinions about the parking policies within the municipality of Utrecht. The residents are always concerned with the parking policies when traveling to the municipality of Utrecht, as they adapt their parking behavior to it. Using P+R facilities, parking the car in a cheaper place and walking a further distance, or avoiding the municipality of Utrecht and traveling to other cities were the most highlighted changes in behavior. It does seem that the residents are not content with the parking policies in the municipality of Utrecht, as it was often experienced as too expensive.

The government officials that were interviewed mainly saw the parking policies as a steering mechanism. They have as the objective with parking policies to influence the mobility of people that travel by car. Numerous policies within the municipality of Utrecht were presented and the government officials themselves experienced that people changed their behavior regarding mobility choices. However, the residents did not seem to change their mobility choices based on the parking policies that were presented.

When looking back at the main research question, parking policies seem to have a marginal to non-existent influence on the mobility choices of the people of Vijfheerenlanden. Their main reasons for using the car as a mobility option were

the time-conserving factors compared to other mobility options and the convenience of the car. To stimulate the residents from Vijfheerenlanden to use another mobility option than the car, other mobility options need to be improved because there was a certain willingness among the residents to use other mobility options. Parking policies on their own are therefore certainly not able to change the mobility choice.

§6.1 Limitations and implications for further research

Within the process of this research, some limitations have occurred along the way. The most notable one is the presence of only one case study area, where within the beginning more case study areas were planned. The province of Utrecht has multiple less urbanized areas located close to the city of Utrecht apart from Vijfheerenlanden. Although there was explicitly sought after equal distribution of residents across Vijfheerenlanden, having more residents in other municipalities with roughly the same characteristics as Vijfheerenlanden could have benefited this research. Furthermore, as this is a case study between one municipality and a larger city within the Netherlands, it cannot give a definitive answer to how people from less urbanized areas will react to parking policies and alter their mobility choices. Every city within the Netherlands has unique parking policies and other situations like networks of infrastructure. However, the results from this research are still able to give new insights into how mobility choices are made by individuals and in what kind of way parking policies are experienced by people who experience a degree of car dependency.

As discussed above, this research has been conducted on one less urbanized area to a single large city within the Netherlands. Future research could be conducted between a larger city and another less urbanized area to determine if parking policies have the same impact on mobility choices in other situations. Furthermore, large-scale quantitative research could also benefit new contributions to planning research. This research was focused on nine people who were interviewed with a semi-structured approach, but with a relatively low number of respondents, it could be hard to generalize larger areas and opinions on parking policies and mobility choices. Although there were no problems with answering the main research question and the sub-questions, adding large-scale quantitative methods in combination with the deep knowledge gained from interviews could give a better understanding of the influence of parking policies on mobility choices.

§6.2 Validity and reliability

This research has been reliable due to the different viewpoints offered by two types of interviews, as well as a relatively equal distribution among the residents. A thick description has been tried to achieve as much as possible, as seen from the data analysis part of the methodology section. All of the respondents have a clear description, and the interview process, as well as how the interviews were analyzed have a clear description. This way it is possible to conduct this research the same way a second time.

§7 Literature

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