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Preface

This thesis was written for the MSc Program in Spatial Planning at Radboud University. I delved into the literature and policies surrounding mobility inequality during the thesis. I'm content with the results, and I hope they contribute to the writing of policies on mobility inequality.

I want to thank my family and friends who supported me during my thesis. I also want to thank my boyfriend and his family. I am also grateful for my employer, XState, who gave me space and time to finish my thesis. Furthermore, I would like to thank my supervisor, Dr. Pascal Beckers, who patiently guided me through the thesis process. Lastly, I would like to thank the survey and interview participants.

Abstract

Mobility inequality refers to the uneven distribution of transport modes. Individuals negatively affected by mobility inequality, which entails limited access to various transport modes, experience several far-reaching effects. For example, because of the limited access to transport modes, individuals could have reduced job chances, reduced access to healthcare (e.g. hospitals) and reduced number of social contacts. These effects could lead to unemployment, poorer health and social isolation. Thus, mobility inequality can sometimes lead to a reduced quality of life. Not everyone is equally affected by mobility inequality, and research indicates that women and immigrants experience various forms of mobility inequality. Some immigrants can experience issues when navigating the transport due to language issues or racial insensitive interactions. Women can experience sexual intimidation, limiting their mobility as some transport modes might not be perceived as safe. One way to address mobility inequality issues is by introducing a new transport mode; another is addressing the issue through policies. The thesis aims to explore both options and how they affect the issue of mobility inequality.

This thesis explores the themes of mobility inequality and cycling behaviour regarding the female Dutch Moroccan population in Kanaleneiland and Parkwijk. Kanaleneiland and Parkwijk are two neighbourhoods in Utrecht. The Moroccan population is one of the larger immigrant groups in the Netherlands. They have a different mobility pattern compared to the Dutch population. Moroccans often use cars, walking or public transport, while the Dutch often use bicycles or cars. Moreover, Moroccans are less likely to adapt to the transport patterns of the native Dutch population. They are, for example, one of the immigrant groups that cycle the least, along with Turkish immigrants. However, bicycles could be a mode that can decrease the mobility inequalities experienced by the Dutch Moroccan population.

The thesis examines the mobility inequality issues the female Dutch Moroccan population (of the neighbourhoods mentioned above) encounters, how the bicycle is integrated into this population, and whether the bicycle indeed decreases mobility inequality. Additionally, the thesis aims to look at municipal cycling policies and mobility (in)equality policies in Utrecht (city). The goal is to review and identify any issues and improvements that can be made to current policies. Lastly, the thesis aims to review the cycling lessons in the city of Utrecht. The goal is to review the workings and their effectiveness in getting citizens to cycle.

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Chapter 1: Introduction

1.1 Introduction to the research

The Netherlands is internationally known as a cycling country. One of the reasons is the high quality of the cycling infrastructure, leading to several cities in the Netherlands being rated as the best cycling cities in the world, one of them being the city of Utrecht (Fernandez, 2022; Nast, 2019). Additionally, multiple provinces in the Netherlands have developed cycling visions to encourage cycling and to improve cycling infrastructure (Provincie Utrecht, 2024; Provincie Noord-Holland, 2022; Provincie Zuid-Holland, 2016). The region U10, which the city of Utrecht is a part of, also has produced a cycling vision (Mobycon, 2018). The goal of this vision is that 60% of all work-related trips should be made by bike, public transportation, or a combination of both modes (Mobycon, 2018, p.17). Thus, cycling is a well-developed mode in the Netherlands, and the governmental actors are determined to encourage cycling.

Nevertheless, the Planbureau voor de Leefomgeving et al. (2022) (translation: Environmental Assessment Agency, abbr. PBL) pointed out that achieving the cycling goals formulated in the cycling visions might be more difficult to realise than expected. One of the reasons is the car-centric focus of urban planning in the Netherlands. This car-centric focus leads to a decrease in the quality of the infrastructure for the other modes (Planbureau voor de Leefomgeving et al., 2022). For example, 40% of the trips in the Netherlands are only doable by car. Car-centric planning is partly a remanent of the past as new policies (in Utrecht) focus on bicycle, pedestrian and public transport and discourage car usage (Gemeente Utrecht, 2021b). Though the decreasing quality of the public transport system (especially in rural areas), the inefficiency of the public transport system and the building of new work locations on the edges of cities (which are almost only reachable by car) creates a car-dependent transport system (Planbureau voor de Leefomgeving et al., 2022; Bastiaanssen et al., 2023). This car dependency possibly leads to mobility inequality as the car is not a viable option for everyone. Some people can not afford a car, and others might be unable to use a car due to a lack of skill or mental or physical challenges. The following section introduces mobility inequality by stating the definition, introducing the affected groups, and providing an example of an issue an individual experiencing mobility inequality can face.

Mobility inequality refers to the uneven distribution of transport modes (Hidayati, 2020). However, the uneven distribution is not only caused by policies, as hinted at above. Research determined that individual characteristics (e.g. age, income), the environment (e.g. policies, inadequate infrastructure, culture), or both can also cause distributional differences (Hidayati, 2020; Hidayati et al., 2021). Mobility inequality impacts specific individuals more than others. Hidayati et al. (2021) determined that middle-aged men belonging to the ethnic majority, in good physical and mental condition, are least affected by mobility inequality issues. Thus, mobility inequality affects many people, including older adults, children, women, and immigrants. Women, for example, potentially experience (sexual) harassment while travelling, and in some cultures, women's movements are restricted (Chamseddine & Boubkr, 2021; Saadaoui, 2019; Chafai, 2017). Immigrants often have restricted movements, stay closer to home, and make fewer trips than native (Dutch) citizens (Kennisinstituut voor mobiliteitsbeleid et al., 2023; Hidayati, 2020). This is especially true for first and second-generation Moroccan and Turkish immigrants (Kennisinstituut voor mobiliteitsbeleid et al., 2023, p. 20). This difference in travel patterns might be due to language difficulties or fear of discrimination (Hidayati, 2020). Interestingly, immigrants might consciously restrict themselves from travelling far distances as they often cluster in neighbourhoods with immigrants of similar

cultural backgrounds (Hidayati, 2020, p. 39). This self-restriction is also called voluntary immobility. *'This cluster [...] provides a familiar locality but discourages outside travel and interaction with the host country'* (Hidayati, 2020, p. 39). People affected by mobility inequality might not be able to find employment. For example, in South Rotterdam, lowly educated citizens without a car struggle to find or keep a job (Planbureau voor de Leefomgeving et al., 2022).

Policymakers have noticed the issue of mobility inequality, and new policies are being written on this topic (Planbureau voor de Leefomgeving et al., 2022, p. 9). However, research on the travel behaviour of immigrants in the Netherlands is still in its infancy (Kennisinstituut voor mobiliteitsbeleid et al., 2023). The travel behaviour of Turkish, Moroccan, Suriname and Dutch-Caribbean migrants is the most researched out of all migrant groups, though it is still lacking (ibid). Additionally, the last national research conducted on migrant behaviour, in general, was 15 years ago (Kennisinstituut voor mobiliteitsbeleid et al., 2023). Still, the lack of research applies to all migrant groups within the Netherlands.

This thesis aims to contribute to mobility inequality and behavioural science literature by researching Moroccan women's cycling behaviour. The focus is on Moroccan women rather than men, as women might encounter more issues while travelling than men, as argued by literature on Mobility inequality (Hidayati, 2020; Hidayati et al., 2021). Additionally, the thesis focuses on the Moroccan population because the Kennisinstituut voor mobiliteitsbeleid et al. (2023, p.34) determined that Moroccan and Turkish individuals have lower rates of travel assimilation than the other migrant groups. This means Moroccan and Turkish individuals have a lower tendency to change their travel behaviour and are less likely to adopt Dutch travel behaviour. It would be interesting to see how a typical Dutch vehicle would be integrated into Moroccan communities and what kind of benefits the bicycle could have for the community.

1.2 Societal relevance of the research

Several new articles show how mobility inequality is a problem in the Netherlands. The AD (Algemeen Dagblad) mentioned how this issue is most prevalent in rural areas, but urban areas also face these issues (Keunen, 2021). Additionally, the AD and the NRC (Nederlands Dagblad) mentioned the decreasing availability of public transport and how it impacts the accessibility to work (Benjamin, 2023; Bos, 2024). Lastly, the NRC and Binnenlands Bestuur mentioned how sustainability goals surrounding mobility, such as increased fuel prices, affect them more heavily (Benjamin, 2024; Hendriksma, 2024).

Utrecht aims to introduce paid parking for cars throughout the city to reduce car usage (Gemeente Utrecht, n.d.-a). Though a recent rapport of the PBL has pointed out that 40% of the trips are impossible without a car, there is a particular need for the car. The price-related disincentives for the car make the car less and less accessible to low-income citizens, increasing mobility inequality. Citizens of Moroccan Turkish, Suriname and Dutch Caribbean descent often earn less compared to their Dutch counterparts (Jongen et al., 2019). Jongen et al. (2019) found a significant difference in salary between Moroccan and Dutch citizens in the same income scale. The significantly lower income makes these groups more vulnerable to mobility inequality, and the need for bicycles may increase if the car becomes too expensive.

The PBL mentions that mobility inequality could reduce employment chances (Planbureau voor de Leefomgeving et al., 2022). However, one might even expand the issue to reducing one's quality of life and opportunities to develop themselves as the lack of quality transportation limits access to work, health care, schooling, and social contacts (Government Office for

Science et al., 2019). Thus, researching the root causes of mobility inequality is not only interesting and practical but also crucial for those affected as their quality of life is decreased by this issue.

1.3 Scientific relevance of the research

The subject of mobility inequality is quite popular in research; for example, Google Scholar retrieved 17.000 hits in (0,10 seconds) between 2023 and 2024 (Google, n.d.). This thesis aims to contribute to this body of knowledge. Specifically to understand cycling from the perspective of multiple stakeholders. Psarikiou (2020, p. 286) mentioned how research should aim to develop a more inclusive understanding of cycling. This understanding can be expanded by researching the view on cycling among different stakeholder groups. Secondly, Psarikiou et al. (2021) mentioned that the barriers to cycling should be identified. This thesis aims to determine the limitations of cycling within policies and real life. Lastly, the paper by Cunha & Silva (2022) that there is a need for research that covers both qualitative and quantitative methods. This thesis employs both methods.

1.4 Research objectives and questions

1.4.1 Objectives

The thesis aims to contribute to mobility inequality and behavioural science literature by researching Moroccan women's cycling behaviour. Several research objectives are formulated in order to achieve this goal. The objectives function as milestones, guiding the research. The first objective is to identify the motivations of Moroccan women to cycle, both personal and cultural. This objective identifies how and why the bicycle is integrated into their lives and extends into the community. The second objective is to identify the mobility inequality issues faced by Moroccan women in Utrecht. This objective is interested in determining if Dutch Moroccan citizens encounter issues related to mobility inequality, what the issues are, and how they can be addressed through cycling. The third objective is focused on improving policies on mobility inequality. As mentioned before, mobility inequality is an increasingly important topic in policy, and this objective directly addresses this need. The last objective is to identify which role cycling lessons can play in mobility inequality. The objective is to examine how cycling lessons function, why Moroccan women participate in these lessons, and how they contribute to the integration of cycling into the Moroccan population.

1.4.2 Research questions

The main question is:

How can cycling contribute to diminishing mobility disadvantages faced by Moroccan women in the city of Utrecht, and what role can local mobility policies and cycling lessons play in this issue?

The following section addresses the main and sub-questions of the thesis. The objectives directly influence the sub-questions. The main question is, in turn, the compilation of the sub-question. The sub-questions are:

1. What is the cycling behaviour of Moroccan women in Utrecht?
2. What are the mobility impediments faced by Moroccan women in Utrecht?
3. What are relevant local mobility policies addressing mobility inequality and cycling in Utrecht?
4. What role do cycling lessons play in diminishing mobility inequalities?

The first objective directly influences the first question. The research question seeks to discover which factors influence Dutch Moroccan women's cycling behaviour, looking at why they decide to cycle or what prevents them from cycling. The second question directly relates to the second research objective, identifying if they encounter issues regarding mobility inequality and how cycling might play a role in addressing these issues. Likewise, the third question and the third objective are directly related. The research question is interested in identifying ways the current municipal cycling and mobility (in)equality policy could be improved to reduce mobility (in)equality and increase cycling. Lastly, like the others, question four lines up with objective four, both interested in the cycling lessons and their role in increasing cycling among the Moroccan population.

Chapter 2: Literature Review and Theoretical Framework

This chapter defines the main concepts of the thesis. The first section introduces the Moroccan context for cycling, describing the culture around transportation and specifically how it relates to women. The second section introduces the central concept of the thesis, mobility inequality. The third section discusses municipal cycling and mobility (in)equality policies in Utrecht, and the fourth section introduces the behavioural science theory. The last section delineates the theoretical framework and the operationalisation of concepts.

2.1 Cycling in Moroccan culture

Cycling is not a popular mode of transport in Moroccan culture, but it is one of the most popular vehicles in Dutch culture. In Morocco, the bicycle plays a minor role compared to transportation modes such as walking and cars (Chamseddine & Boubkr, 2021). Furthermore, a higher income is usually linked to increased car usage and decreased walking (Chamseddine & Boubkr, 2021, p. 276). Public transportation is often avoided, especially by women, because of the fear of getting harassed (Chamseddine & Boubkr).

Public transportation is not the only difference in the travel behaviour of men versus women in Morocco. Women tend to have more complex travel patterns, take more trips, travel to multiple destinations, and stay closer to home than men (Chamseddine & Boubkr, 2021; Saadaoui, 2019). Furthermore, the purpose of women's trips often correlates with their household duties, such as caring for children and the elderly and doing the groceries. Short trips, multiple destinations and many non-work-related trips are characteristic of care mobility (Saadaoui, 2019, p. 10). Additionally, women's travel behaviour is often connected to their personal safety. As mentioned, they might avoid unsafe places or activities such as public transport, going out after dark or walking long distances alone (Chamseddine & Boubkr, 2021; Saadaoui, 2019). Lastly, in Morocco, cycling is often reserved for men; thus, women cycling might be perceived as improper behaviour in some cases (Pikala bikes, n.d.) The patriarchal culture might play a role in cycling behaviour. In a patriarchal culture, how a woman acts is linked to the social status of the family and men (Chafai, 2017). Thus, if a woman acts differently, for example, by choosing to cycle, it might reflect poorly on the family. However, the strictness of the culture differs between regions, the most prominent example being the traditional rural area versus the progressive city (Chafai, 2017).

On the other hand, there is a movement towards increasing the popularity of bicycles in Morocco. Cities Today¹ mentions the commitment of the Moroccan Government to reintroduce bicycles as a sustainable transport mode in the project Medina Bike (Michell, 2016). Additionally, Pikala Bikes works with the Moroccan government to increase bicycle popularity, aiming to make Morocco the cycling capital of Africa (Pikala bikes, n.d.). Cantal Bakker, a Dutch citizen, initiated this project. Together with Dutch partners and the Moroccan authorities, they build cycling infrastructure, provide employment connected to bicycles (e.g. bicycle guides, mechanics), teach traffic rules to the children (mainly primary schools) and teach women how to cycle (Pikala bikes, n.d.).

Some of the cultural differences in transport between Morocco and The Netherlands can be observed in the Dutch Moroccan population. For example, first-generation migrants have a slightly higher car ownership rate than native Dutch (Kennisinstituut voor mobiliteitsbeleid et

¹ An institute which is concerned with supporting world leaders to create sustainable, liveable and resilient cities in the field of mobility and transportation (Cities Today, n.d.)

al., 2023, p. 27 and p. 32). However, it should be mentioned that they have a car usage rate similar to that of the Dutch. Additionally, first-generation immigrants have a lower rate of driver's license ownership. However, second-generation Moroccan immigrants have license ownership rates similar to natives (idem.). Second-generation immigrants generally display similar mobility patterns to native citizens for the car. The rapport also found that Moroccan (and Turkish) are the least likely to cycle compared to other immigrant populations in the Netherlands (Kennisinstituut voor mobiliteitsbeleid et al., 2023, p. 29). One reason might be the lack of role models to introduce them to cycling. The second generation seems to have a more positive attitude towards bikes than the first. Lastly, Moroccan men are more likely to cycle than their female counterparts.

2.2 Mobility inequality

The concept of mobility inequality has multiple definitions across disciplines (Hidayati et al., 2021). This thesis defines mobility inequality as: *“Differences in the capacity to move or travel to a specific location. These differences can be associated with individual attributes, external conditions, or a mix of both to define mobility inequality.”* (Hidayati, 2020, p. 67). Four main concepts underpin mobility inequality: mobility, accessibility, externalities, and transport affordability (Xia & Yeh, 2022, p.194). These concepts will be further explained in the following sections. After describing the concepts, the thesis will discuss who is affected, why mobility inequality exists and how citizens are affected.

2.2.1 Concepts of mobility inequality

The first concept, **‘mobility’**, is defined as *“potential of movement”* (Handy, 2002, p. 3). The concept can be measured through, for example, time spent travelling, the number of trips or distance (Handy, 2002). Handy (2002) distinguishes between actual and potential movement, stating: *“First, potential movement can exceed actual movement, for example, if individuals choose to drive less than they could. Second, increases in actual movement can mean decreases in potential movement, as in the case when roads are congested.”* (Handy, 2002, p.3).

The second concept, **‘accessibility’**, is closely related to mobility. Accessibility is *“the potential for interaction”* (Handy, 2002, p. 4). This concept is often more challenging to measure than mobility. Handy (2002) describes that accessibility is often measured through *“an impedance factor reflecting the time or cost of reaching a destination and an attractiveness factor, reflecting the qualities of the potential destinations”* (Handy, 2002, p. 4). Generally, the greater the choice of activities and destinations, the greater the accessibility (Handy, 2002).

The third concept, **‘externalities’**, relates to external factors influencing one’s ability to reach their desired destination. Examples of externalities are the quality of the infrastructure, spatial configuration (e.g., neighbourhood layout) and socio-cultural constructs (Hidayati, 2020). For example, the public transport system in the Netherlands is relatively inefficient, especially in rural areas (Planbureau voor de Leefomgeving et al., 2022). This inefficiency leads to an increased travel time, and in some cases, it takes over two times longer to travel by public transport than by car (ibid). Additionally, public transport is being downsized, especially in rural areas. Thus, in some cases, destinations become entirely unreachable. In Rabat (Morocco), some residential areas lack facilities within walking distance (spatial configuration), and the bike is often not an option (both social and spatial configuration influences). Due to this, women usually have to walk to get to the facilities, and during the walk, they risk being harassed (social-cultural) (Saadoui, 2019).

The fourth and last concept is ‘**transport costs**’. This concept relates to the costs of transport modes. However, these costs are not necessarily financial. Rietveld and Daniel (2004) defined six cycling-related costs as ‘**generalised costs**’. These costs are (Rietveld & Daniel, 2004, p. 533):

- Monetary costs, such as parking and maintenance.
- Travel time, which depends on spatial structure and adequacy of infrastructure.
- Physical needs and comfort depend on the infrastructure's quality and physical conditions (e.g., weather, alleviation changes).
- Traffic safety/risk of injury concerns, such as the risk of being injured because of interactions with other road users.
- Risk of theft and vandalism.
- Personal security relates to (perceived) personal safety.

For other transportation modes, costs might include ticket costs, fuel costs, and insurance and taxes.

2.2.2 Who, why and how mobility inequality

Who does mobility inequality affect? Mobility inequality does not uniformly influence everyone in the population. The group that is least affected by mobility inequality is comprised of middle-class men belonging to the ethnic majority who are physically and mentally in good condition (Hidiyati et al., 2021; Hidiyati, 2020). This means that although not everyone is affected equally, most of the population is affected in one way or another, including immigrants and women. An excellent example of mobility inequality is the gendered mobility and mobility of care experienced by Moroccan women, as described in section 2.1, *Cycling in Moroccan culture*. Women are unable to reach their destination due to safety concerns or experience restrictions in their mobility because of their role as caretakers due to cultural norms.

Why does mobility inequality exist? One of the causes might be the current place-based planning strategy rather than people-based accessibility (Hidiyati, 2020, p. 493). The difference between people-based and place-based accessibility is explained by Kim (2018, p. 4), who states: “*Place-based accessibility measures the physical proximity to desired activities. [...] Person-based accessibility adds an “individual” layer to place-based accessibility.*”. Thus, the place-based approach only checks if, for example, the desired activities are available within 15 minutes from home. However, availability does not mean accessibility. A disabled man can have a grocery store 15 minutes from his house, but this store is only accessible by stairs. Thus, the facility is available but not accessible. This limitation is defined as capability constrained in the time geography model by Hägerstrand (1970). Kim (2018) also refers to this model in her article. The model defined several constraints to accessibility (Hägerstrand, 1970): authority constraint, a constraint based on rules and laws; coupling constraint, the inability to combine multiple activities in a day; and capability constraints, referring to the mental or physical ability to reach a destination. The people-based accessibility planning strategy considers these accessibility constraints, which refers to the “individual” layer described by Kim (2018).

How does mobility inequality affect an individual? Mobility inequality makes individuals unable to access the destinations they wish to reach (Hidiyati, 2020). It thus reduces mobility and accessibility through externalities and transport costs. The current place-based planning does not adequately address mobility inequality, as it does not take into account personal factors such as authority constraints, coupling constraints and capability constraints (Hidiyati et al., 2021; Hidiyati, 2020; Kim, 2018; Hägerstrand, 1970).

Mobility inequality has several consequences for the population. A reduction in accessibility and unequal access to mobility resources may lead to some citizens being unable to reach vital facilities such as hospitals, stores, and social connections (Government Office for Science et al., 2019; Hidiyati et al., 2021). Moreover, individuals who can not use a car are often more vulnerable to accidents (Government Office for Science et al., 2019). These factors can reduce the quality of life (ibid.). Additionally, a lack of accessibility and mobility may lead to a lack of access to socio-economic opportunities (e.g. unable to access schools or work) (Hidiyati, 2020, p. 69). This may result in the widening of the existing socio-economic gaps. On an individual level, this means that the lack of access to socio-economic opportunities may lead to a lowered status, which reduces opportunities, resulting in a vicious circle.

2.2.3 Inequalities in cycling

Some policymakers see the bicycle as a way to reduce car dependence on short and middle long distances (up to 7 km non-electric and up to 15 km electric) (Psarikidou et al., 2021; Gemeente Utrecht, 2021b; Provincie Utrecht, 2014). In *Cycling Societies*, chapter 7, Psarikidou et al. (2021) mention five major concerns regarding inequality in cycling. These are funding infrastructural, policy, gender, and digitalisation. The coming paragraphs further explain these concerns. However, one should note that the paper by Psarikou et al. (2021) is based on the British context, focusing on Birmingham. Not all points apply to the Netherlands. Nonetheless, since cycling is the main focus of the thesis, these concerns are relevant, nevertheless.

‘Funding inequalities’ concern the distribution of (economic) funds (Psarikidou et al., 2021, p. 108). The amount of funding can differ between cities and cycling initiatives within a city. For example, London can have a larger fund dedicated to cycling and cycling programs than Birmingham. The fund size often depends on strong cycling actors within the city, such as mayors. These proponents can lobby for or against more funds, facilitating or complicating the decision process (Psarikidou et al., 2021). In the case of initiatives, larger cycling initiatives can obtain funding more quickly than smaller initiatives (Psarikidou et al., 2021, p. 109). In some cases, smaller initiatives are focused on specific social groups (e.g. Asians); thus, the unequal division of funds can also impact certain socioeconomic groups.

The **‘infrastructural inequalities’** are concerned with the development and quality of cycling infrastructure and the inclusivity of bicycles in the city through programs. The quality of the cycling infrastructure often differs within a city. For example, certain affluent districts and districts with good cycling infrastructure in Birmingham received even more implementations and projects to improve cycling (Psarikidou et al., 2021). However, certain poorer neighbourhoods lack good cycling infrastructure and have not received such projects. The second point, making cycling more inclusive, could be improved by offering a free bike-sharing scheme. In the Netherlands, such a scheme already exists in the form of OV bicycles (public transport bicycles), although these are not free to use.

The **‘policy inequalities’** concern the target groups of the programs and policies regarding cycling accessibility. These programs and policies often target the working middle-class population. In this context, Psarikidou et al. (2021) mention tax-based schemes, work-based schemes, and even bicycle shops. Her reasons are that tax-based schemes are more profitable the more someone earns, work-based schemes exclude non-employed citizens, and bicycle shops have a “high class” image, often selling expensive bikes, deterring low-income citizens from entering the shop (Psarikidou et al., 2021). Another issue with policies is the places where the bicycle programs are executed. For instance, in Birmingham, these schemes are often supported in affluent districts (Psarikidou et al., 2021, p. 110).

‘Gendered’ inequalities concern the difference in accessibility between genders. In the context of cycling, there are two categories in which these gender differences exist: road bicycle racing and casual cycling. For road bicycle racing, women often have less access to clothing and equipment (Psarikidou et al., 2021, p. 112). Additionally, women often cycle slower than men, leading women to avoid cycling with men. Gendered issues regarding casual cycling are; socio-cultural issues, since some women are not allowed to or are not used to cycling because of their culture; safety concerns, since women tend to avoid routes that are too quiet or dark; and concerns with appearance, since women sometimes avoid the bicycle to get to work as they want to avoid being sweaty and dishevelled (Psarikidou et al., 2021, p. 113-114).

Lastly, there are issues with inequality in **‘digitalisation’**. These concerns are mostly age-related as the younger generations are more used to technology and adapt quickly to it (Psarikidou et al., 2021). However, digitalisation also presents some opportunities to increase mobility equality, such as calculating safer routes for women and children. Still, the producers of these cycling apps and the municipality should ensure these digital developments are accessible to everyone.

2.3 Reviewing local policies on mobility (in)equality and cycling

Mobility policies such as the Strategy on Spatial Planning Utrecht 2040 and the Spatial Strategy on Mobility 2040 directly impact Utrecht's spatial layout and infrastructure; for example, the mobility plan focuses on stimulating the use of public transport and active mobility modes (e.g. walking and cycling) (Gemeente Utrecht, 2021b; Gemeente Utrecht, 2021c). Additionally, the municipality wishes to reduce car usage (Gemeente Utrecht, 2021b). In order to achieve both goals, it will develop cycling and pedestrian infrastructure, support public transport systems, reduce accessibility by car, and implement paid parking for cars.

Although there is an increased interest in modes other than cars, the Netherlands still suffers from a car-centric design (Planbureau voor de Leefomgeving et al., 2022). In this car-centric design, citizens without a car are potentially disadvantaged in their movement. For example, jobs are primarily found in the city's outer rings, which are easily accessible by car because of the highway. However, the quality of public transport connections decreases further from the centre, and the longer distance makes walking or cycling to work inconvenient (ibid.). An extreme version is urban sprawl in the United States of America, which made cities completely unwalkable and most citizens completely reliant on their cars (Jacobs, 2011, p. 440). This is a perfect example of how Urban planning and policies affect mobility and can spread mobility inequality. The following paragraphs illustrate which characteristics policies addressing mobility (in)equality and cycling should contain. The last section describes which barriers policymakers might encounter when formulating new policies.

2.3.1 Characteristics of policies addressing mobility inequality.

The field of mobility inequality is relatively new in policy and not as developed as cycling policies (Planbureau voor de Leefomgeving et al., 2022). Furthermore, research and policy have increased interest in this topic (ibid). The literature review identified eight points that mobility inequality policies should contain. The information has been retrieved from the PhD thesis *Understanding mobility inequality: A socio-spatial approach to analyse transport and land use in Southeast Asian metropolitan cities* by Hidayati (2020), in which several policy failures regarding policy around mobility inequality are mentioned. The second document reviewed is the Rapport *Inequalities in Mobility and Access in the UK Transport System*, produced by the

British Government of Office for Science et al. (2019). In this rapport, they made policy recommendations regarding mobility inequality.

The eight points are (Hidayati, 2020, p. 195-213; Government Office for Science et al., 2019, p. 54):

- Integration of policies across levels, policy sectors (housing, multicultural) and transport modes.
- Strategies addressing the accessibility of shared and public transport for affected groups.
- Strategies addressing the accessibility of active transport modes for affected groups.
- Strategies addressing mobility inequalities and development in urban transport and planning (e.g. smart mobility, electric cars.)
- Strategies regarding safety.
- Products of communication.
- Participatory elements.
- (Social) monitoring.

The following sections will further describe these points.

Hidayati (2020, p. 195) describes three mismatches in policy. The first is a mismatch of scale, the second is a mismatch in operationalisation, and the third is a mismatch in accountability. The points mentioned before can be categorised along these three mismatches. Additionally, research points out that vulnerable groups (immigrants, women, and elderly) often walk or use public transport as their primary transportation mode if the car is unavailable (Hidayati, 2020; Chamseddine & Boubkr, 2021; Kennisinstituut voor Mobiliteitsbeleid et al., 2023). Thus, both walking and public transport can be essential modes for these groups, so some of the points mentioned are directly related to walkability and public transport. Below, each of the eight points is linked to these three mismatches.

The **integration of policies across levels, policy sectors and transport modes** directly correlates to the “mismatch of scale” issue. Hidayati (2020, p. 196) presented the following situation: the transport master plan in Jakarta failed to rapport on previous plans, plans for a larger scale (e.g. the national plan) or regulations such as Ministry or Presidential regulation. Thus, it was impossible to illustrate how these plans are related, and they can potentially even contradict each other in operationalising certain concepts. To quote Hidayati (2020, p. 2): *“A well-coordinated and integrated policy implementation can ensure a coherent operationalisation.”*

Strategies addressing the accessibility of shared and public transportation (and active transport modes) for affected groups are correlated to the third mismatch: accountability. As mentioned before, vulnerable groups are primarily dependent on walking (active transport) or public transport (Hidayati, 2020; Chamseddine & Boubkr, 2021; Kennisinstituut voor mobiliteitsbeleid et al., 2023). Therefore, the accessibility of these modes is crucial for the affected groups. In this case, the affected groups or target groups are vast, namely anyone who experiences mobility inequality. However, one can also be more specific. For example, this thesis focuses on Moroccan women in Utrecht. The municipality can be held accountable by adding goals and conditions regarding active (e.g., walkability) and public and shared transport. For example, unreach goals can lead to questions from the public. The goals and conditions can also function as starting points in the evaluation. This evaluation should focus on whether the policy indeed supports the affected groups.

Strategies addressing mobility inequalities and development in urban transport and planning (e.g., smart mobility, electric cars.) refer to the multiple developments in the mobility sector of urban planning, such as Maas and Smart mobility (Government Office for Science et al., 2019). This point also refers to new technological developments in transportation, such as electric vehicles and self-driving vehicles. For example, shared vehicles might have to be paid for by credit card, which not everyone might have. These vehicles may also have to be reserved through digital applications, which might be challenging for elderly citizens. On the other hand, these developments offer opportunities to disadvantaged groups, see also paragraph 2.2.3 Inequalities in cycling. However, the Government Office for Science et al. (2019, p. 54) state that municipalities should pay attention to make sure that all people who cannot afford or use the new technologies are not disadvantaged by the transition (Government Office for Science et al., 2019, p. 54).

Strategies of safety refer to actions that municipalities can take to improve personal and traffic safety. These strategies can be essential for women, as many feel unsafe when walking alone or using public transportation (Hidayati, 2020; Chamseddine & Boubkr, 2021; Saadaoui, 2021). Additionally, the behaviour of other road users might cause some distress. For example, reckless driving by motorcycles (in Jakarta) or loud engines may scare people on bikes. Lastly, some people break the law, such as a car driver ignoring the pedestrian crossing or a cyclist running a red light. The situations mentioned above can be addressed by, for example, adding train compartments and waiting areas that are reserved only for women, like in Japan (Pass, 2022). Another suggestion is to enforce more laws that can reduce traffic violations.

Products of communication refer to raising awareness about mobility inequality and how municipalities frame mobility inequality. Hidayati (2020) mentions a need to raise awareness about the marginalisation of pedestrians and gendered mobility, as awareness about these issues can lead to socio-cultural innovation in society (Hidayati, 2020, p. 210). Awareness about the issues plays a significant role in ensuring the successful implementation of policies. Topics like sexual harassment in public and raising awareness about physically and mentally disabled people could be addressed in positive posters. Moreover, the municipality could also produce posters promoting easier and safer routes. However, one should know how the posters are framed to design an inclusive message (Aarts et al., 2015; Anaya-Boig, 2021). Miscommunication could have adverse effects, such as perpetuating stereotypes (Aarts et al., 2015; Anaya-Boig, 2021).

Participatory elements refer to the inclusion of citizens during the planning and design stage. These participatory elements are more practical at the local level, such as allowing citizen to influence the design of their neighbourhood or streets (Hidayati, 2020, p. 209). However, participation can also be a survey aimed at a marginalised group. For example, citizens who use a wheelchair can be asked which mobility or accessibility issues they encounter (in their neighbourhood). Alternatively, individuals with a specific background can be asked what they think about the safety in their neighbourhood.

Lastly, **Social Monitoring** refers to monitoring the outcomes of policies and regulations. This category is directly related to the mismatch of accountability. The specification of “social” is because the monitoring/evaluation of mobility policies is often technical. For example, Hidayati (2020) mentions that the monitoring in Kuala Lumpur for accessibility is still quite technical, instead focusing on the “percentage of low-floor buses” (objective, quantitative data) rather than on the individual’s experience with the bus (subjective, qualitative data) (Hidayati, 2020,

p. 198). According to Hidayati (2020, p. 198), “*This indicates the mismatch of policy implementation, especially concerning how to ensure that the implementation strategy will be used and benefited by the target groups.*”

2.3.2 Characteristics of policies addressing cycling

The thesis focuses on cycling and how cycling can be incorporated into the Moroccan community in Utrecht, in which policy potentially plays an important role. Unlike mobility inequality, cycling has been a part of the policy domain for a while, especially in the Netherlands. More than a quarter of the trips are made by bicycle, and The Netherlands is one of the world's most bicycle-friendly countries (Centraal Bureau voor de Statistiek, n.d.; Nast, 2019; Fernandez, 2022).

Anaya-Boig (2021) and Adam et al. (2018) describe several characteristics of cycling policies. Based on these two articles, the following five characteristics of cycling policy have been included in this thesis:

- infrastructure and infrastructural adaptations;
- regulations;
- strategies of safety;
- products of communication;
- cycling programs.

These key points will be explained in the following section.

Infrastructure and infrastructural adaptations include the physical environment, such as cycling lanes and bicycle parking spaces. These structures can be exclusive for cyclists or shared with other transportation modes (Anaya-Boig, 2021, p. 22). Infrastructure, if well-built, facilitates a feeling of safety. However, poorly implemented infrastructure might lead to safety concerns and the exclusion of certain groups (Anaya-Boig, 2021, p. 23; Adam et al., 2018). Cycling infrastructure contains both push (e.g. poorly implemented infrastructure) and pull factors (e.g. well-implemented infrastructure) that can invite or prevent people from cycling (Adam et al., 2018, p. 504). For example, a bicycle lane separate from the road invites people to cycle, while a lack of safe parking might discourage people from cycling. According to Adam et al. (2018) and Anaya-Boig (2021), this category also contains cycling programs, but in this thesis, cycling programs have their separate category. The reason for the separation is explained in the last section, which is dedicated to this point.

The second characteristic is **regulations**. This category entails laws and regulations about and around cycling. Laws and regulations can prohibit certain behaviours at certain places and times; they are the terms and conditions for cycling (Anaya-Boig, 2021, p. 24). Anaya-Boig (2021) mentions that cycling regulations should be carefully examined. Additionally, the way they might affect vulnerable people should be considered. She illustrates this by how cycling through a red light might be due to unfair waiting times at traffic stops (Anaya-Boig, 2021, p. 25). Another example might be a woman parking her bicycle near a club because of safety considerations while it is prohibited to park there.

Thirdly, the characteristic **strategies of safety** concerns both traffic and personal safety on the bike (Adam et al., 2018). Safety is one of the main concerns for cyclists. Therefore, strategies focused on safety or ensuring safety for cyclists should be one of the main policy outputs (Adam et al., 2018). Additionally, safety measures specifically aimed at particular groups, such as

women, children and the elderly, can make cycling more accessible to them. These concerns do not only apply to cycling (see paragraph 2.3.1, specifically strategies regarding safety). Safety strategies could include adding traffic lights at intersections, providing slower lanes, raising awareness about traffic safety, social safety, or both.

The **products of communication** are concerned with how cycling and cyclists are portrayed (Anaya-Boig, 2021). Cycling, as mentioned in inequalities, can sometimes be portrayed as a mode for citizens with a middle to high-income class, which might make it less attractive to low-income citizens (Psarikidou et al., 2021). Moreover, people who did not grow up in a cycling culture might not see cycling as a convenient mode, as positive connotations with cycling often arise after they have started to cycle (Van Voornhoven, 2021). A lack of positive attitudes towards bicycles potentially reduces the likelihood that these citizens cycle. This is further explained in paragraph 2.4.1 Attitude (Hewstone et al., 2015; Aarts et al., 2015).

Lastly, **cycling programs**, which are non-infrastructural, seek to change views and attitudes regarding cycling, hoping to achieve the goal of people voluntarily starting to cycle (Adam et al., p. 504). These programs are split off from infrastructural adaptations because they specifically do not include infrastructural actions but are concerned with communication or social projects. This also includes the educational dimension mentioned by Anaya-Boig (2021). The government or social groups (initiatives) can lead these cycling programs. For example, the bicycle deal in Utrecht is governmental-led, and citizens have set up the BikeFlip initiative (Van der Steenhoven & Hulshof, 2022).

2.3.3 Barriers to developing cycling policies

While developing policies, a policymaker can encounter several barriers or issues. Anaya-Boig (2021) and Adam et al. (2018) have identified multiple barriers specific to the cycling domain. These are the cycling context, harmonisation between policies and laws, balancing cycling initiatives and car disincentives, and gathering finances and social capital. Below, these barriers will be explained.

The first issue, the **cycling context**, refers to topography. For example, Morocco has more altitude differences compared to the Netherlands which is quite a flat country (Atlasproducties, 2021). Thus, Moroccan cycling policies would require specific alterations for altitudinal differences compared to the Dutch cycling policies (Adam et al., 2018).

Secondly, the **cohesion and harmonization between policies and laws** play a role. Cohesion of policies is required between locations and different governmental levels (e.g. local, provincial, national). See also paragraph 2.3.1, which contains a section that discusses the integration of policies across levels, policy sectors, and transport modes. Additionally, there is a need for cohesion between policies and law. However, this harmonisation also experiences some difficulties. The main difference between policies and laws is language; therefore, collaboration with lawyers is mandatory. (Anaya-Boig, 2021).

Thirdly, **balancing incentives and disincentives between cycling and cars** can be a barrier (Adam et al., 2018). A policy should contain incentives to cycle, such as good infrastructure and cheap public transport, as cycling is often used as pre-and-post transport for public transport (Gemeente Utrecht, 2021b). At the same time, using the car should be less attractive, in other words, car-usage disincentives. This could be high taxes for car ownership, prohibiting cars from certain locations such as the city centre, and high parking fees. However, this

transportation mode should still be accessible as some people depend on their cars, such as rural inhabitants, people with disabilities, families, and commuters. Hence, totality excluding car usage could create a new mobility inequality.

Lastly, policymakers may encounter issues regarding **gaining social and financial capital**. Social capital refers to the community's support of projects or programs. In the case of Moroccan-Dutch citizens and other immigrant groups, culture plays an important role. Misinterpreting (cycling) culture can be detrimental to the success of cycling policies. As Anaya-Boig (2021, p. 31) states: “*The success or failure of cycling policies can largely be attributed to differences in bicycle cultures that are rooted in history.*” The municipality will have to invest in researching this topic and other cycling cultures within their cities. Financial capital or funding issues could also restrict policymakers. A lack of funding could prevent policymakers from, for example, implementing social programs (e.g. cycling lessons) and providing sufficient infrastructure.

2.4 Behavioural science

Cycling behaviour is a central focus of the thesis, next to mobility inequality. Therefore, it is crucial to discuss behaviour theory, which explains why we behave in a certain way. One of the core theories of behaviour is the Theory of Planned Behaviour, developed by Ajzen in 1985 (see Figure 1). This theory has three components: subjective norm, attitude, and self-efficacy. The theory of planned behaviour illustrates how the three components influence intention and how intention can result in behaviour. Intention alone may not result in behaviour, as this calls for a specific plan of action as well as the availability of facilities (Aarts et al., 2015, p.28). The three components are explained in the paragraphs below.

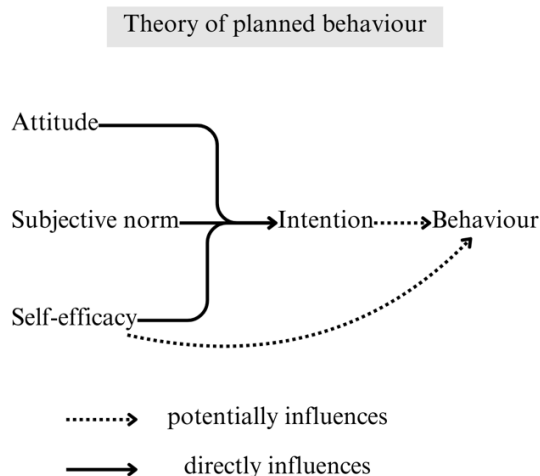


Figure 1 Theory of Planned Behaviour (Retrieved from Aarts et al., 2015, p. 26)

2.4.1 Attitude

The first unit is ‘**attitude**’. This is described as: “[...] *an evaluative judgement of an object, that is based on cognitive, affective, and behavioural information*” (2015; Hewstone et al., 2015, p. 173). An attitude can differ in direction (positive or negative) and strength (e.g. strongly (dis)liking something). Additionally, the attitudinal perspective can be either one-dimensional - positive or negative - or two-dimensional, plotting positive and negative attributes along different axes (Hewstone et al., 2015, p. 179-180). It is important to note that the one-dimensional view does not support attitudinal ambivalence, meaning an individual likes and dislikes an object (Hewstone et al., 2015, p. 180).

As mentioned in the section above, attitude is formed by cognitive, affective, and behavioural information. This section explains these three components, starting with the cognitive component. “*The cognitive component of attitudes refers to beliefs, thoughts and attributes we associate with a particular object*” (Hewstone et al., 2015, p. 174). One example of the cognitive component is stereotypes (Hewstone et al., 2015, p. 175). This component is influenced by expectancy, thus whether a belief or attribute is present and personal value attached to the belief or attitude. (Hewston et al., 2015). For example, cycling is considered healthy, and this cognitive component could be positive. Believing that you sometimes (expectancy) get a sore behind from cycling could be considered negative.

Secondly, the affective component, Hewstone et al. (2015, p. 175) describe it as follows: “*The affective component of attitudes refers to feelings or emotions associated with an attitude object*”. These emotions can be influenced by exposure: the more someone is exposed to an object or behaviour, the more positively the person feels about it (Hewstone et al., 2015). For example, in Morocco, the population is not often “exposed” to cycling. However, if they move to the Netherlands, they are more often exposed to the bicycle. Due to this increased exposure, attitudes towards cycling are likely to shift to a more positive view.

Third, the behavioural component that influences the attitude. “*The behavioural component of attitudes refers to behaviours we have performed (or might preform in the future) with respect to an attitude object.*” (Hewstone et al., 2015, p. 176). This is strongly connected to consistency in behaviour, either with one’s beliefs or previous behaviour. Failing to do so will lead to distress (Hewstone et al., 2015, p. 177). This phenomenon is also called cognitive dissonance. This is a strong component that shapes attitudes, as even the belief of having performed the behaviour before is enough to shape one’s attitude towards an object, person, or action (ibid.). For example, if people value sustainability and health and cycle often, they are more likely to take a bike. Likewise, frequent walking increases the likelihood of an individual continuing to walk rather than taking the bike. If an environmentally conscious person buys an old (and polluting) car, mental distress (cognitive dissonance) might occur. To resolve this distress, the person either adjusts their behaviour (e.g. stops driving the car, buys a new model) or adjusts their attitude (e.g. reframing old cars as ‘vintage’).

2.4.2 Subjective/social norm

The subjective norm is also known as the social norm. The social norm is the standard behaviour within a group, grounded in the expectations of the reference group about what normal or appropriate behaviour is (Mackie et al., 2015; Hewstone et al., 2015). The reference group refers to the social groups with whom the individual interacts, such as family, friends, or people of the same culture (Aarts et al., 2015). The influence of the social group depends on the value of importance the individual links to the group. For example, if friends are more important to the individual than family, the individual will be more likely to show behaviour approved by their friends (Aarts et al., 2015).

There are two types of social norms: injunctive and descriptive norms. Injunctive norms are formed by what the individual thinks appropriate behaviour is. Descriptive norms, on the other hand, are formed by copying the behaviours of others, thus inferring from that what the appropriate behaviour is (Mackie et al., 2015; Hewstone et al., 2015). Social norms hardly change as the interdependent relation between action and (social) expectations is quite resistant to change (Mackie et al., 2015; p. 6). The following paragraphs outline the role of social norms and how they are communicated.

Hewstone et al. (2015, p. 238) have defined three main functions of social norms:

1. Social norms dictate how to behave and can reduce uncertainty about appropriate behaviour. Furthermore, they can also validate one's attitudes and beliefs (Hewstone et al., 2015, p. 243). Compliance with the group's attitudes and behaviour allows a group to reach its goals more quickly.
 - For example, the descriptive norm is formed by seeing many people cycle instead of using other transport modes. The injunctive norm is formed through believing cycling is the norm in the Netherlands. One can compare their attitudes about cycling to those of their peers, testing their personal views. If there is a positive attitude towards cycling among their peers, a person who likes cycling would most likely get a positive response from the group when expressing his preference for this transport mode. This (re)affirms his positive beliefs about cycling. The descriptive and injunctive norms show that cycling is the appropriate behaviour and thus makes it more likely that the individual will cycle.
2. The social norm dictates how one is expected to act; thus, "*Social norms help to coordinate individual behaviour*" (Hewstone et al., 2015, p. 238). If someone shows up to a birthday party without a gift, it would be considered rude in some cultures. Thus, these people are likelier to show up with gifts or money.
3. Social norms can help decide how things should be distributed. For example, on some occasions, such as when entering the bus, women and children are often allowed to enter before the men. Another example is how, in some cultures, the host only pours tea for the guest, and the guest usually does not pour the tea themselves.

Social norms are often unnoticeable and become salient after breaking a rule (Hewstone et al., 2015). As stated by Hewstone et al. (2015, p. 238), social norms are often communicated in three ways. Namely, *directly* by instruction or demonstration, *passively* by non-verbal cues or implicit standards, and by *copying* others around us. A social norm regarding cycling could be that women do not cycle. If a woman does cycle, the social norm is violated. When the norm is violated, the individual is socially punished through dirty looks (passive communication), (rude) comments (direct instruction) or standing out (failing to copy).

2.4.3 Self-efficacy

The third component of the Theory of Planned Behaviour is self-efficacy. This is an individual's evaluation of their capabilities to perform a behaviour (Aarts et al., 2015; Bubou & Job, 2020; Maddux et al., 1986). When deciding whether to perform a behaviour, the individual forms two expectancies: an outcome expectancy, which is concerned with whether the behaviour will lead to a particular outcome, and a self-efficacy expectancy, which concerns one's beliefs in one's skills and capabilities to perform the given behaviour (Maddux et al., 1986, p. 738). Self-efficacy is closely connected to self-worth and self-esteem, as well as self-confidence. Additionally, self-efficacy is task and knowledge domain-specific (Bubou & Job, 2020, p. 6-7). Lastly, whether a person has performed a task before affects their performance. The performance is positively influenced if the task has been successfully performed before (Bubou & Job, 2020).

In the previous paragraph, self-esteem is described as closely connected to self-efficacy. Self-esteem is "*the overall evaluation that we have of ourselves along a positive – negative*

dimension” (Hewstone et al., 2015; p. 136). It consists of implicit and explicit beliefs and knowledge about oneself (e.g., inability to cycle). Self-esteem is part of the “being” self, which is how one would describe oneself (e.g. I am Christian, I am a cyclist, I am friendly), as well as an individual’s values, goals, and expectations (Hewstone et al., 2015). The “other” self is the agentic self, concerned with evolving the current self, or as Hewstone et al. (2015, p. 125) put it: “The *power we have to shape our functioning and life circumstances.*” People with high self-esteem think more positively about themselves. They are confident in reaching their goals and thinking more optimistically (Hewstone et al., 2015, p. 136). People with low self-esteem view themselves in a less positive light and doubt their abilities and qualities (Hewston et al., 2015, p.136).

For example, if a woman who has never cycled before does not believe she can cycle or can learn how to cycle, she is less likely to learn and perform the behaviour, as she is not confident in her abilities. If she wants to become a cyclist (casual cycling), then her agentic self will motivate her to take action. She would likely join cycling lessons with the expected outcome of being able to cycle, although her self-efficacy expectancy might still be low. The self-efficacy expectancy might increase the more she trains, thus performing tasks successfully and building confidence.

2.5 Theoretical Framework

The theoretical framework of this thesis is directly based on the theoretical framework of Rietveld and Daniel (2004) (see Figure 2). However, several adaptations to the framework were made. The first adaptation replaces ‘sociocultural factors’ with ‘social norm’. The social norm is an overarching term for sociocultural factors, and Mackie et al. 2015 described how this norm can be measured. The change from socio-cultural factors to social norm was thus for the sake of simplification and measurement. Another modification is the merging of ‘generalised costs of cycling’ and the ‘generalised costs of other transport modes’ to: ‘generalised costs of cycling compared to other transport modes’. This modification is likewise for simplification of the framework. Lastly, ‘local authority initiatives, policy variables’ has been replaced by (and expanded on) the category ‘policy’. This category encapsulates the characteristics of policies, policy barriers, and local initiatives.

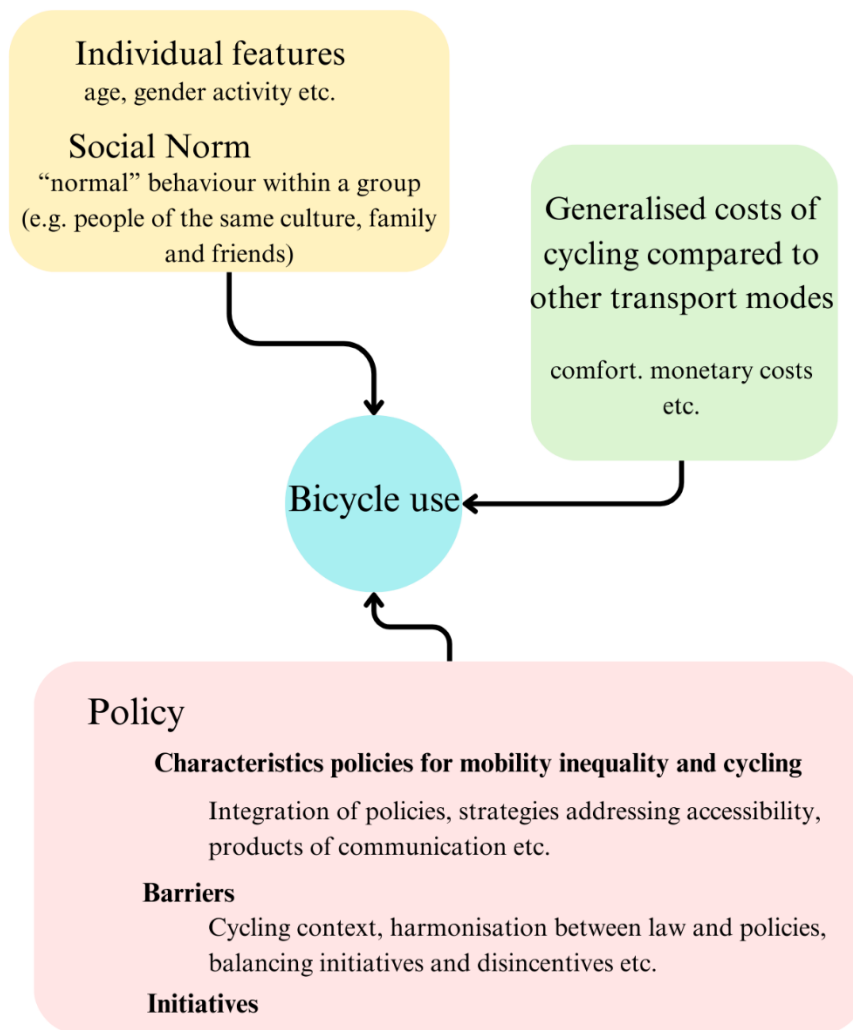


Figure 2 Theoretical Framework adapted from Rietveld & Daniel (2004)

2.6 Operationalisation

The following paragraphs describe how the framework concepts (see Figure 2) are operationalised. The first concept to be operationalised is the concept of ‘policy’. The following paragraph will further outline the operationalisation of this concept. In this chapter, the interview and survey are briefly mentioned. The other research methods are the interview, survey, and content analysis. The next chapter, Chapter 3, Research Philosophy and Strategy and Methods, further elaborates on research methods.

2.6.1 Policy

2.6.1.1 Characteristics of policies

As seen in the theoretical framework, the policy category is divided into ‘characteristics of policies’, ‘barriers’ and ‘initiatives’. First of all, in paragraph 2.3.1, Characteristics of policies addressing mobility inequality, several key characteristics are explained. After a discussion with Isti Hidayati (I. Hidayati, personal communication, February 27, 2024), six characteristics are included in the policy analysis. Likewise, in paragraph 2.3.2, Characteristics of policies addressing cycling, several key characteristics are explained. However, in this case, all characteristics are selected.

The six characteristics selected for good mobility inequality policy are:

- Integration of policies across levels, policy sectors (housing, multicultural) and transport modes.
- Strategies addressing the accessibility of shared and public transport for affected groups.
- Strategies addressing the accessibility of active transport modes for affected groups.
- Strategies regarding safety.
- Products of communication.
- (Social) monitoring.

Participatory practices are excluded as they are hard to evaluate without being part of the process. To frame the processes sufficiently, additional interviews would have been required, but due to the restricted time available for this thesis, this was not possible.

Strategies addressing mobility inequalities and development in urban transport and planning (e.g., smart mobility, electric cars) are excluded as these new technologies are outside the thesis's scope. However, it would be interesting if future research looked into this characteristic.

The selected characteristics function as values that are either included, scarcely included, or excluded from a set of policy documents. These documents can then be reviewed and receive a score depending on the characteristics included.

2.6.1.2 Barriers

The concept of barriers has different forms, such as the cycling context, harmonisation between policies and laws, balancing cycling initiatives and car disincentives, and gathering finances and social capital (Anaya-Boig, 2021; Adam et al., 2018; paragraph 2.3.3 Barriers to developing cycling policies). Policy barriers are used in the interviews with policymakers. The characteristics above or forms of barriers will be used to start and guide the interview, for example, to ask which barriers they encounter and to use them as examples to clarify the question if needed.

2.6.1.3 Initiatives

The initiatives are operationalised with two frameworks: the framework for understanding the role of community capacity in enabling responsibility for community ecological footprint (Middlemiss & Parrish, 2010, p. 7561 Figure 1) and the ladder of government participation (Mees et al., 2019, p. 200 Table 1). These frameworks were not mentioned in the literature review as they are used purely to analyse the cycling lessons in Utrecht and do not add to the literature background. The two frameworks are referenced as the cycling lessons in Utrecht are not purely based on volunteers, and they are also governmentally organised (De Fietsmeesters, 2021; Gemeente Utrecht, 2021a; Gemeente Utrecht & Verlaan, 2023)

The framework of Middlemiss and Parrish (2010) is based on the functioning of environmental and sustainable grassroots initiatives. These initiatives are often started and supported by enthusiastic volunteers with limited power, resources, and influence (Middlemiss & Parrish, 2010, p. 7562). Grassroots initiatives are often initiated due to a feeling of responsibility to act because one has the ability to act (Middlemiss & Parrish, 2010). These initiatives depend on four capacities. A weakness in one or more capacities limits the ability to fulfil the set responsibility (ibid). Contrary to strong capacities, which increase the ability to fulfil the set responsibilities, Making cycling accessible to others is the responsibility on which the cycling lessons are potentially grounded.

The four capacities are:

- **Personal capacity.** These are the capacities of the participants in the community. These include their understanding of the issues, skill set, and enthusiasm (Middlemiss & Parish, 2010, p. 7561). For example, these can be enthusiastic participants in lessons or skilled cycling teachers.
- **Infrastructural capacity.** This refers to the physical infrastructure provided by the government, businesses, and communities (Middlemiss & Parish, 2010). For example, cycling lanes and bicycle repair shops.
- **Organisational capacity.** This refers to active organisations and the community's capacity to encourage cycling through resources and support (Middlemiss & Parish, 2010). Organisations such as Fietsmeesters and Sport Utrecht do this.
- **Cultural capacity.** This concerns the legitimacy of cycling within a community's history, culture, and values (Middlemiss & Parish, 2010). An example is the representation of cycling within the Dutch Moroccan community.

The second framework, the ladder of government participation, details how the government can work with citizen initiatives without frustrating them (Mees et al., 2019). There are five levels of governmental participation. These are (Mees et al., 2019, p. 200 table 1):

1. Letting go means that the (citizen) initiatives are completely left alone - there is neither regulation nor funding, and the initiatives are entirely self-organised.
2. Facilitating/enabling. The initiatives are initiated and coordinated by citizens, and the government supports the initiatives with (limited) resources and relevant information. The initiatives are still mostly independent.
3. Stimulating. The initiatives are initiated under the government's guidance, and the government provides financial support. The initiatives do, however, maintain autonomy in their decision-making and coordination.
4. Network steering. The government (co-)initiates the initiatives and uses its network to gather relevant stakeholders. Furthermore, the government is involved in the coordination and decision-making process.
5. Regulation. The government is responsible for the initiative: it initiates, coordinates, and decides.

Although the framework defines clear levels, in reality, the roles of the government may overlap or co-exist; the boundaries between the levels are not clear-cut (Mees et al., 2019).

How are these frameworks used in this thesis? Firstly, the capacities, like the characteristics in policies, function as values that are either included, scarcely included, or excluded. The data is retrieved by looking at the context of the interviews. Secondly, the ladder of government participation, like the policy barriers, is used to guide the interviews. The levels in the Ladder function as points of discussion in the interviews and as inspiration for further questions.

2.6.2 Generalised costs

The generalised cost of cycling is measured in the survey by asking the individuals if any of the costs defined by Rietveld and Daniel (2004) are more advantageous for the bicycle than (all) other modes. These questions are answered on a 5-point Likert scale (see paragraph 3.4.2 Statistical analysis for further information on Likert scales). The costs are (Rietveld & Daniel, 2004, p. 533):

- Monetary costs
- Travel time
- Physical needs and comfort
- Traffic safety/risk of injury
- Risk of theft
- Personal security

2.6.3 Individual features and social norm

2.6.3.1 Individual features

Due to time limitations, only four individual features are operationalised: age, gender, neighbourhood, and personal attitude towards transport modes. Gender is operationalised in male, female and non-binary/third gender. The neighbourhood is operationalised as: “Lives in Parkwijk” or “lives in Kanaleneiland”. For age, six age groups are made: 15- 20 years old, 20- 30, 30- 40 to 60- 70+. Lastly, the attitude towards transport modes is measured through word associations. The words selected for the word associations are:

- Convenient
- Cheap
- Expensive
- Easy
- Difficult
- Rich
- Poor
- Fun
- Fast
- Slow
- Boring
- Safe
- Dangerous

2.6.3.2 Social norm

The social norm is operationalised through questions concerned with the injunctive and the descriptive norm, based on Mackie et al. (2015). For example: “Do you see people cycle often?” These questions were answered on a 5-point Likert scale. Additionally, the score of social norms is compared with the score of personal views. This was done to get a more accurate measurement of the descriptive and injunctive social norm. For example, if most people do not cycle but think more people should cycle, it points to a big gap between what people do (descriptive) and what people think people should do (injunctive).

2.6.4 Summary table

The following summary table (Table 1) has been included to enhance the reader’s understanding of the chapter’s key concepts and provide a better understanding of the key concepts.

Table 1: Summary of the sub-chapter Operationalisation

Category	Operationalisation	Example
Characteristics of policies	Sufficient, insufficient or no inclusion of good policy characteristics in documents	Social monitoring, strategies for safety
Barriers	The barriers defined by Anaya-Boig (2021) and Adam et al. (2018) function as guides for policymaker interviews.	“Do you encounter any problems regarding harmonising laws and policies?”
Initiatives	The framework for understanding the role of community capacity in enabling responsibility for community ecological footprint by Middlemiss and Parrish (2010) and the ladder of government participation by Mees et al. (2019) guide the interviews. However, the framework of Middlemiss and Parrish is an evaluative tool rather than a framework used for the questions.	“What is the role of the government in the cycling lessons, using the ladder of government participation?”
Generalised costs	The framework of Rietveld and Daniel (2004) is used to formulate questions in the survey.	“Is the monetary cost of the bicycle advantageous or disadvantageous compared to other modes?”
Age	Age-range	15-20, 20-30 etc.
Gender	Gender	Female, Male, Non-binary/third gender
Neighbourhood	Name of neighbourhood	Kanaleneiland or Parkwijk
Attitude	Word associations with transport modes	Fast, Convenient, dangerous etc.
Social norm	Injunctive and descriptive norm	“How common is cycling among your friends/ family?”

Chapter 3 Research Philosophy, Strategy and Methods

The following chapter delineates the research philosophy, strategies, and approach. The first paragraph outlines the research philosophy and research strategies. The second paragraph outlines the research approach, and the third outlines the data analysis. The fourth and last paragraph outlines issues and concerns regarding validity, reliability and ethics.

3.1 Research philosophy and approach

3.1.1 Philosophy

Research philosophy refers to the beliefs and perspectives of the researcher that consciously or subconsciously guide the research's progress (Thiel, 2014). There are multiple philosophies to adopt, and the two most influential schools of thought are the empirical-analytical/positive approach and the interpretive/constructivist approach. The following paragraph presents which philosophy was selected, as well as the reasoning behind it. The second paragraph describes several weaknesses of the philosophy. The second segment of this paragraph describes the research approach.

The thesis employs the interpretative/constructivist approach. This approach is concerned with researching a phenomenon from different perspectives. This matches with the thesis, as the issue of mobility inequality (and cycling) is approached from the perspective of Moroccan women as well as the perspective of policy and policymakers (including initiative takers) (Thiel, 2014). Stated differently, the interpretive approach is concerned with the different realities of people related to an event or situation. Lastly, this approach takes free will into account (Thiel, 2014).

However, there are some points of criticism regarding the interpretive approach. Thiel (2014, p. 35) defines three main issues. The first is a risk of double hermeneutics or interpretations, as different people can have different perceptions and interpretations of concepts (ibid). These different interpretations make it “*difficult to know if the knowledge is generally valid*” (Thiel, 2014, p. 35). Secondly, if reality is subjective, the gathered knowledge might be a personal interpretation of the phenomenon rather than the objective truth. Moreover, measuring the same phenomenon might lead to different results depending on the researcher. The main question is, thus, whether the research is even replicable (Thiel, 2014, p. 35). This is an issue because research should generally gather similar results when reproduced (Thiel, 2014). Lastly, the uniqueness makes building a body of knowledge difficult as the data is very specific and often not generalisable to the larger population (Thiel, 2014).

3.1.2 Approach

This thesis's research approach is deductive and employs quantitative and qualitative methods, also known as the mixed method approach. In deductive research, a research question has been formulated and answered through a theoretical framework (Thiel, 2014). Contrary to inductive research, which aims to build a theoretical framework. It should, however, be noted that the interpretive approach often leads to inductive research. Nonetheless, this thesis aims to look at the behaviour and how it is connected to mobility inequality rather than introducing new frameworks to review behaviour and mobility inequality.

According to Kumar (2019), the mixed method is a research process in which qualitative and quantitative approaches are combined. The mixed method approach can be selected for multiple

phases in the thesis (ibid). This thesis uses the approach in the data collection phase, as the data is collected through surveys, interviews and content analysis.

The mixed method approach builds on two principles (Kumar, 2019, p.27):

- In the case of multiple objectives, mixing methods allow each objective to be addressed in the approach best suited to that objective. Not mixing methods could thus reduce the findings' quality, accuracy and reliability.
- Mixing methods allows for a more complete picture of a phenomenon or situation.

There are four reasons why the mixed methods approach has been chosen for this thesis:

Mixing methods allow for generalisation through data collected by quantitative methods and validity through data collected by qualitative methods (Kumar, 2019). This generalised data is especially important when considering the issues described in the chosen philosophy. The data collected using quantitative methods can compensate for the lack of generalisability.

Secondly, the method allows for triangulation. Kumar (2019, p. 31) defines triangulation as *“The use of the same set of data from multiple sources to best achieve the objectives you study. It is based upon the belief that use of the same set of data, collected through different approaches to draw conclusions, [...] will provide a better understanding of a problem, situation, phenomenon or issue.”*

Thirdly, mobility inequality and cycling behaviour are two complex phenomena. Using mixed methods allows for a level of freedom and flexibility one approach might not provide (Kumar, 2019). Lastly, this thesis has multiple objectives, and mixed methods allow each objective to be approached in a suitable way (ibid).

However, mixed methods might also make the research process longer and more complicated (e.g. additional skills and diverse sample groups) (Kumar, 2019). This downside was taken into consideration. Yet, due to the significant increase in quality, as mentioned above, this approach was deemed most suitable for this specific study.

3.2 Research strategy

The two research strategies employed in the thesis are desk research and case study. The following paragraphs describe these strategies and why they have been chosen. Both strategies are primarily used in qualitative research (Kumar, 2019; Thiel, 2014)

3.2.1 Case study

In the case study, one or multiple cases are studied in the real world rather than in a lab or simulated setting (Kumar, 2019; Thiel, 2014). A case in this research is a neighbourhood. However, cases can be almost anything, including cities and relationships (Kumar, 2019; Thiel, 2014, p. 86). Case studies are holistic and in-depth (Kumar, 2019; Thiel, 2014). A holistic approach *“means that a large body of - mainly qualitative - data is gathered on everything to do with the case”* (Thiel, 2014, p. 86). This strategy is most suitable for exploring and understanding rather than confirming and quantifying (Kumar, 2019, p. 196). There are, however, some disadvantages to this approach. First of all, due to the uniqueness of the cases, the gathered data is often not generalisable. Secondly, this strategy offers limited options for statistical hypothesis testing (Thiel, 2014).

The case study as a research strategy has been chosen due to its suitability for exploring cases, as mentioned above (Kumar, 2019, p 196). The thesis explores cycling behaviour and how it can link to mobility inequality. The original aim was to have a multiple homogenous (cases with similar characteristics) case study, as this allowed for the replication of knowledge (Thiel, 2014). The replication of knowledge assumes that similar characteristics between the cases are likely to be valid for other cases, increasing the validity and reliability of the data (Thiel, 2014, p. 90). However, due to the small sample sizes in the interviews and surveys, the research became a singular case study.

3.2.1.1 Case selection

Utrecht is an affluent city and the capital of the province of Utrecht. The city currently houses a population of 367.984, and it attracts many new inhabitants, such as immigrants (Gemeente Utrecht, n.d.-b; Gemeente Utrecht et al., 2022). This attraction is due to the central location and the various economic opportunities. Utrecht is among the best cycling cities globally (PeopleforBikes, 2022; European Union, 2022). Additionally, the city maintains this status by adapting infrastructure and introducing social programs such as cycling lessons (Gemeente Utrecht, 2021b; Gemeente Utrecht, 2021c). Thus, the city has an excellent cycling infrastructure and is popular for migrants (and natives) to settle. One of the larger migrant populations in the Netherlands and in Utrecht are Moroccans (De Jong, 2016; Kennisinstituut voor mobiliteitsbeleid et al., 2023). The abundance of Dutch Moroccan citizens is essential during the survey and interviews, as they require interaction with the target group. Thus, running out of individuals to question would likely not be a potential issue in Utrecht. Moreover, as mentioned in paragraph 2.3.1 Characteristics of policies addressing cycling, cycling requires infrastructural facilities, and an individual is less likely to cycle if these are not in place. Though infrastructure is not the only factor that affects cycling, by minimising the effects of infrastructure, other factors that influence cycling could be explored more in-depth. Lastly, the availability of cycling lessons is a pre-requisite as the thesis also focuses on cycling lessons and their role in decreasing mobility inequality.

Initially, the cases selected were two neighbourhoods in Utrecht, Kanaleneiland and Parkwijk. Both neighbourhoods house a sizeable Moroccan population; in Kanaleneiland, about 40% of the residents are of Moroccan descent and in Parkwijk, about 20%-25% of the residents are of Moroccan descent (Van Bijsterveld & OpenInfo.nl, n.d. -a – d²). Additionally, both neighbourhoods support cycling lessons (N. Zuidma, personal communication, November 27, 2021). There is, however, a difference between income between the neighbourhoods; Parkwijk houses higher-income citizens compared to Kanaleneiland, based on the value of houses (WOZ in Dutch) (Van Bijsterveld & OpenInfo.nl, n.d. -a – d). This difference could be interesting in multiple homogenous case studies as the influence of income can be researched. However, this difference is less interesting in the singular case study, and a neighbourhood like Overvecht, which is similar to Kanaleneiland in both population rates and income, could have been included (Van Bijsterveld & OpenInfo.nl., n.d.-e).

3.2.2 Desk research

Desk research uses existing data. This can be data originally not formulated for research or data formulated for research (Thiel, 2014). It is an efficient and effective strategy contrary to the case study, as the case study's holistic approach requires a lot of time and effort (ibid). Additionally, the researcher does not interfere with the research situation. This reduces issues with validity and reliability. However, it should be noted that the original writers of the policy

² Allecijfers.nl a site of Van Bijsterveld & OpenInfo.nl is supported by the Dutch government (Rijksoverheid, n.d.).

documents could have had validity and reliability issues. Thus, one could still encounter some validity or reliability issues in this method (Thiel, 2014). The desk research strategy is suitable for “*exploring the background or context of a certain research problem*” (Thiel, 2014, p. 102). Thiel (2014) mentions that the strategy can encounter some issues regarding operation. Though the documents were (successfully) operationalised, the examined documents were given a score depending on whether they included specific characteristics (see paragraph 2.6 Operationalisation).

Desk research has been chosen as a strategy because it is suitable for exploring the policy context of mobility inequality and cycling (Thiel, 2014). Additionally, the lighter nature of desk research, compared to the case study, makes it easier to look at both the real world and policy as two time-consuming strategies would be quite exhausting. The desk research in this study uses primary data, which are data that have not been written for research (e.g. policy documents) (Thiel, 2014, p. 102). These data have two important characteristics which suit the thesis:

- It allows for researching human behaviour without having to prompt it (Thiel, 2014, p. 104).
- The documents selected carry a communicative function; the desk research focuses on the message's contents (ibid).

There are three data-gathering techniques in desk research: content analysis, secondary analysis, and meta-analysis. The content analysis is chosen for this study as it focuses on what the text tries to tell the audience. The data is analysed through textual analysis, in which certain words or phrases (or characteristics) are searched in the text.

3.3 Research methods

The research is conducted by both qualitative and quantitative methods: the mixed-methods approach. The specific methods employed are the content analysis (qualitative), the survey (quantitative) and the interview (qualitative). These will be further discussed in the following paragraphs.

3.3.1 Content analysis

The content analysis focuses on how cycling and mobility inequality are embedded in the local policies of the municipality of Utrecht. The first section addresses the characteristics of the documents selected and lists the selected documents. The collected data has to have the following characteristics;

- They are written within the last six years.
- They are currently active or are a vision for at least 2030.
- They are concerned with mobility, cycling, mobility inequalities, or all of the above.
- They are written by the municipality of Utrecht or commissioned by the municipality of Utrecht.

The two characteristics exclude old or outdated documents; only current and active policies are included. The third and fourth characteristics narrow the scope to municipal documents and documents on mobility inequality, cycling or both, as the thesis is only interested in these topics. The following documents were selected:

- The spatial strategy on mobility 2040
- Strategy on spatial planning 2040
- Monitoring document on the spatial strategy for mobility
- The regional vision of cycling 2.0 U10
- Vision on transportation for everyone

- Implementation program mobility inequality

The following segments describe the documents in more detail.

3.3.2 Survey

The survey was selected for the following reasons. First, the community forms the subjective norm, also known as the social norm. Therefore, it is essential to question as many community members as possible. Surveys are especially suitable for extensive data collection (Thiel, 2014). A second reason was its adaptability to the research subject. The method is used in multiple research areas, including behavioural sciences (Mackie et al., 2015). Lastly, the survey data is easily comparable with other data, which is interesting for future research (Thiel, 2014).

There are some limitations to this method. Firstly, there are some issues with online surveys, as not everyone might be as tech-savvy, and others might not fill in the whole survey. In order to ensure a smooth experience, this survey has been conducted in person in the neighbourhoods, not via email. Secondly, language barriers might potentially cause some issues during the survey. This barrier was addressed using a translation app (i.e., Google Translate) and pre-testing the survey. Thirdly, surveys and interviews suffer from confirmation biases and subconscious biases (Alshenqueeti, 2014). These biases influence the validity of the gathered information. For example, the results are more positive toward cycling, as cycling is the norm in the Netherlands. Lastly, there is a need for a more in-depth and personal perspective. One could argue that generalization is needed to provide some context to the research results. The interviews partly cover the lack of depth, as they aim to provide an in-depth insight into cycling and mobility inequality. The interviewing methods are further described in paragraph 3.3.3.

3.3.2.1 Data collection

The survey contains 30 questions (See Appendix 1). The first three questions concern personal data. Questions 4 to 22 concern the cycling behaviour of the participants (uses, generalised costs, ownership and attitude). Questions 23 to 27 measure the social norm and determine the reference group. Lastly, questions 28 to 30 measure the personal view on the social norm. The questions are multiple-choice (single and multiple selection), ranking or Likert-scale questions. The Likert-scale question contains a scale from one to five: one is always negative for cycling, and five is always positive.

The survey focused on measuring the subjective norm, monetary costs, and perceived accessibility of bicycles for Dutch Moroccan citizens. The survey was aimed at both men and women as it measures the social norm of the population. The surveys were conducted in Kanaleneiland and Parkwijk. The aim was to conduct at least 40 surveys in real life or online. This target was reached, as 15 surveys were conducted in Kanaleneiland and 25 in Parkwijk, all conducted in real life. The survey was analysed in SPSS 26 (see paragraph 3.4.2 Statistical analysis).

3.3.3 Interviews

The semi-interview has been selected for the following reasons. First, it allows for an in-depth perspective on the issue, which the survey lacks (Alshenqueeti, 2014; Opdenakker, 2006; Thiel, 2014). Secondly, it allows for a dialogue between the interviewer and the interviewee (Alshenqueeti, 2014). The dialogue provides further depth, as it gives a look into the personal opinions and the reasoning behind their opinion. It also may produce “more correct” information as the interviewer can tailor the question to make it comprehensible for the

interviewee if needed. It does require the research to pay “double attention”, which entails listening to the response and understanding what this means (Opdenakker, 2006).

There are several limitations to the method. To begin with, the method is low in reliability (Alshenqeeti, 2014; Thiel, 2014). The survey partly counters this, as it is highly reliable. Additionally, the interviews are very time-consuming (in contrast to surveys), making them only suitable for small-scale research (Alshenqeeti, 2014; Thiel, 2014). Though the interview is time-consuming, as mentioned before, the in-depth data gathered through this method significantly increases the study's internal validity (Alshenqeeti, 2014; Thiel, 2014). Lastly, there are some ethical concerns, as the interview is not anonymous (Alshenqeeti, 2014).

There are also some limitations that are shared with the survey, such as the language barrier, confirmation biases, and subconscious biases (Alshenqeeti, 2014). This will be addressed using translation apps and pre-testing the interview questions, similar to the survey.

3.3.3.1 Data collection

The interview with the experts takes a maximum of about an hour. The interview first collects personal information such as name and occupation (See Appendix 2 to 5). These questions are followed by several questions (up to a maximum of 11) about policies, the working of the cycling lessons and the relationship between policy and the lessons. The policymakers' interviews aim to collect insight into which policies support cycling and cycling initiatives. The initiative's interviews aim to form an understanding of the personal motivations behind teaching citizens to cycle and the mechanisms behind the cycling lessons. Lastly, the goal of the researcher interview is to gather a deeper insight into cycling lessons and their relationship with policies.

The interview with the residents takes a maximum of 1 hour. The interview first collects personal information such as name and age. These questions are followed by several questions (up to 10) about the goals and motivations for cycling or joining the cycling initiatives and their opinion about the social norms. The purpose of these interviews is to provide in-depth insight into the personal opinions on the social norm and the personal attitude towards cycling.

The interviews are conducted face-to-face (including digital face-to-face). There are two main groups that will be interviewed: various experts and the residents. These two groups will receive different interviews because they provide unique insights into cycling and cycling initiatives.

The experts are:

- Policymakers in the city of Utrecht working in the mobility department (preferably with mobility inequality)
- Researcher³ of Labyrinth, a research lab in Kanaleneiland
- Coordinator of the cycling initiatives working at Sport Utrecht
- Cycling teachers of the organisation Cycling Masters

The citizens are women of Moroccan descent between the ages of 20-40, either first or second generations. These citizens live in Kanaleneiland or Parkwijk. Lastly, they can cycle.

Seven expert interviews were conducted, and the original goal was six interviews. Additionally, three citizen interviews were conducted; the original goal was four interviews.

³ The researcher has conducted a research about the functioning of cycling lessons within the province of Utrecht. The researcher has a master in Social Geography and a PhD in Human Geography. He specialised in understanding the cognitions behind the trade-offs individuals make in their dreams (such as their dream home) when confronted with personal and external market limitations .

3.4 Data analysis

3.4.1 Textual analysis of the policy documents

The data of the content analysis and the interviews are analysed through MAXQDA 2022. MAXQDA 2022 is a specialised program for qualitative data analysis, including but not limited to content analysis (MAXQDA, 2023). The data is processed using both priori codes, codes defined before the research, and emergent coding, codes defined during the process. The policy documents are coded through priori coding because they are scored based on the inclusion of policy characteristics. The interviews use both priori and emergent coding and are chosen to end up with a complete as possible analysis. The interview aims to produce “general” data such as quotes, common themes, and connections between the interviews.

As mentioned in the last segment, the policy documents are analysed using priori codes. The priori codes are the characteristics of policies regarding cycling and mobility equality, as defined in Chapter 2.3. The documents are scored on a three-point scale. They receive a score of no data, insufficient data and sufficient data per characteristic, and these categories are further explained in the paragraphs below. Also found below is an example table (Table 2) to provide a visual example of the points discussed in this and the following paragraphs.

No data is presented by an empty cell []. A document receives this score when it fails to mention the characteristics in general. Additionally, a document obtains this score if the characteristic is only mentioned in the name, thus failing to explain the characteristics (e.g. their definition, their operationalisation) and the actions the government would like to take regarding the characteristic.

Insufficient data is presented by a dash [/] in a cell. A document receives this score when the characteristic is explained but not defined properly and operationalised properly. Furthermore, it will receive this score when the document does not mention any actions concerning the characteristic. The score is based on the PhD thesis of I. Hidayati (2020) in which she mentions how the concept of ‘justice’ was mentioned in the transport plan but did not receive the proper operationalisation and no indicators of performance (Hidayati, 2020, p. 100). Only mentioning the concept is insufficient as the policy loses effectiveness because a bad operationalisation makes it hard to measure justice, achieve justice and know when justice has been achieved.

Sufficient data is presented by an X [X] in a cell. A document receives this score when the characteristic is well explained. Thus, the document contains a definition, operationalisation, and an action plan or goals regarding the characteristics.

Table 2 Example table

Document/characteristic	Integration and consistency in policy	Products in communication	of Characteristic 3	Etc.	Etc.	Etc.
The spatial strategy on mobility 2040	X	/	[X, /,]	[X, /,]	[X, /,]	[X, /,]
Strategy on spatial planning 2040 (RSU 2040)	X		[X, /,]	[X, /,]	[X, /,]	[X, /,]
Monitoring document on the spatial strategy for mobility			[X, /,]	[X, /,]	[X, /,]	[X, /,]
Vision on transportation for everyone	X		[X, /,]	[X, /,]	[X, /,]	[X, /,]
Implementation program Mobility inequality	X	/	[X, /,]	[X, /,]	[X, /,]	[X, /,]

3.4.2 Statistical analysis

The data from the survey is analysed through inferential statistics. The data is processed through SPSS 26, a program for statistical analyses (IBM, n.d.). The survey data answers questions such as ‘What is the cycling behaviour of Dutch Moroccan citizens?’, ‘What is the social norm regarding cycling among these citizens?’ and ‘What is their personal view on cycling?’ This data is analysed through the independent sample two-tailed t-test, chi-square goodness of fit test and regression analysis. The construction of the null hypothesis (h_0) and alternative hypothesis (h_a) is the same across all tests. The h_0 assumes that the variables have no significant effect on the dependent variable, and h_a assumes that the variables do significantly affect the dependent variable. The following segments will further outline the tests and their purpose.

The t-test is used to determine if there is a significant difference in mean between groups or within one group (Amour Learning, 2019). The independent sample t-test was selected because there are many ideas about cycling in the Dutch Moroccan population, such as whether they like or do not like to cycle. The means between these groups are compared. Thus, the independent sample t-test is the best fit. The research is also interested in finding out if there is a difference in either the negative or the positive direction. Therefore, the best choice is a two-tailed test (Amour Learning, 2019; Lyman Ott & Langnecker, 2013). Thus, the t-test selected is the independent sample two-tailed t-test.

The chi-square test is suitable for identifying differences between categories within the group. This test is especially interesting regarding the social norm, as the opinion of cycling may differ between demographic categories (e.g. age and gender) (Amour Learning, 2019; Lyman Ott & Langnecker, 2013).

Lastly, the regression analysis test of correlation was chosen. The added benefit of this test is determining whether the social norm regarding cycling behaviour is related to the behaviour (Thiel, 2014). The regression also shows the direction in which the two are related. However, It should be noted that the Likert-scale and the ranking questions are not true scale variables but ordinal variables. However, for the sake of the analysis, equal distances between the categories are assumed.

The survey contains Likert-scale, ranking and multiple-choice questions. For the analysis, the following rules apply.

- Likert-scales are constructed in such a way that a higher score (5) correlates with a positive trait for bicycles and cycling. For example, cycling once a month will have a Likert-score of 1, and cycling daily has a score of 5.
- For ranking, a lower rank correlates with a higher score. If a variable or object is ranked in eighth place, it will receive a score of 8.
- For multiple-choice questions, each checked answer counts as one point.

Several dummy variables are created to incorporate the categorial data retrieved from the survey into the regression. The following section explains which questions dummy variables are created and what the variables are.

The variables ‘positive’ and ‘negative’ associations correlate to question 9 (See Appendix 1): “Which words do you associate with “bike?” The positive association score is the number of times they checked a positive word. Thus, if someone checked both “convenient” and “fast” but no other positive words, the score would be 2. The same is done for the negative word associations. The words “cheap” and “expensive” are excluded in both association scores as these words are quite subjective. For instance, one can find a cheap object undesirable and an expensive object desirable, as owning something expensive could increase one’s social status.

Similarly, questions 15, 16 and 17, which evaluate the quality of bicycle paths, bicycle parking and crossings/intersections, are the accumulation of the number of times one has noted an issue with that infrastructural object. Thus, if someone checked two issues with Bicycle paths, the total score of that variable would be two. The variable mean social norm is also the mean score of questions 24 – 27, and the variable mean personal view is the mean score of questions 28 – 30.

Lastly, the category age (question 3) has two dummy variables, namely: Young Adult (age 20-30) and Adult (age 30-50). The reference variable for age is Teen (age 15-20). Likewise, the category of bike ownership (question 18) has one dummy variable: that the person owns a bike. The reference variable is ‘the citizen does not own a bike’. Question 18 does have five categories (see Appendix). These categories are collapsed into the dummy and the reference variable. Lastly, gender and neighbourhood both contain two categories, and these variables were recoded into Male (1) and Female (0) and Kanaleneiland (1) and Parkwijk (0).

3.5 Validity, reliability & ethics

3.5.1 Validity and Reliability

The validity refers to whether the measurement tools measure what the researcher wants to measure (Kumar, 2019). Reliability refers to the stability and consistency of the measuring tools (see Figure 3). Validity has two categories. Internal validity concerns whether the data collected by the same questions are consistent. Thus, if the data internally agrees with itself. External validity is concerned with the generalisability of the data, hence, if the data externally agrees with other cases (Lehtinen et al., 2016).

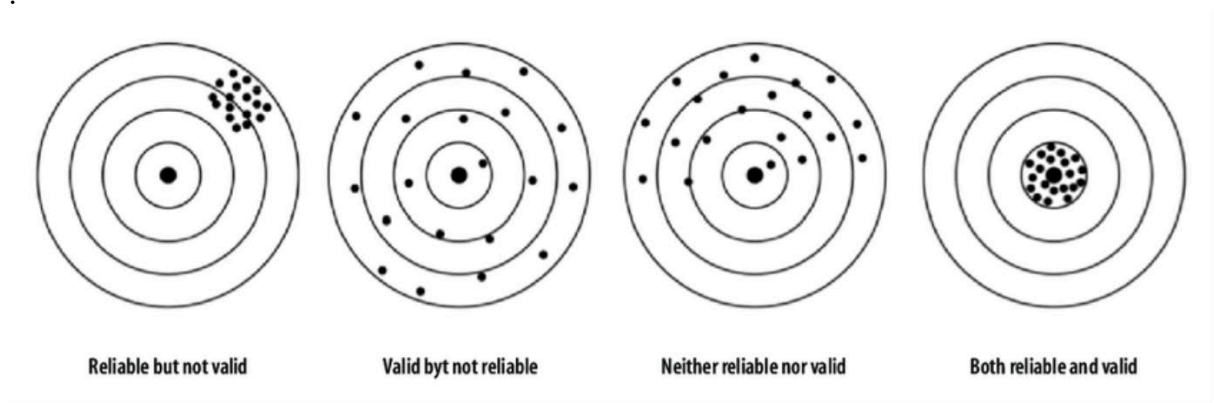


Figure 3 Reliability and validity visual representation (Source: De Souza et al., 2017)

Table 3 Reliability and validity of the research

Subject/validity or reliability	Internal validity	External validity	Reliability
Constructivist Philosophy	Good	Issue	Issue
Mixed method approach	Depends on methods	Depends on methods	Depends on methods
Case study	Good	Issue	Depends on methods
Desk research	Good/ Depends on background documents	Good/ Depends on background documents	Depends on background documents
Survey	Issue	Good	Good
Interview	Good	Issue	Issue
Content analysis	Good/ Depends on background documents	Good/ Depends on background documents	Depends on background documents

Explanation of Table 3:

As Thiel (2014) mentioned, the constructivist philosophy focuses on the unique experiences and personal perceptions of groups or individuals, reducing external validity. Moreover, Thiel (2014) discusses how even the reality that is measured can be questioned: is it the individual's or the researchers' reality? This could question the reliability of the studies which employ this philosophy.

The validity and reliability of the mixed methods approach partly rely on the chosen methods (e.g. interviews) (Kumar, 2019). However, due to triangulation, the reliability and validity tend to be higher (Kumar, 2019). The case study, as Thiel (2014) mentioned, has a high internal validity. However, due to the uniqueness of the cases, the external validity tends to be lower. The reliability depends upon the methods employed. The reliability and validity can be increased by triangulation (Thiel, 2014).

The desk research tends to be a reliable and valid strategy as the researcher does not immediately influence the research. However, both reliability and validity also depend on the background documents used in the analysis.

The survey tends to be highly reliable and produces generalisable data (Thiel, 2014; Alshenqueeti, 2014). However, the internal validity tends to be limited as this research survey does not dive deeply into the issue. However, some questions correlate to each other, and a disconnection between these questions can imply a threat to the internal validity. For example: “Are there any issues with bicycle paths?” and “What is the quality of the bicycle path?”

The interview tends to have a high internal validity. However, it struggles with reliability and external validity (Thiel, 2014; Alshenqueeti, 2014). The reliability is reduced as the participant might give socially acceptable answers rather than their personal opinion. Furthermore, they might tailor their answers to the interviewer (e.g., if the researcher is Dutch, participants might expect a positive reaction to cycling). Both factors challenge the reliability of the interview. The external validity is lower as the interview concerns personal perspectives and experiences that might not be generalisable (Thiel, 2014).

Like the desk research, content analysis tends to be reliable and valid. However, both reliability and validity also depend on the reliability and validity of the selected documents.

3.5.2 Ethics

The data collected by the interview and the survey contain personal information. This is why the data is protected. Both methods require a verbal or written agreement in which the participant consents to use their information. The survey participants will give their written consent by checking the boxes at the bottom of the first page (see Appendix 1). Additionally, the participants received a number based on their neighbourhood and if they were the first or second person questioned. The interviewees were asked for verbal consent as soon as the recording started. Additionally, an advance mail informed them about the research and their right to withdraw from the study. Their names will not be shown in the thesis.

Chapter 4 Results

This chapter presents the results and tries to answer the research questions. The following four sections will each address one of the four research questions. The research questions are answered through the triangulation of interviews, survey questions and desk research data.

4.1 Question 1 What is the cycling behaviour of Moroccan women in Utrecht?

Cycling behaviour is influenced by several factors, such as individual and social-cultural factors, policies and general cycling costs compared to other transport modes (see also Paragraph 2.5 Theoretical Framework) (Rietveld & Daniel, 2004; Mackie et al., 2015). This chapter aims to gain further insight into the factors of the cycling behaviour of Moroccan women through interviews and the (self-conducted) survey. The first paragraph provides a general overview of the characteristics of the survey participants. In the second paragraph, cycling behaviour is reviewed by analysing the interviews with Moroccan citizens in Utrecht. The last paragraph addresses the survey results through regression to determine which factors significantly affect cycling behaviour in the Moroccan population.

4.1.1 General characteristics survey respondents

The survey has 40 respondents, of which 29 are female and 11 are male. As mentioned before, the survey concerns the social norms of the general population, which is why Dutch Moroccan men are also included. Of these respondents, 17 are between the ages of 15 – 20, 11 are between 20 – 30, 8 are between 30 – 40 and 4 are between 40 – 50. In the statistical analysis, the ages 30 – 40 and 40 – 50 are merged in order to balance the respondents per age group. This leads to the following categories: teens ages 15 – 20, young adults ages 20 – 30 and adults ages 30 – 50. The surveys are conducted in Kanaleneiland and Parkwijk. 15 respondents live in Kanaleneiland, and 25 respondents live in Parkwijk. The graphs addressing gender, age and neighbourhood are presented in the appendix (see Appendix 6). The following section addresses how the categories compare to each other.

When comparing gender across age, most men are aged 20 – 30, while most women are 15 – 20 years old (see Figure 4). Furthermore, in Kanaleneiland, men and women are approached about fifty-fifty, while in Parkwijk, women are approached far more frequently (see Figure 5). Lastly, comparing age across neighbourhoods, most respondents in Kanaleneiland are ages 20 – 30, and most respondents in Parkwijk are ages 15 – 20 (Figure 6).

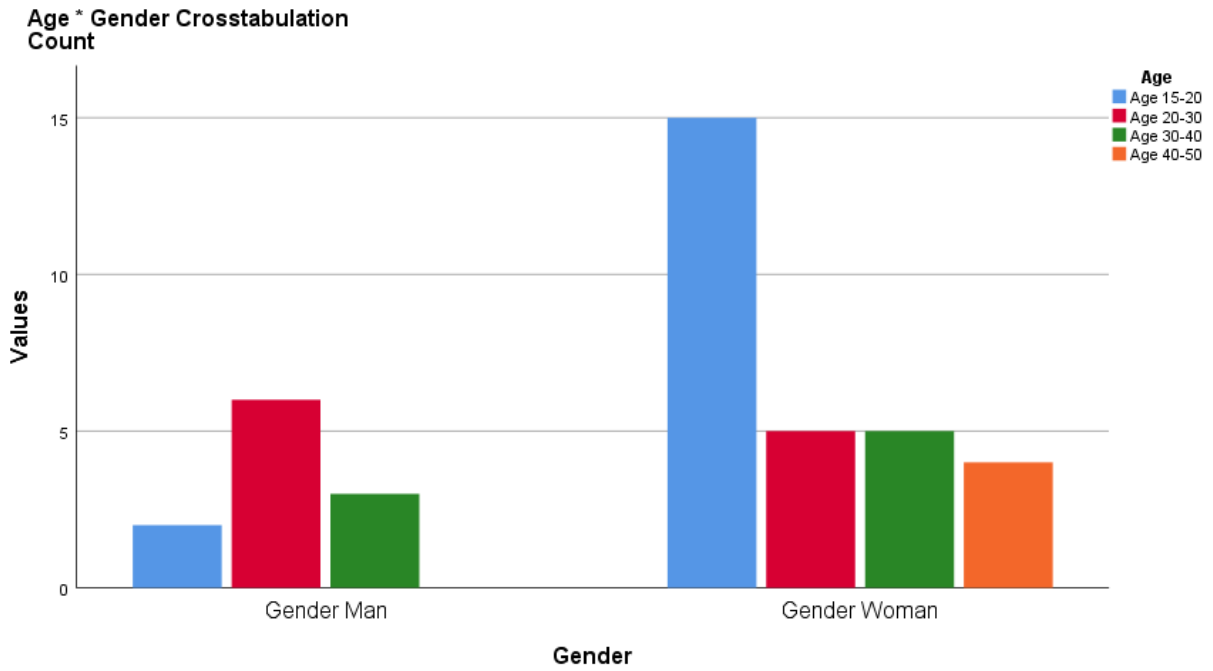


Figure 4 Crosstabulation respondents' gender and age.

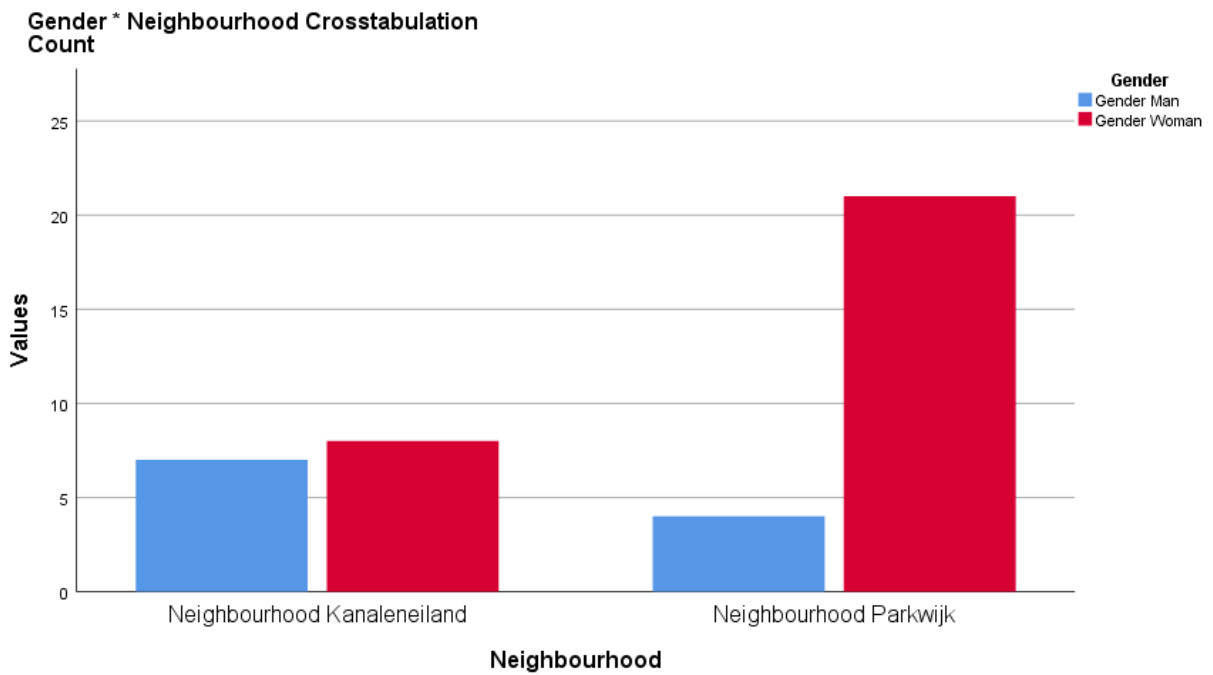


Figure 5 Crosstabulation respondents' gender and neighbourhood.

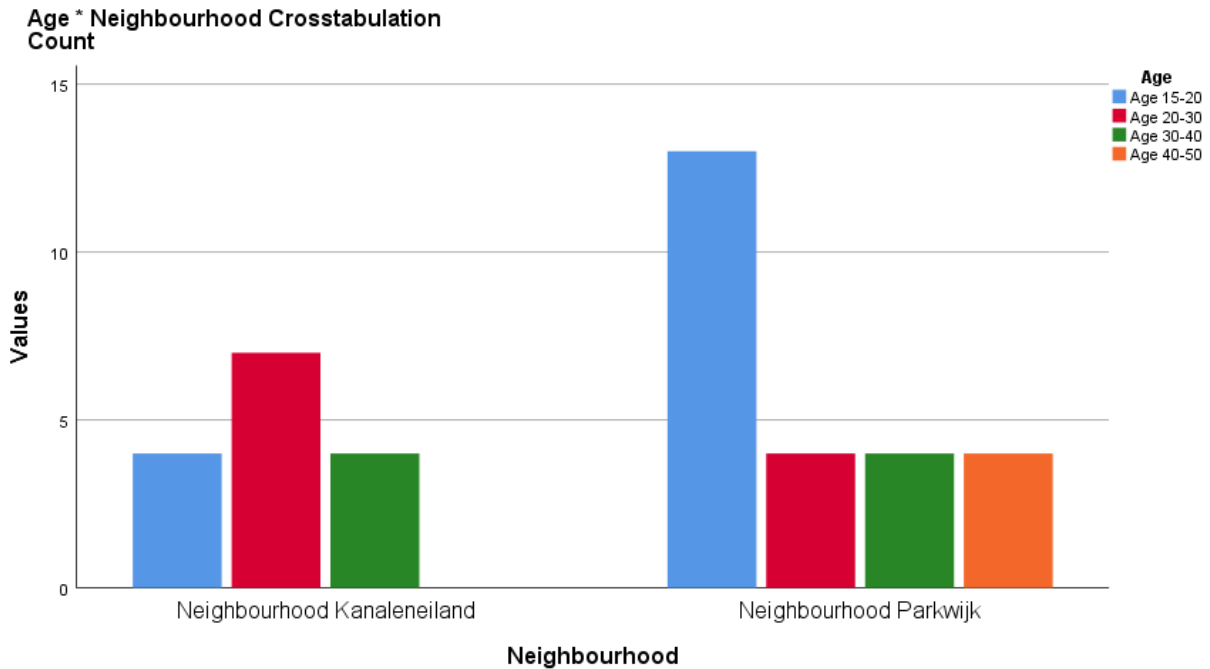


Figure 6 Crosstabulation respondents' neighbourhood and age.

4.1.2 Cycling behaviour according to Moroccan women in Utrecht

Three women have been interviewed for this thesis. One of the interviewees lives in Parkwijk, and the other two live in Kanaleneiland. Two women cycle and own a bicycle, one does not own a bicycle but mentioned that she would like to buy one (Citizen interviews 8, 9 & 10). All three women also own a car.

The three women mentioned that cycling is not the standard mode of transport in the Moroccan community. Two women mentioned that the car is their favourite mode, as it is both comfortable and convenient (Citizen interviews 9 & 10). One of the women mentioned that some Moroccan families have multiple cars in front of their homes.

“I have six children. My husband owns a car, my eldest daughter owns a car, my second eldest daughter is learning how to drive, my son has a car, and my daughter of 20 years old has a car” (Citizen interview 8, Pos 82).

This result is consistent with the results of the survey. The figure below shows the frequency distribution of first, second and third place per transport mode for the category ‘Favourite transport mode’. The car is ranked in the first place 30 times. This mode scores far better than the other transport modes. The bus, for example, is ranked in first place four times and the walking (pedestrian) three times. Bicycles are ranked only two times in first place and have received second or third place far more often. The following section looks further into the cycling ranking and the differences observed per gender, neighbourhood, and age.

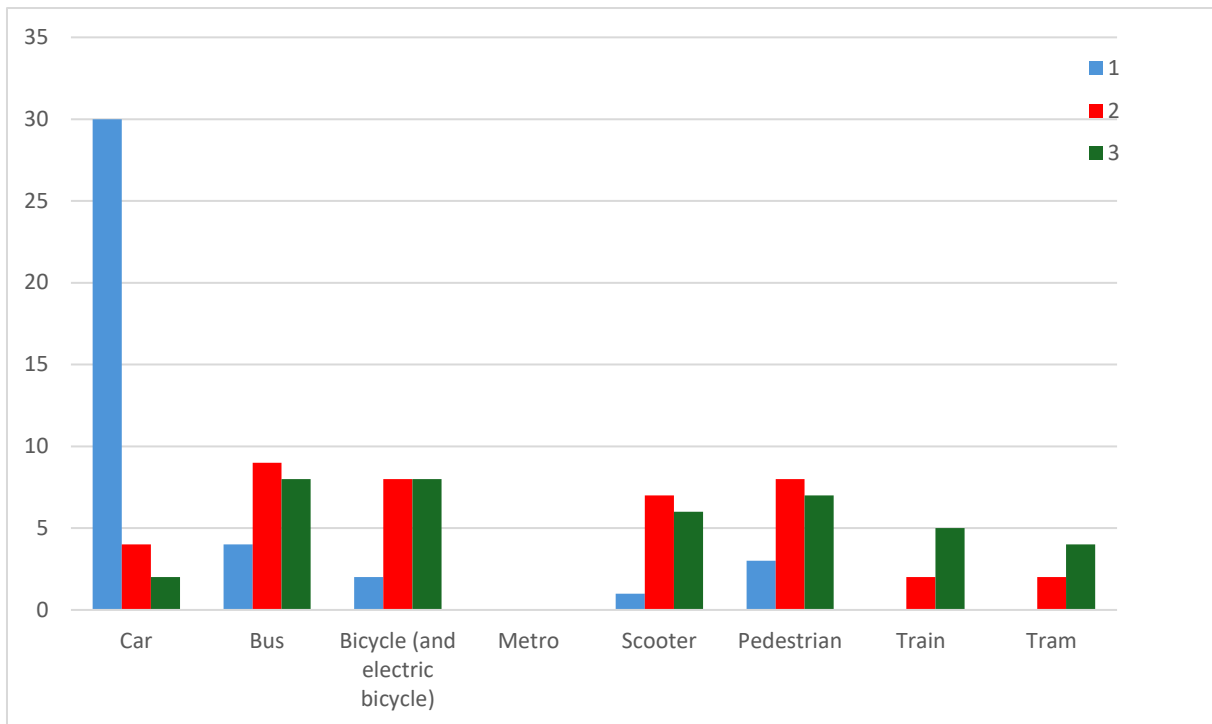


Figure 7 Favourite transport modes.

Figure 8 presents the first to eighth-place distribution of the rank of the bicycle per age group. The same has been done for gender (Figure 9) and neighbourhood (Figure 10). The bicycle ranking is evenly distributed across ranks one to four for ages 15-20 in the age category. However, they also ranked the bicycle most often as their least favourite transport mode. Moreover, it could be argued that ages 30-40 view the bicycle more positively than other age groups because they most often ranked the bike as the second favourite transport mode and not lower than the fifth favourite.

Additionally, in the gender category, women had the most diverse distribution and ranked the bicycle as the second or eighth favourite transport mode most often. The diverse distribution is likely due to the larger sample (29 women and 11 men). The low ranking of the bike by women is likely because many surveyed women are teens (See Figure 4). Lastly, Kanaleneiland and Parkwijk frequently ranked the bicycle as the second or third favourite transport mode in the category neighbourhood. Additionally, in Parkwijk, the bicycle is a more diverse distribution. This is likely due to the larger sample size (25 in Parkwijk and 15 in Kanaleneiland) and the high amount of women surveyed in Parkwijk (see Figure 5).

Is your favorite transport mode Bike * Age Crosstabulation Count

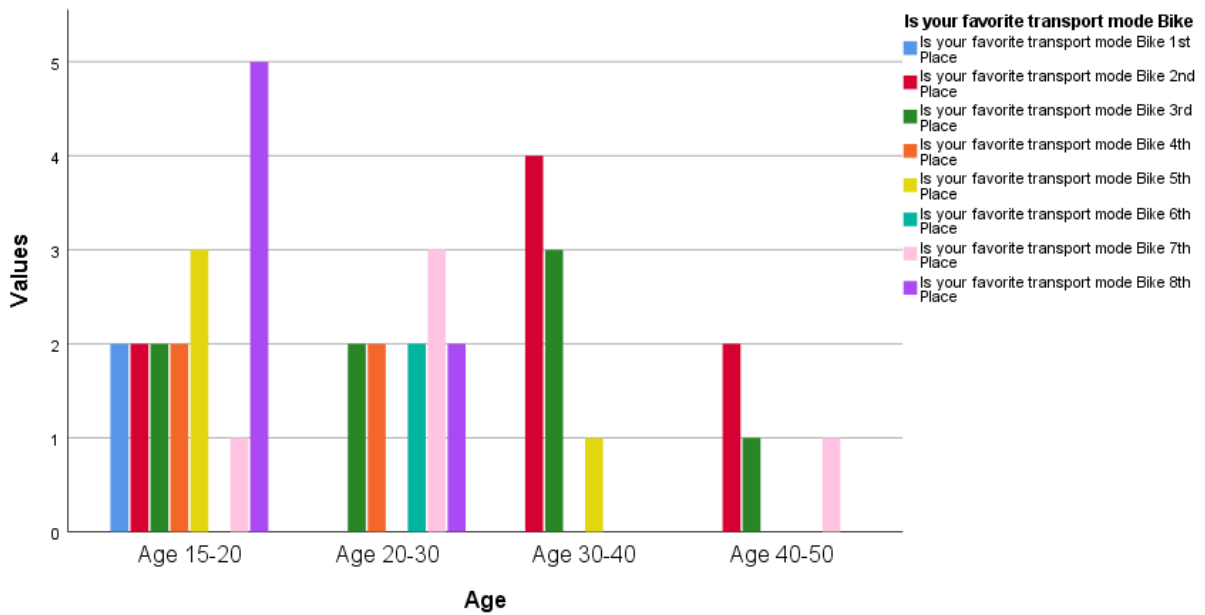


Figure 8 Favourite transport mode per age group

Is your favorite transport mode Bike * Gender Crosstabulation Count

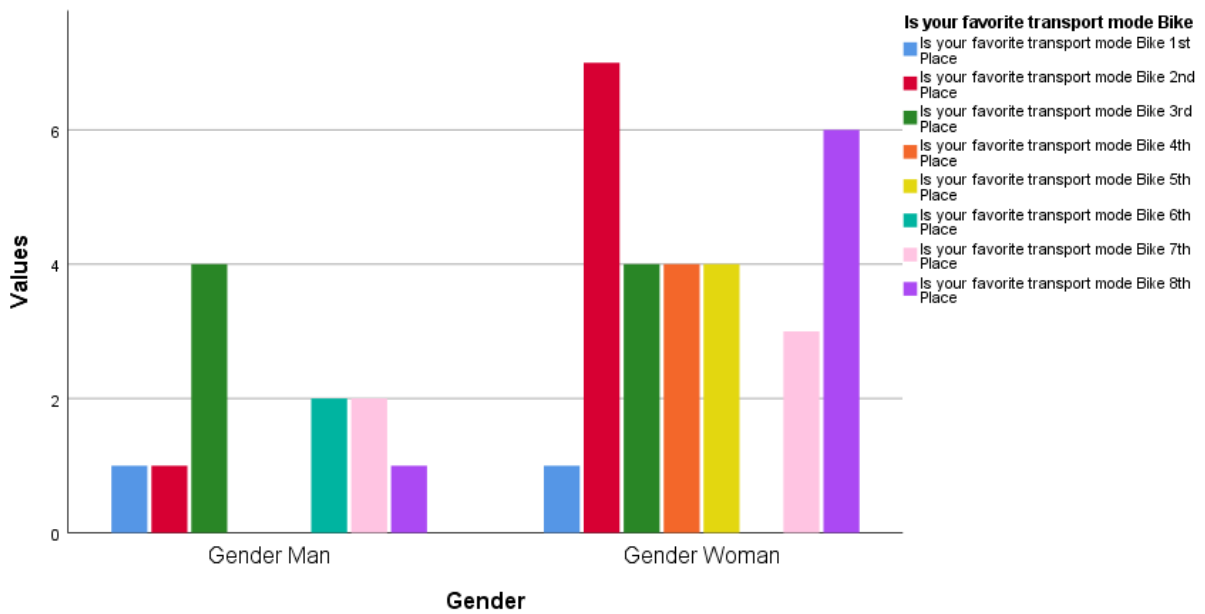


Figure 9 Favourite transport mode per gender

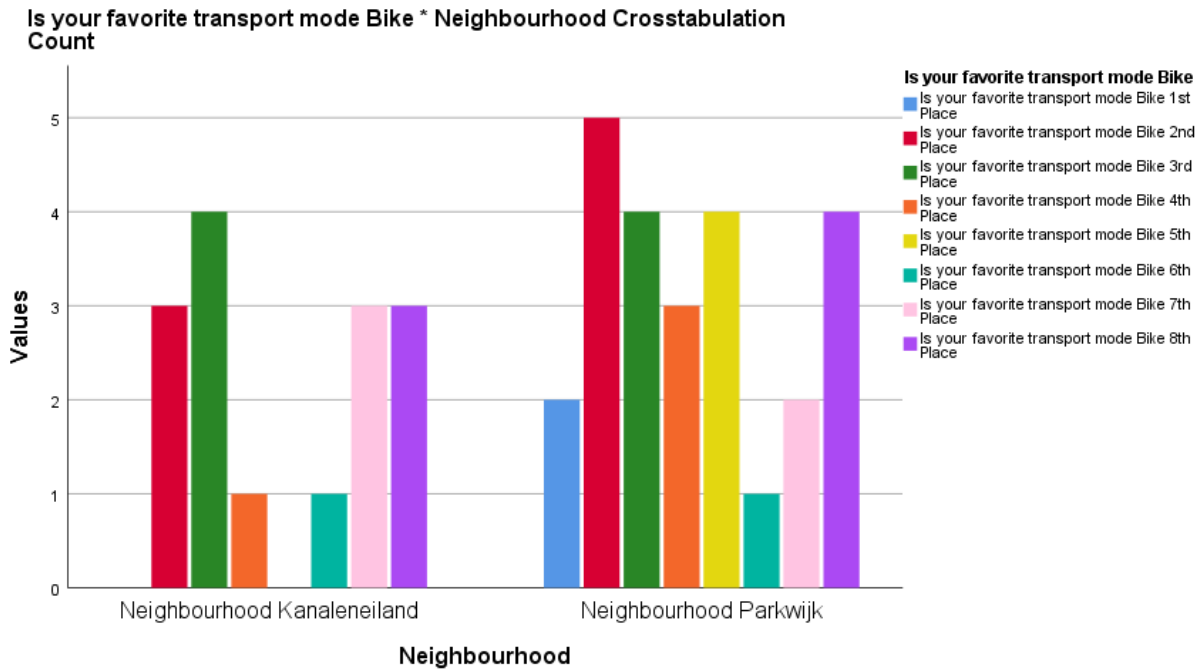


Figure 10 Favourite transport mode per neighbourhood

The survey thus seems to support the notion that Moroccans prefer the car. However, the sample size of this survey was too small to make a definite statement about the favourite transport mode. However, one could argue that the preference for the car is similar to the native Dutch population, as one policymaker said:

“Yes, I am curious what kinds of results would be discovered among citizens without a migration background. Most citizens would like to use the car, especially if you own one. Then, it would mostly be ranked as one of the best. [...] Public transportation may be a bit less, but I think the bike would often be ranked second. On average in Utrecht.” (Policymaker interview 1, Pos. 20-22)

The preference for cars also influences transport use. One of the Moroccan women stated the following:

“I do not know if it is positive or negative (social view on cycling). It is not black and white. It is crucial to realise how culture plays a role in your choices. What the bike is for Dutch citizens is the car for Moroccan citizens. For example, there are families with four cars in front of their house. The car is used most often (to travel with), but the bicycle is not. Thus, it is not what is positive or negative but rather what is normal.” (Citizen interview 8, Pos. 74).

The figure below (Figure 11) displays how frequently several transport modes are used within a month. This figure shows how the car is the most popular mode of transportation, along with walking. The bicycle is not used as frequently. This section further explores how the frequency of bicycle use differs between age (Figure 12), gender (Figure 13) and neighbourhood (Figure 14). Looking at the age category, ages 20-30 use bicycles the least. The researcher mentioned how their long skirts are less convenient when cycling, and women often adopt this clothing after menstruating (Researcher interview 3, Pos. 29). Additionally, women are often stay-at-home mothers. They often travel short distances, staying close to home (mobility of care, see

paragraph 2.1). These short distances are often easily travelled by foot, and the bicycle is often unnecessary (Researcher interview 3, Pos. 32; Citizen interview 10).

Women seem to cycle more often than men, which contradicts the interview with the researcher and the KiM rapport (see paragraph 2.1 Cycling in Moroccan culture). This contradicting result might be due to a difference in sample size. The regression might provide some further insights into the statistics. Lastly, in the category, neighbourhood citizens living in Parkwijk cycle more often than those living in Kanaleneiland. This might be due to a more equal distribution between men and women surveyed in Kanaleneiland compared to Parkwijk (See Figure 5). Furthermore, most citizens surveyed in Kanaleneiland are 20-30 years old, and in Parkwijk are between 15-20 years old (see Figure 6)

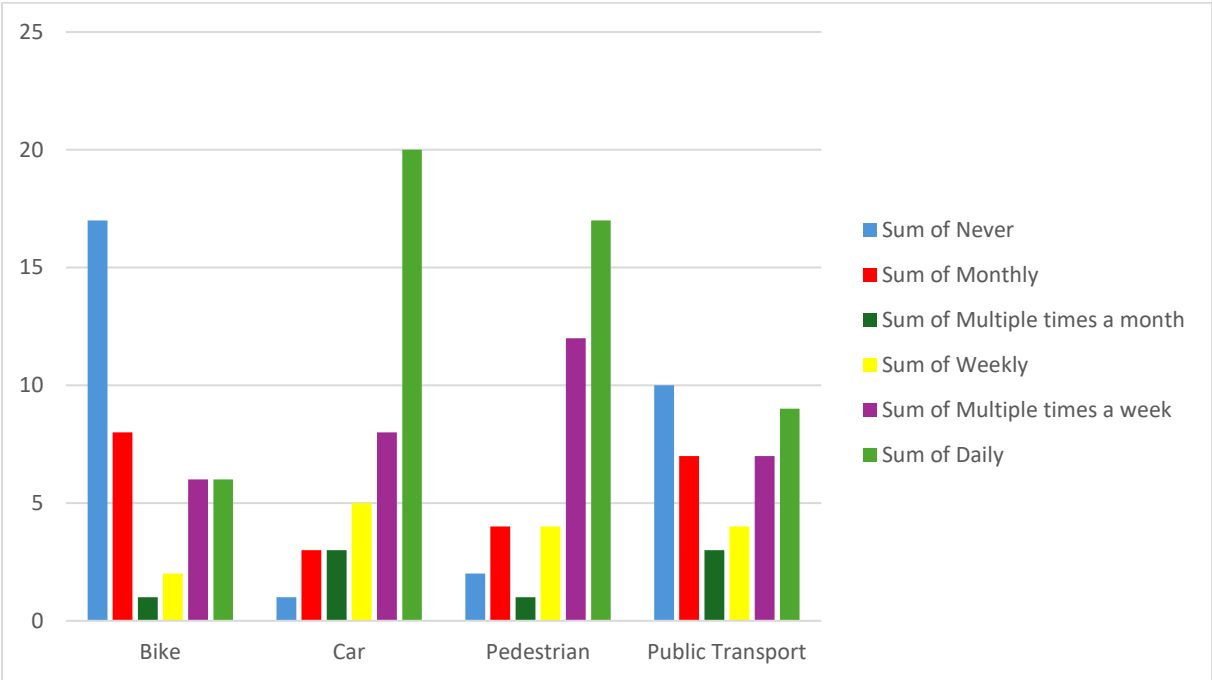


Figure 11 Frequency of use of the transport modes.

How Frequently do you use Bike * Age Crosstabulation Count

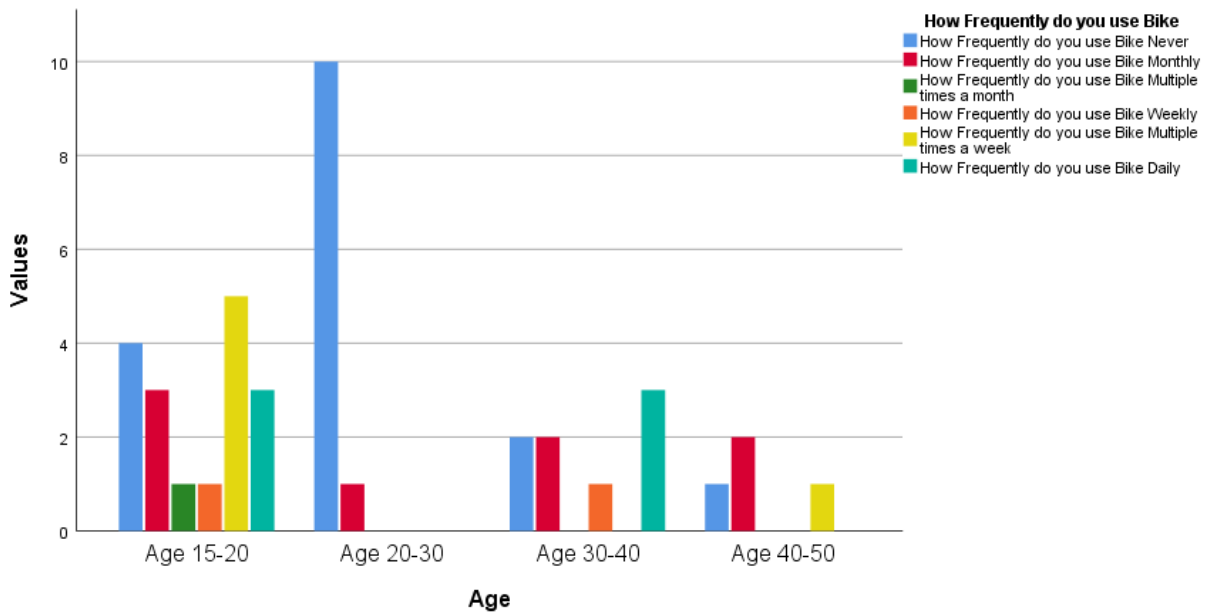


Figure 12 Frequency of use of the bicycle per age group

How Frequently do you use Bike * Gender Crosstabulation Count

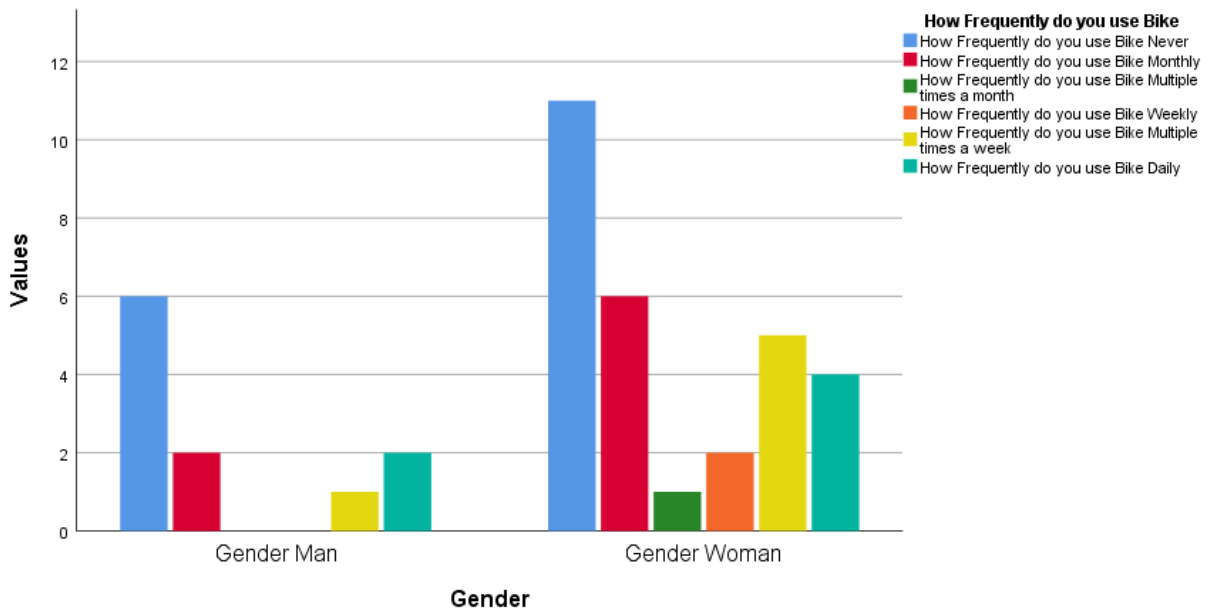


Figure 13 Frequency of use of the bicycle per gender

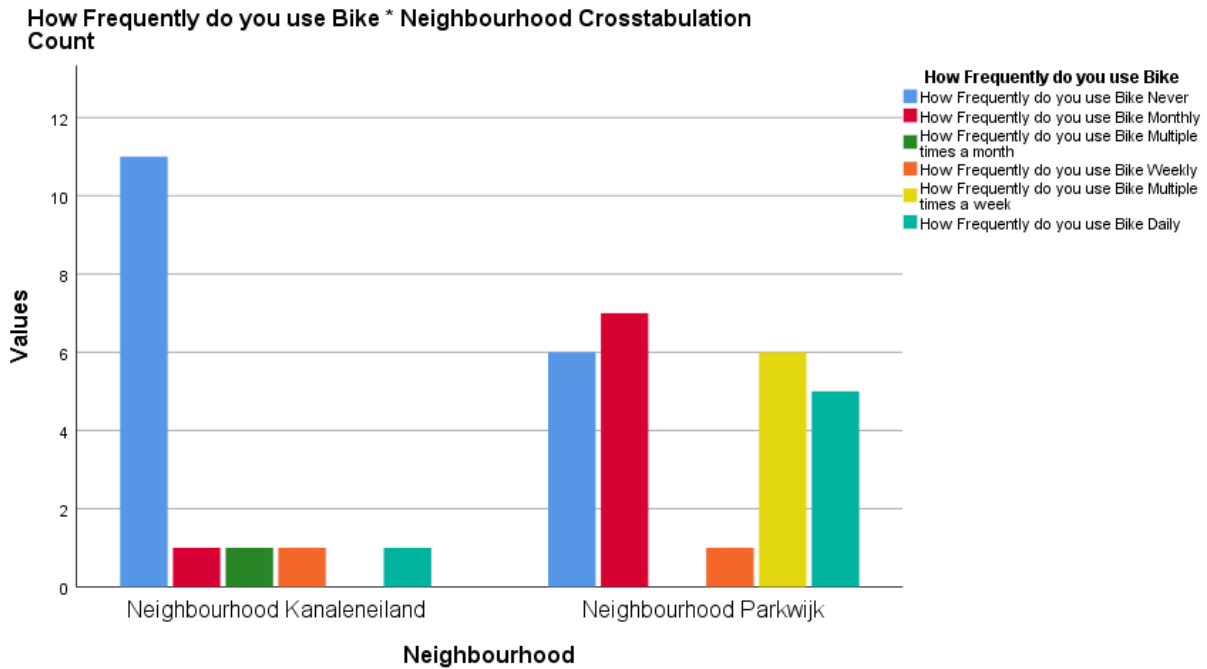


Figure 14 Frequency of use of the bicycle per neighbourhood

4.1.3 SPSS Results

As mentioned in the introduction, the survey collected information on different factors that can influence bicycle usage. This thesis has defined two dependent variables for all statistical tests: ‘bicycle frequency of use’ and ‘bicycle ranking of favourite transportation’. There were 156 variables in total. Due to the high number of tests, both chi-square and t-tests, only the final regression calculations are described in this chapter. The null-hypothesis handled for both regressions is: h_0 assumes that none of the variables significantly affect the frequency of bicycle use (regression 1) or bike ranking (regression 2). The alternative hypothesis h_a assumes that some variables significantly affect the frequency of use (regression 1) or the ranking (regression 2). The following section will discuss the social norm and the personal view. The second section discusses the regression results for the variable frequency of use. The last section discusses the results for the ranking of the bicycle.

4.1.3.1. Social norm and personal view

As mentioned throughout the thesis, personal views and social norms are essential factors that influence behaviour. Questions 24-30 gathered data on these topics. The means are calculated in SPSS 26 as part of the regression and are displayed in Table 4.

Table 4 Mean scores of social norm and personal view *the values are rounded.

Variable	Mean*
Social norm	2,9
Personal view	3,2

The variables were measured on a Likert-scale from 1 to 5. Both variables score around 3, meaning the social norm and attitude toward cycling are neutral, if not slightly positive. Additionally, the mean scores do not differ much, indicating that the social norm reflects the population's feelings rather than being completely disconnected from the personal view.

Personal views were also measured through word associations. Due to the length of the thesis, the results are presented in the appendix (see Appendix 7).

4.1.3.2 Frequency of use

After multiple t-tests and chi-square tests, 19 out of the 156 variables were selected. These selected variables were tested as significant compared to the other variables in their category, except age, gender and neighbourhood. The variables were tested within their respective categories. These tests were t-test and chi-square. As an example, the t-test for question 5 can be found in the appendix (see Appendix 8). The 19 variables are:

- Gender (Q2)
- Age (dummy variables): Young adult and Adult) (Q3)
- Neighbourhood
- Availability of bicycles (Q5)
- Positive and negative association with the word bicycle (Q9)
- The comfort of the bike compared to other modes (Q11)
- Traffic safety on the bike compared to other modes (Q11)
- Theft risk of the bike compared to other modes (Q11)
- Safety ranking of the car (Q12)
- Safety ranking of the bike (Q12)
- Problems with bicycle paths (Q15)
- Problems with bicycle parking (Q16)
- Bicycle ownership (Dummy variables: does have a bike) (Q18)
- Social norm (Q24 – 27)
- Personal view (Q28 – 30)

No variables were missing in this regression. The regression table, the R^2 adjusted is presented instead of the R^2 to compensate for the small sample size ($N = 40$).

The null hypothesis is h_0 : none of the variables significantly affect the cycling frequency. The alternative hypothesis is h_a : some variables significantly affect the cycling frequency. The following table presents the results of the regression (Table 5).

Table 5 Results Regression analysis of frequency in use of the bicycle. Note: $p < 0,05$ ** and $p < 0,1$ *

Hypothesis	Constant	B (unstandardised)	T	P-value	Results
H_0	Gender**	0,277	2,276	0,033	Not Supported
	Neighbourhood**	-0,377	-3,149	0,005	Not Supported
	Young Adult**	-0,563	-2,664	0,014	Not Supported
	Adult	-0,247	-1,567	0,131	Supported
	Availability 15 minutes from house Bike	0,118	0,769	0,450	Supported
	Positive word associations with bike**	0,327	1,883	0,073	Not Supported
	Negative word associations with bike	0,081	0,554	0,585	Supported

	The comfort of the bike compared to other modes	-0,157	-1,127	0,272	Supported
	Safety in Traffic	-0,138	-0,918	0,368	Supported
	Theft Risk**	0,464	3,924	0,001	Not Supported
	Is the safest transport mode Car**	0,249	2,116	0,046	Not supported
	Is the safest transport mode Bike	0,095	0,635	0,532	Supported
	problems with a bicycle path	0,025	0,175	0,862	Supported
	problem with bicycle parking	0,002	0,014	0,989	Supported
	Bike ownership	-0,249	-1,424	0,169	Supported
	Social norm	0,222	1,186	0,248	Supported
	The mean score of the Personal View	0,151	0,688	0,498	Supported
R ² adjusted	0,677				
F (17,22)	5,811				
Significance (ANOVA)	0,000				

Looking at Table 5, one can assume that the model is a good fit, R^2 adjusted = 0,677, which means the model explains 67,7% of the variation of the dependent variable. Additionally, the independent variables significantly predict the frequency of bicycle use, $F(17, 22) = 5,811$, $p < 0,05$).

The independent variables were further assessed to determine the influence of each variable. The results revealed that Theft risk is significant ($p < 0,05$) and positively correlated to the frequency of use ($B = 0,988$, $t = 3,924$, $p = 0.001$). Similarly, Positive word associations are significantly ($p < 0,05$) and positively related to the frequency of use ($B = 0,458$, $t = 1,883$, $p = 0,073$), Gender ($B = 1,217$, $t = 2,276$, $p = 0,033$) and Safest transport mode is the car ($B = 0,322$, $t = 2,116$, $p = 0,046$). Neighbourhood is significantly ($p < 0,05$) and negatively related to the frequency of use ($B = -1,524$, $t = -3,149$, $p = 0.005$) as well as Young adult ($B = -2,469$, $t = -2,644$, $p = 0.014$). Hence, h_0 was unsupported for these factors, and h_a was accepted.

Conclusions

These results have led to the formulation of the following conclusions:

The negative correlation between young adults and frequency of bicycle use indicates that young adults (20-30 years) cycle less than Teens and older Adults. Moreover, there is a positive correlation between gender and frequency of use to men cycling more than women. Lastly, the negative correlation between neighbourhood and frequency of use, points to habitants of Parkwijk cycling more than habitants of Kanaleneiland. The increased bicycle usage in Parkwijk is thus due to the relatively high number of teens and adults surveyed in this neighbourhood and not due to the high number of women (see paragraph 4.1.2).

Furthermore, the positive word associations are also positively correlated to frequency of use. Thus, people who have more positive associations with cycling make it more likely that a person will cycle. The variable safety rank of the car is positive to the frequency of use. Question 12

is formulated so that a higher score correlates to a lower rank (See Paragraph 3.4.2 Statistical analysis). Therefore, a lower safety rank for the car increases the likelihood of cycling. Lastly, theft risk is positively related to the frequency of cycling. Questions 4 and 11 are formulated so that a higher score means an increase or a “win” for cycling (See paragraph 3.4.2 Statistical analysis). Thus, the better the theft risk is controlled, the more likely people are to cycle.

4.1.3.3 Favourite transport mode is cycling.

After multiple t-tests and chi-square tests, 14 out of the 156 were selected. These variables were tested as significant compared to the other variables in their category. The categories are the same as the questions in the survey (see appendix). These variables are:

- Gender (Q2)
- Age (dummy variables: Teen and Young adult) (Q3)
- Neighbourhood
- Availability of bike (Q5)
- Availability of tram (Q5)
- Positive and negative association with the word bicycle (Q9)
- Comfortability on the bike compared to other modes (Q11)
- Problems with crossings (Q17)
- Bicycle ownership (Dummy variables: does have a bike and does not have a bike) (Q18)
- Social norm (Q24 – 27)
- Personal view (Q28 – 30)

No variables were missing in this regression. The regression table, the R^2 adjusted is presented instead of the R^2 to compensate for the small sample size ($N = 40$).

The null hypothesis is H_0 : none of the variables significantly affect the bicycle's ranking in the favourite transport mode category. The alternative hypothesis is H_a : some variables significantly affect the bicycle's ranking in the favourite transport mode category. The following table presents the results of the regression analysis (Table 6)

Table 6 Results Regression analysis favourite transport mode ranking of the mode bike. Note: $p < 0,05$ ** and $p < 0,1$ *

Hypothesis	Constant	B (unstandardised)	T	P- value	Results
H_0	Gender	-0,039	-0,238	0,814	Supported
	Neighbourhood	0,110	0,607	0,549	Supported
	Young adult	0,244	1,036	0,310	Supported
	Adult	-0,119	-0,600	0,554	Supported
	Availability of bike*	-0,357	-2,015	0,054	Not Supported
	Availability of tram	-0,228	-1,273	0,214	Supported
	Positive word association	-0,081	-0,406	0,688	Supported
	Negative word association	0,081	0,441	0,663	Supported
	The comfort of the bike compared to other modes	0,054	0,338	0,738	Supported

	Problems with crossings	0,134	0,967	0,342	Supported
	Bike ownership	0,125	0,597	0,556	Supported
	Social norm	-0,205	-0,858	0,399	Supported
	Personal view	-0,256	-0,960	0,346	Supported
R ² adjusted	0,389				
F (13,26)	2,912				
Significance (ANOVA)	0,010				

Looking at Table 6, one can assume that the model is a good fit, R^2 adjusted = 0,389, which means the model explains 38,9% of the variation of the dependent variable. Additionally, the independent variables significantly predict the frequency of bike ranking in favourite, $F(13, 26) = 2,912$, $p < 0,05$). However, it should be noted that the ranking of favourite transport modes is not a true scale variable but an ordinal variable. For the sake of the analysis, equal distances between the categories are assumed.

The independent variables were further assessed to determine the influence of each variable. The results revealed that the availability of a bike is significantly ($p < 0,1$) and negatively correlated to the ranking of the bike in the favourite transport mode ($B = -1.711$, $t = -2,015$, $p = 0,054$). Thus, the h_0 was rejected, and h_a is accepted for this variable.

Conclusion

These results have led to the formulation of the following conclusion:

The regression points out that the availability of the bicycle is negatively correlated to the favourability of the bike. Question 6 is formulated so that a higher score correlates to a lower rank (see paragraph 3.4.2 Statistical analysis). Thus, the availability of a bicycle increases the likelihood that someone will cycle.

4.2 Question 2 What are the mobility inequality issues faced by the Moroccan women in Utrecht.

The previous paragraph addressed the cycling behaviour of the Moroccan population. This paragraph addresses the role of the bicycle in Moroccan culture, the role the bicycle can play in addressing mobility inequality, and the experienced mobility inequality of Moroccan women in Utrecht.

4.2.1 The bicycle in Moroccan culture

The differences between the Dutch and Moroccan cycling cultures are described in Chapter 2.1. One of the differences is the social norm around transportation. Citizens of Morocco tend to use the car or walk rather than cycle, while cycling is an everyday mode in the Netherlands (Saadaoui, 2019; Chemssedine & Boubkr, 2021). Furthermore, most women in Morocco do not tend to cycle due to some gender norms around cycling (Pikala bikes, n.d.). These two points are supported by one of the citizens who was interviewed, and she stated the following:

“That is not surprising, in our culture in Marocco you maybe have two or three cities where a motor is used by everyone. However, in most cases the bicycle is not used by women, certainly not.” (Citizen interview 8, pos. 72).

Another citizen also mentioned the importance of culture for cycling, especially regarding second-generation migrants. She stated:

“It might take some time for the Moroccan population to cycle more. I never saw my parents cycle, which is why it is less relevant. However, my daughter will see me cycle, and it might take some generations before cycling is part of family life. [...] I have never seen them cycle because my parents were raised in Morocco, and in Morocco, nobody cycles. Therefore, it is a cultural characteristic.” (Citizen interview 10, pos. 177-178 and 182).

Chapter 2.1 also mentioned the differences in travel behaviour between men and women. In Morocco, women take multiple short trips due to their cultural caretaker role (Saadoui, 2019; Chamseddine & Boubkr, 2021). Additionally, women can be restricted in their movement, as specific modes such as cycling can be seen as unsuitable (Chafai, 2017). Lastly, women have some safety concerns, especially with respect to personal safety. They might avoid specific routes, modes or behaviours to prevent (sexual) harassment (Saadoui, 2019; Chamseddine & Boubkr, 2021).

Even though these differences might play a role in women's travel behaviour, the citizen interviews did not produce a clear insight into the difference between men and women. Yet, through cross-referencing the interviews, one can conclude that many Dutch-Moroccan women do have a care role in their families, and thus their travel pattern is affected by this role. The Cycling Masters and the researcher stated that caring for children or being able to cycle with their children for recreation is one of the main reasons women would like to cycle (Researcher interview 3; Cycling Master interview 6; Cycling Master interview 7). Additionally, two citizens mentioned that they often cycle with their children or would like to cycle with them (Citizen interview 9 and Citizen interview 10).

One of the citizens mentioned cultural limitations and stated that women do not cycle in Morocco (see quote above Citizen interview 8). However, it was not discussed in depth. The researcher did encounter some women who do not cycle due to cultural pressure in his research.

He mentioned that some individuals experience social control. However, this is quite rare to happen. The most affected group is traditional women who do not often interact with individuals beyond their own group (Researcher interview 3, Pos. 46).

Lastly, the women did not mention any concerns regarding their personal safety. Some women mentioned they avoid going out at night, but this is not necessarily for safety reasons. One citizen stated:

“I will not walk outside in the dark, but I could not do that anywhere. I would be comfortable doing that in my street, but I would not walk long distances, but nowhere else. That is just not in my nature.” (Citizen interview 8, Pos. 32).

The coordinator of the cycling lessons has had some discussions with coordinators of other municipalities about various topics, including discouraging factors regarding cycling (Initiative Coordinator interview 2, Pos. 65). He stated in the interview that the lower status of the bicycle did influence cycling behaviour. This directly relates to social norms; in some cultures, the norm is not to cycle, and cycling is a poor man’s vehicle (ibid). However, cat-calling and other harassment were not mentioned by any other municipalities and are possibly less prominent issues (ibid).

4.2.2 The bicycle and mobility inequality

Bicycles are often useful for short to moderate (7 km) trips, allowing people to travel further distances than walking (Gemeente Utrecht, 2021b). However, the limited bicycle usage among first-generation Moroccan women due to a lack of skills, funds, or social acceptance can be seen as mobility inequality.

Access to the bicycle is important as several amenities, such as work and health care, become more convenient to reach. The Planbureau voor de Leefomgeving (PBL) researched the accessibility of cars, public transport, and cycling. According to the document of the PBL *Toegang voor Iedereen* (Translation: Accessibility of everyone), the bicycle plays an important role in improving employment rates, especially for low-income, young or low-educated citizens (Planbureau voor de Leefomgeving et al., 2022, p. 11 – 12). In accordance with the same research, the bicycle also plays a vital role in increasing the accessibility to the GP (general practitioner), education, grocery stores and green areas. As a final point, the bicycle is also a convenient mode to use as pre- or post-transport to public transport, for example, using the bike to and from the train station (Planbureau voor de Leefomgeving et al., 2022; Gemeente Utrecht, 2021b).

4.2.3 Mobility inequality as experienced by Moroccan women in Utrecht

The last paragraphs looked at the role of the bicycle in the Moroccan culture and the opportunities the bicycle provides in reference to mobility inequality. However, do the Moroccan women in Utrecht experience mobility inequality? The women who were interviewed all expressed that they do not feel disadvantaged in terms of mobility. However, they also mentioned a difference between first- and second-generation immigrants. One woman mentioned:

“I am Moroccan; however, I was born here, I grew up here, I am just as Dutch as my neighbour [...] Thus, I don’t encounter as many issues as someone who moves to the Netherlands at 30.

They have a whole other life behind them. They would have to adapt more (to the Netherlands) and should be kept in mind.” (Citizen interview 9. Pos. 61 & 65).

This is supported by the research of the Kennisinstituut voor mobiliteitsbeleid et al. (2023), which mentioned that second-generation immigrants have a mobility pattern that is more similar to that of native citizens. The rapport also mentions the lack of role models, especially for first-generation migrants (see quote, Citizen interview 10, Pos. 177-178 & 182). The seemingly more positive attitude towards the bike in the later generations, both in my interviews and in the research of the Kennisinstituut voor mobiliteitsbeleid (abbr. KiM), might still be overly optimistic. To quote KiM:

“A regular bike is not seen as something particularly special to be proud of. Participants whose main transport mode was the bike mentioned getting comments from their community about their lack of other transport mode options.” (Kennisinstituut voor mobiliteitsbeleid et al., 2023, p. 48).

Although mobility inequality is not a significant issue for these women, there were some safety concerns about the infrastructure in their respective neighbourhoods. The two citizens in Kanaleneiland expressed concerns about the cross-section/roundabout near the shopping mall (Figure 18). One of the residents mentioned:

“[...]especially the roundabout near the shopping mall is extremely dangerous. It has been adapted a bit. However, it is still a dangerous spot.” (Citizen interview 8, Pos. 34).

The other resident was concerned about the safety of her children, not only regarding the roundabout but regarding the whole neighbourhood, stating:

*“[...] there are more issues regarding safety because I don't have the impression that it (the neighbourhood) is child friendly. I would not let my daughter walk alone through the neighbourhood towards *inaudible* to play outdoors.”* (Citizen interview 10, Pos. 90).

In Parkwijk, one of the residents mentioned that the crossings near the bus lane in her neighbourhood are quite dangerous, especially for cyclists and pedestrians (see Figure 16). The car must cross both the bus lane and the bicycle path. Additionally, the cyclists and pedestrians are often poorly visible due to the poorly lit area and the layout of the crossings and (some) cyclists driving without lights on. She mentioned:

“It has gone wrong many times this week. There was an accident with a cyclist [...] But this cyclist used a Vetbike (electric bicycle), and he cycled probably faster than the driver thought he would [...], but I notice myself that when I approach the crossing, I tend to pay more attention just in case” (Citizen interview 7, Pos. 26 & 28)



Figure 15 Google Maps (n.d. a) Roundabout Marco Pololaan and Churchillaan, 1:10)

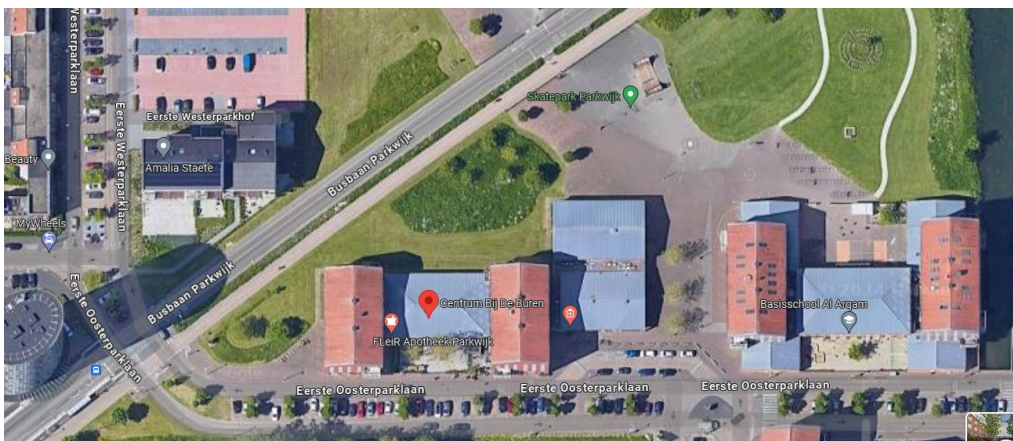


Figure 16 Google Maps (n.d. b) Crossing bus lane and Eerst Oosterparklaan, 1:20

The safety issues with the neighbourhood design can increase the mobility inequality experienced by the citizens; for example, children are prohibited from travelling alone near the intersection. However, the neighbourhood design might not be the only issue, as the PBL has determined that the Netherlands (not only Utrecht) is still quite car-oriented. In a car-oriented design, the car takes priority over the other transport modes. This leads to an increased quality of infrastructure for cars and decreasing the quality of the other modes. Although car-centric planning is primarily a remanent of the past, there is still a bit of a car-centric mentality (Planbureau voor de Leefomgeving et al., 2022). For example, jobs are still moving towards the edges of cities and highways. These places are difficult to reach by other modes besides cars. Additionally, for 40% of transport movements, one must have a car (Planbureau voor de Leefomgeving et al., 2022, p. 9).

One of the transport modes that experience a decrease in quality is public transport. Public transport is often slower than cars (Planbureau voor de Leefomgeving et al., 2022). The cutbacks in the mobility budget led to a decrease in the quality of the public transport network. This mode mainly focuses on the cities and their centres (Planbureau voor de Leefomgeving et al., 2022, p 45). Additionally, the frequency of public transport modes decreases outside of rush hour, which impacts the accessibility of the mode (Planbureau voor de Leefomgeving et al., 2022). For example, a bus line would go from once every minute during rush hour to once every half hour outside of rush hour. Another problem with this transportation mode is the high price;

multiple participants of the bicycle lessons mentioned the high cost of public transport as a reason to start cycling (Initiative coordinator interview 2; Bicycle Master interview 6; Bicycle Master interview 7; Kennisinstituut voor mobiliteitsbeleid et al., 2023). Lastly, the digitization of public transport plays a role. For example, having to pay by card on the bus and the schedules being posted on websites such as 9292 increase the difficulty of using public transport because you need a card and have certain skills and know how to use the site. This can pose some issues, especially for immigrants.

To quote one of the policymakers:

“Sometimes, it is presented as if things are being developed to be as easy to use as possible. However, I do think that public transport has become more complex over the years, and there are more and more barriers, so to speak. I believe one can’t pay cash anymore on the (train) stations.” (Policymaker interview 4, Pos. 22)

This mismatch between the design and the citizen's vision, ideal or dream is explained as follows by the researcher, based on Design Thinking (Researcher interview 3, Pos. 14). Design thinking follows three steps: the right frame, design, and design right. The citizens should be the focal point when approaching a neighbourhood design, and they should define their wishes for the neighbourhood (Researcher interview 3). This is getting the right frame. These dreams should then be looked at by engineers, who should formulate a design that follows this dream but is still realistic (e.g., following laws and regulations). This design should still be flexible enough to allow people to try out what fits them best (e.g., people cut off a corner by walking through the grass instead of on the path) (Researcher interview 3). This is getting the right design. Lastly, getting the design right, zoom in on the short cuts people took and adapt the design to these short cuts (Researcher interview 3). This allows the design to be close to the citizens' wishes while still grounded in reality.

4.3 Question 3: What relevant local mobility policies address mobility inequality in Utrecht?

The municipality of Utrecht develops policies to manage the city. There are several departments, such as housing, health and mobility. This thesis focuses on the mobility department and the policies it produces on cycling and mobility inequality. The policy documents selected for the analysis are introduced in the following section, paragraph 4.3.1. The following section presents the analysis and the results in paragraphs 4.3.2 and 4.3.3. The analysis aims to determine if the policy documents sufficiently address the topics of cycling, mobility inequality, or both.

4.3.1 Documents selected for the analysis

Ruimtelijke Strategie Utrecht 2040 (Strategy on spatial planning Utrecht)

The municipality of Utrecht writes the RSU 2040, a collaboration between multiple departments within the municipality (Gemeente Utrecht, 2021c). The strategic vision describes the ambitions of the city of Utrecht, including the suburbs. This document contains the main concepts and target values regarding the spatial division in Utrecht. In the coming years, the central concepts and indicative programs will be implemented into plans and designs (Gemeente Utrecht, 2021c, p. 8). The municipal strategy aligns with the national and provincial strategy on spatial planning (see Figure 17). RSU 2040 is grounded in RSU 2030, which was developed in 2016 (Gemeente Utrecht, 2021c, p. 17)

The world quickly changes, for example, in energy, housing, and mobility. The municipality has to stimulate and support the transition to sustainable energy, address the growing population, and stimulate active, shared, and public transport modes (Gemeente Utrecht, 2021c). Throughout these changes, the municipality has been determined to provide a city suitable for everyone. *“The city is inclusive and affordable, where all citizens can participate, and public spaces, houses, facilities, and city functions are affordable and accessible. The city invites citizens to connect.”* (Gemeente Utrecht, 2021c, p.10).

To remain a city for everyone, the municipality has produced six city profiles, the city barcode and twelve principles for urban development (Gemeente Utrecht, 2021c). However, the main document does not include the twelve principles. Instead, they are addressed in a letter to the Council of State (Gemeente Utrecht, 2021c; Gemeente Utrecht & Aarts, 2021). The barcode and city profiles were discussed in both documents. Therefore, the barcode and city profiles are included in the thesis, but the principles are not.

The city profiles are (Gemeente Utrecht & Aarts, 2021, p. 1):

1. The green city
2. The connected city
3. The compact city
4. The inclusive city
5. The sustainable city
6. The slowed-down city

The municipality of Utrecht has developed the city barcode as a tool to facilitate an integral approach to urban planning. This integral approach includes the various departments in the municipality (e.g. green, housing and (transport) infrastructure) (Gemeente Utrecht & Aarts, 2021, p. 6; Gemeente Utrecht, 2021c, p.71). The barcode shows the mutual ratio between the elements of the public space and quantifies the space needed for these elements (Gemeente Utrecht, 2021c, p. 71).

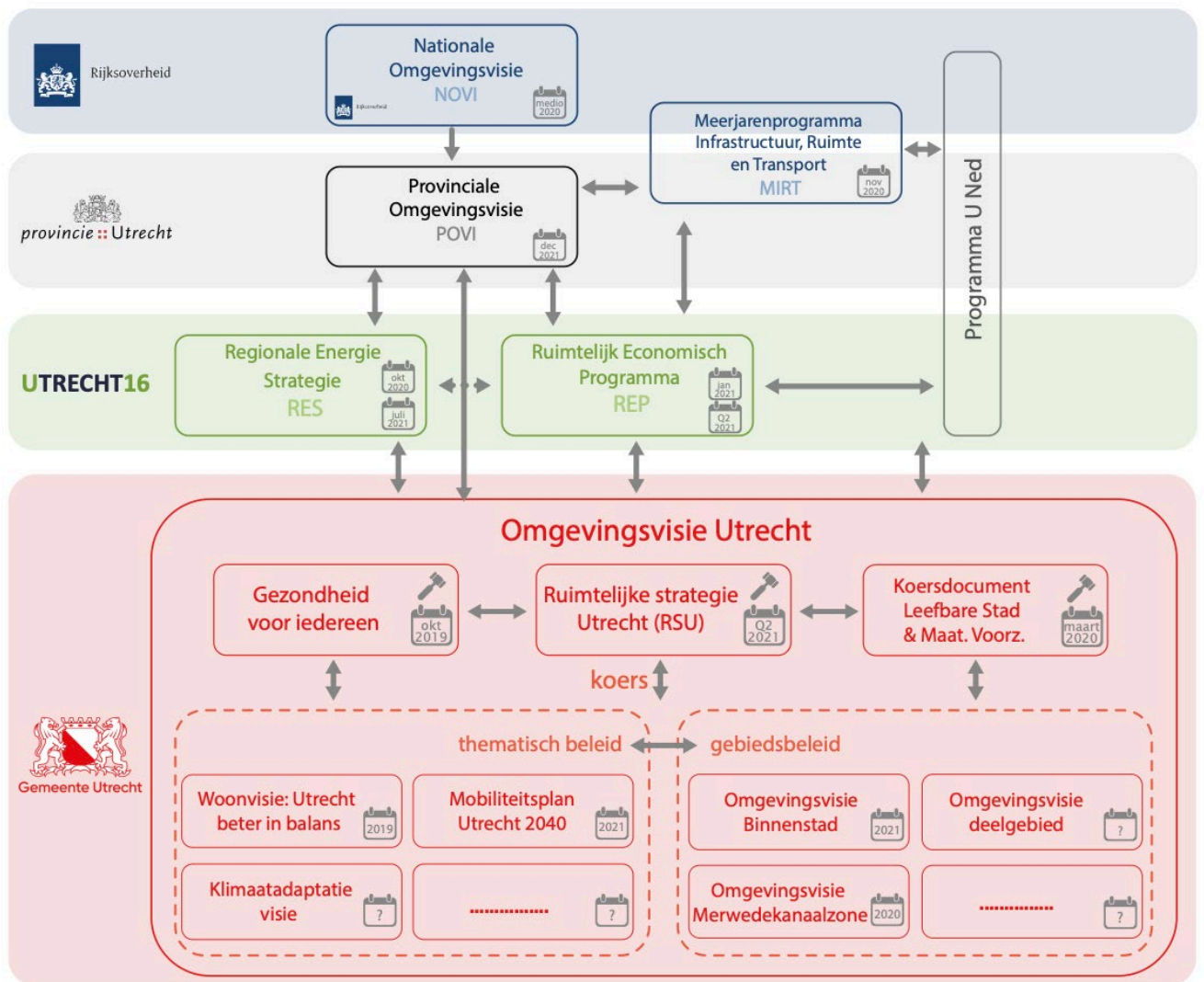


Figure 17 The position of the municipal strategy on spatial planning in the broader context (Source: Gemeente Utrecht, 2021c, p. 21)

Mobiliteitsplan 2040 (Spatial strategy on mobility 2040)

The spatial strategy on mobility is written by the mobility department of the municipality of Utrecht and is connected to the RSU 2040 (see Figure 17). The mobility plan specifically addresses the vision for the transport system. The municipality aims to address the growing need for mobility through active (e.g. cycling and walking) and public and shared transport modes (Gemeente Utrecht, 2021b, p. 4). They do facilitate access to all destinations by car. However, the car does not have the priority (Gemeente Utrecht, 2021b, p. 4). Hence, travelling by car might not be the shortest or the fastest.

As a form of active transportation, the bike has an important role in the mobility strategy (Gemeente Utrecht, 2021b). The municipality aims to grow the cycling infrastructure and improve its quality. The routes around the city centre and to the transport nodes are essential points in the main cycling routes (Gemeente Utrecht, 2021b). They also want to provide additional routes that are calmer and suitable for all citizens.

In order to provide a healthy, attractive and accessible city, the municipality has formulated a strategy with five interconnected steps (Gemeente Utrecht, 2021b, p.40):

1. Smart planning: addressing how and where to (further) develop the mobility network and the city.
2. Changing travelling: addressing the travel patterns seen within the transport network and changing them where needed to relieve the network.
3. Functioning network: addressing the quality of the transport network.
4. Smart parking: addressing parking infrastructure.
5. Smart coordination addresses traffic management and integral choices through physical projects and regulations.

Within the mobility strategy, the municipality has formulated ten goals that also function as a foundation on which base requirements of accessibility are defined (Gemeente Utrecht, 2021b, p. 37). It thus functions as a guideline for future projects.

The goals are (Gemeente Utrecht, 2021b, p. 37):

1. A higher quality of life and accessibility to various destinations.
2. By choosing suitable solutions.
3. More space for pedestrians.
4. Increasing the level of scale for the bicycle.
5. Growing the system for public transportation.
6. Good car accessibility for persons who must use the car by highways and connecting roads in the city.
7. More efficient and cleaner freight transport, using waterways and railroads where necessary.
8. Increasing traffic safety in the city, handling a 30 km/h regime.
9. Influencing travel behaviour.
10. Only building where accessibility needs to be reorganised and urbanisation is used to improve the mobility system.

Monitor mobiliteitsplan (monitoring document on the spatial strategy on mobility 2040).

The monitoring document is similar to the mobility strategy written by the municipality's mobility department. This policy document addresses the mobility development in the city of Utrecht and checks whether the development aligns with the spatial strategy (Gemeente Utrecht et al., 2022). The monitor keeps track of and describes the following trends (Gemeente Utrecht et al., 2022):

1. Demographic
2. Economic
3. Ownership and use of multiple transportation modes
4. The development of mobility per the five steps of the mobility plan.

Regionale Fietsvisie 2.0 U10 (Regional vision on cycling 2.0 U10)

Mobycon, a consultancy agency specialising in mobility, wrote this policy document commissioned by the U10. The U10 is an organisation of 10 municipalities in the province of Utrecht, one of them being the municipality of Utrecht (Utrecht10, 2022). Together, they

address issues and topics such as mobility, economy, living, health, inclusivity, nature and landscapes, and sustainability (Utrecht10, 2022)

The U10 has formulated the following goal regarding cycling in the region: *“In 2030, 60% of the citizens habiting in the U10 region travel to work by bike, public transportation or a combination of these modes.”* (Mobycon, 2018, p. 4). In order to achieve this goal, they additionally formulated the action pillars (Mobycon, 2018, p. 5):

1. Facilitating cycling for long distances (to 15 km)
2. Optimal use of the infrastructure
3. Facilitating cycling-public transport chain
4. Decreasing pressure on the city centre of Utrecht
5. Increasing overall safety

The five pillars were adapted into concrete hard and soft implementations; these are listed below (Mobycon, 2018, p. 5).

The hard implementations to introduce were:

1. Implement quick cycling paths that connect the cities of the U10.
2. Building new connections over physical barriers such as roads and channels as these barriers limit the accessibility opportunities of the bike.
3. Building more and higher-quality bicycle parking places. They also want to improve the bicycle infrastructure around public transport stops and train stations to improve the connection between cycling and public transport. The municipality is still looking into other ways to improve the connection between cycling and other transport services.
4. Increase the number of shared bicycles near important (public) transport nodes in the region.

The soft implementations were:

1. Focusing on shared vehicles, seeing (shared) bicycles as pre- and post-transport options.
2. Encouraging employers to stimulate cycling among their employees.
3. Stimulating cycling for distances to 7,5 km through stimulating e-bikes and improving connectivity with public transport.

[Visie Vervoer voor iedereen \(Vision on transportation for everyone\)](#)

The Visie Vervoer voor iedereen (Vision Transportation for Everyone) is written by the municipality of Utrecht. This vision functions as an internal framework to rate the interventions of the municipality regarding the developments in mobility and specialised transport modes (Gemeente Utrecht, 2021a, p.5). It is also a framework for further developments in these areas. The vision is based on the Vision of Social Basis, the Agenda accessibility, and the strategy on mobility 2040. All these documents were produced by the municipality of Utrecht (Gemeente Utrecht, 2021a). Additionally, the document is grounded in the VN-produced document that dictates that all disabled citizens should be able to actively participate in society (Gemeente Utrecht, 2021a, p. 7)

The Vision Transport for Everyone is grounded in the theory of the traffic pyramid (see Figure 18). The higher up the pyramid, the more specialised the transport becomes. Relating to the aforementioned theory, the municipality formulated the following goals for accessible transportation (Gemeente Utrecht, 2021a, p. 6):

- Citizens should have access to the transport at the base of the pyramid.
- The municipality provides suitable transport.
- The multiple forms of transport for target groups are in tune with each other.
- The system is affordable.
- The pressure on the environment is relieved.

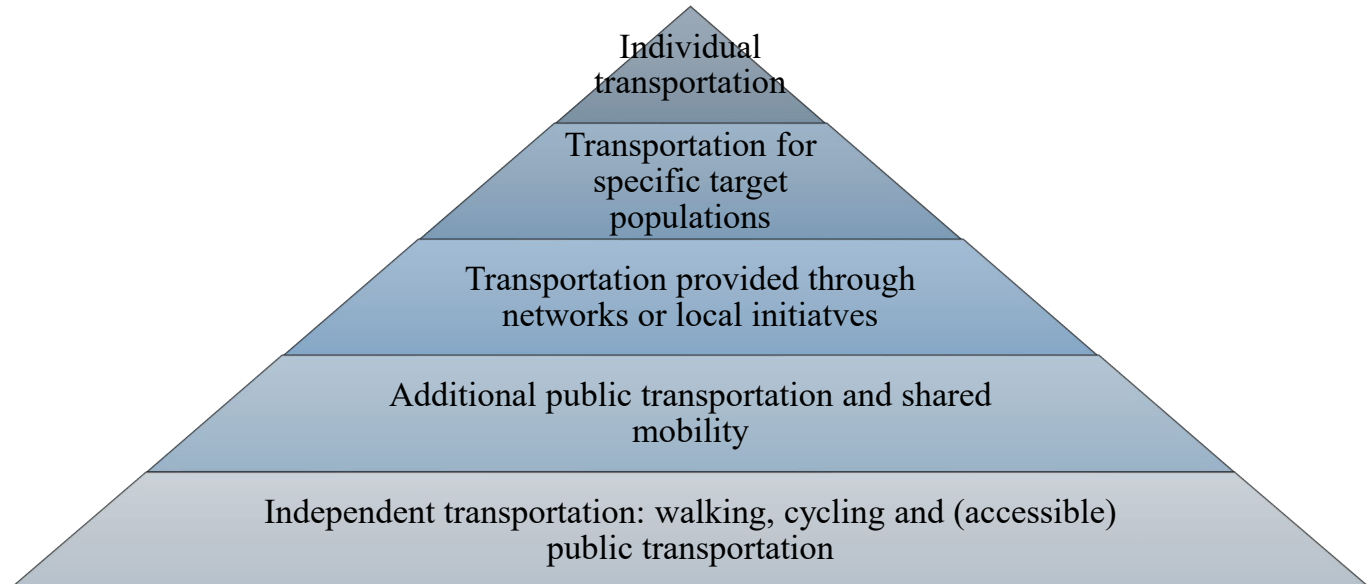


Figure 18 Hierarchy in transport modes (based on Gemeente Utrecht, 2021a, p.10)

Uitvoeringsprogramma vervoersongelijkheid (Implementation program Mobility inequality)

The implementation program Mobility Inequality is written by the municipality of Utrecht, specifically the mobility department. The central concept in the implementation program is: *“All citizens of Utrecht should have plenty of opportunities to move around, allowing them to participate in social life completely.”* (Gemeente Utrecht & Verlaan, 2023, p.5). The policy document is based on the document Vision Transport for Everyone.

The Implementation program is grounded in the traffic pyramid theory, and it introduces a new theory to analyse the transport modes, the 5 B theory (Gemeente Utrecht & Verlaan, 2023, p. 6). The 5 B’s are five risk factors for mobility limitations. These are (Gemeente Utrecht, 2023, p. 6; see Figure 5

- Beschikbaar – Accessible
- Bruikbaar – Usable
- Betaalbaar – Affordable
- Begrijpbaar – Comprehensible
- Beleving – Experience

The document analysed the individual transport modes. Afterwards, goals and an action list to improve each mode were formulated.

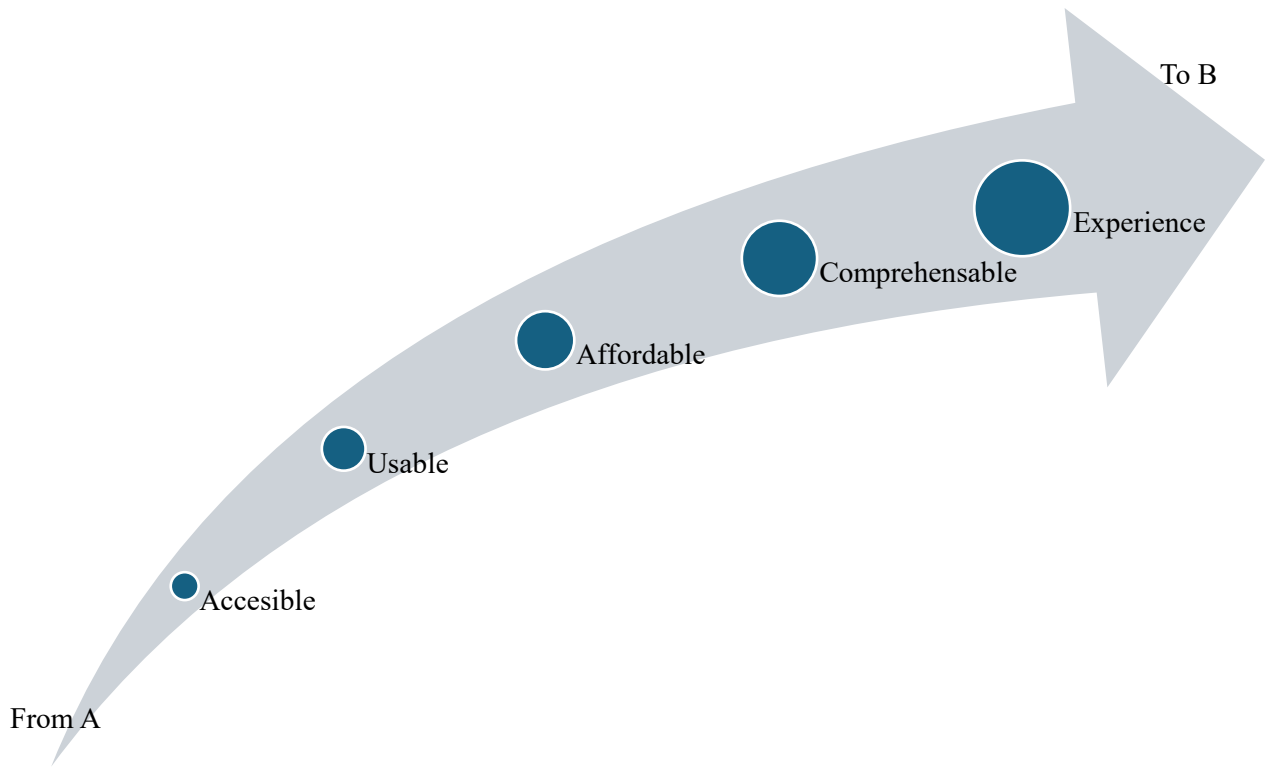


Figure 19 5 B's concept (source: Gemeente Utrecht & Verlaan, 2023, p. 6)

4.3.2 Mobility inequality in policies

The following table displays how each policy document scores per policy characteristic regarding mobility (in)equality. The characteristics are detailed in paragraph 2.3.1. Characteristics of policies addressing mobility inequality. Not all the documents mentioned in the content analysis have been selected. The selected documents are the following:

- The spatial strategy on mobility 2040
- Strategy on spatial planning 2040
- Monitoring document on the spatial strategy for mobility
- Vision on transportation for everyone
- Implementation program Mobility inequality

Table 7 results of policy analysis regarding mobility inequality.

Document/characteristic	Integration and consistency in policy	Products of communication	Strategies of safety	Strategies active transport	Strategies shared and public transport	(Social) Monitoring
The spatial strategy on mobility 2040	X	/	X	X	X	X
Strategy on spatial planning 2040 (RSU 2040)	X		/	X	X	X
Monitoring document on the spatial strategy for mobility			X	X	X	X
Vision on transportation for everyone	X			/	X	/
Implementation program Mobility inequality	X	/	X	X	X	X

The policy document Vision on transportation for everyone, which directly addresses mobility inequality, lacks most of the characteristics (Table 7). This is likely due to the novelty of mobility inequality in policy (Planbureau voor de leefomgeving et al., 2022). One of the policymakers in the municipality of Utrecht mentioned:

“(Yes,) mobility inequality is quite a new theme in our policy, or anyways it is a concept which we employed quite recently.” (Policymaker interview 4, Pos. 4).

Likewise, the topic of provincial policy is quite new. Another policymaker mentioned:

“Inclusivity is something that has been implemented recently in our policy documents. It is really something new.” (Policymaker interview 5, Pos. 28).

However, it should be noted that the Implementation program mobility inequality, which was based on the vision, does hit most of the characteristics. This shows an improvement in the policies written on this subject, as this document is newer than the Vision of transportation for everyone.

The characteristics that have been implemented in most policy documents are “integration and consistency in policy” and “strategies in public transportation” (Table 7). Regarding integration

and consistency in policy, all the documents clearly refer to either previous policy documents or documents of other governmental levels (see paragraph 3.3.1 Content analysis). For example, the RSU 2040 is an integrated policy document between the policy departments of the municipality of Utrecht. Additionally, the policy document contains a figure that visualises the connections between municipal, provincial and national policies (see Figure 3). Similarly, the Spatial strategy on mobility 2040 also references RSU 2040 and its connection to this policy document. Moreover, the spatial strategy also describes how the transport modes are connected (Gemeente Utrecht, 2021b, p. 14, p. 43 & p. 45).

In the case of strategies in public transportation, this characteristic is one of the focal points in the Spatial strategy on mobility in 2040 (Gemeente Utrecht, 2021b). The mobility strategy plan employed the hub and spoke system for the transport system (Gemeente Utrecht, 2021b, p. 38). Moreover, this transport mode has a section dedicated to mobility inequality, while none of the other modes has such a section in the mobility strategy (Gemeente Utrecht, 2021b, p. 92-94). The importance of public (and shared) transportation shows up throughout the other policy documents due to the interconnectivity between the documents.

The characteristic implemented in the least policy documents is “Products of communication”. This characteristic is completely missing from the Strategy on spatial planning, the Monitoring document on the mobility strategy, and the Vision on transportation for everyone. It was scarcely mentioned in the spatial strategy on mobility and the Implementation program mobility inequality. The scarce implementation might be due to the previously mentioned novelty of the subject in policy. The Implementation program mentions the intention of the municipality to join the provincial initiative “OV Voor Iedereen” (translation: Public transport for everyone) (Gemeente Utrecht & Verlaan, 2023, p.13). This initiative helps people to gain familiarity with the public transport system through public campaigns, websites, and folders. The Spatial strategy on mobility 2040 mentions that the municipality will inform the citizens about the possibility of participation regarding the infrastructure in their streets (Gemeente Utrecht, 2021b, p. 120). Although this is not directly linked to mobility inequality, participation can potentially decrease the experienced inequality.

Lastly, it is important to mention that the characteristic “(Social) Monitoring” has performed well. Nevertheless, most monitoring is based on quantitative data and trends rather than qualitative data (Gemeente Utrecht, 2021b, Gemeente Utrecht, 2021c). Citing a municipal policymaker:

“Looking at Monitoring, it is important to know what effect your actions have. This is such a complex subject [mobility inequality] that monitoring becomes increasingly difficult, in my opinion. The effect is often expressed in numbers; however, this is not always the best option as the topic is often subjective and is not easily quantitatively measured. Thus, you must reflect on the quantitative and qualitative, and we would like to include the target group.” (Policymaker interview 1, Pos. 37).

4.3.3 Cycling policies

The following table displays how each policy document scores per policy characteristic regarding cycling. The characteristics are described in detail in paragraph 2.3.2 Characteristics of policies addressing cycling. The selected documents for this analysis are the following:

- The spatial strategy on mobility 2040
- Strategy on spatial planning 2040

- Regional vision of cycling 2.0 U10
- Monitoring document on the spatial strategy for mobility
- Vision on transportation for everyone
- Implementation program Mobility inequality

Table 8 shows the results of policy analysis regarding cycling.

Document/characteristic	Infrastructure	Cycling programs	Regulations	Products of communication	Strategies of safety
The spatial strategy on mobility 2040	X	X	X	X	X
Strategy on spatial planning 2040 (RSU 2040)	X		X		/
Regional vision of cycling 2.0 U10	X	X	X	X	/
Monitoring document on the spatial strategy for mobility	X	/	/		
Vision on transportation for everyone	/	X	/		
Implementation program Mobility inequality	/	X	/		X

The policy documents Spatial strategy on mobility 2040 and the Regional vision on cycling 2.0 U10 directly address cycling, and they score well in the analysis. This means both documents have implemented the important characteristics of cycling policy.

The characteristics that have been implemented in most policy documents are “infrastructure”, “regulations”, and “cycling programs” (see Table 8). Infrastructure and infrastructural adaptations are often the key points in mobility strategies. The current infrastructural strategy is building quick cycling roads, improving cycling infrastructure around transport nodes, and providing a secondary intricate cycling network for “slow” cyclists (Gemeente Utrecht, 2021b, Gemeente Utrecht, 2021c). One of the policy makers does mention that the municipality might even overly focus on infrastructure, stating:

“It (policy) is often focused on that kind of infrastructure (e.g. quick cycling roads), we are part of the department of spatial planning, and the focus is thus on spatial designs and developments [...] We do it for the people. Thus, the social question is essential to ask [...], especially for people who can't reach their destinations. Therefore, I think we should provide more measures addressing this question, which are sometimes not easy to provide.” (Policymaker interview 1, Pos. 133).

The policymaker also mentioned that budgets for social projects are sometimes difficult to obtain compared to those for infrastructural projects (Policymaker interview 1, Pos. 131).

“Regulations” like infrastructure are one of the key points in mobility policies. An example of regulation is the zoning of transport modes in mobility strategy (Gemeente Utrecht, 2021b). The strategy defines three zones, A, B, and C; a particular mode is prioritised in each zone. For example, in zone A, the pedestrians have priority, and cyclists are either guests or lead around the centre (Gemeente Utrecht, 2021b, p. 38 and p. 76). Cars and logistical transport are not

allowed except for local traffic. In this zone, the public transport modes must adapt their speed to the speed of the pedestrians (Gemeente Utrecht, 2021b, p. 38).

The characteristic “Cycling programs” is like the other two characteristics integral to mobility policies. The characteristic was well implemented in most policy documents (see Table 8). One of the policymakers argued that most municipalities have some cycling lessons, and progressively more municipalities implement the bike deal (Policymaker interview 1). RSU 2040 is the only policy document that includes no cycling programs. Both the bicycle lessons and the bicycle deal are cycling programs. In this research, the OV-fiets (public transport bicycle) is also included in the cycling programs (Gemeente Utrecht, 2021a; Gemeente Utrecht, 2021b, Gemeente Utrecht, 2021c; Gemeente Utrecht et al., 2022; Gemeente Utrecht & Verlaan, 2023; Mobycon, 2018). The cycling lessons were included in all the documents, but the OV-fiets were only referenced in the mobility strategy and the regional vision on cycling. Lastly, the bicycle deal was mentioned in the Monitor document and the mobility inequality in the Implementation program.

The characteristics implemented in the least policy documents were “Products of communication” and “Strategies of safety.” The “Communication products” were solely referenced in the Mobility Strategy and the Regional Cycling Vision, while “Safety Strategies” were mentioned across various policy documents. However, due to the limited description, the implementation was deemed insufficient. The limited inclusion of these characteristics might be due to the popularity of cycling in the Netherlands. As mentioned by one policymaker (interview 1): “The Netherlands is a cycling country.” The high quality of the cycling infrastructure and its widespread use might reduce the need to include these subjects in depth. However, in the case of safety, more adaptations could be implemented as the number of traffic incidents involving cyclists is rising (SWOV, 2023). Additionally, the Spatial strategy on mobility and the Implementation program did mention a lack of bicycle parking places and the lack of regulation on bicycle parking are mentioned across various documents (Gemeente Utrecht, 2021b; Gemeente Utrecht & Verlaan, 2023; Mobycon, 2018).

4.4 Question 4 What role do cycling lessons play in mobility inequality issues?

As mentioned in the last section, the municipality does support several cycling programs. These programs or initiatives promote cycling and make it more accessible to low-income citizens, migrants, or children. One of the initiatives is the U-pas. This pass allows adult low-income citizens to buy a bicycle for €30, - including one year of maintenance (Policymaker interview 1; Policymaker interview 4; van der Steenhoven & Hulshof, 2022, p.4). This U-pas initiative is also financially supported by the province of Utrecht (Policymaker interview 5). Another initiative is BikeFlip, a grassroots initiative that collects and repairs bikes (van der Steenhoven & Hulshof, 2022, p.4). Lastly, the municipality supports cycling lessons (Gemeente Utrecht & Verlaan 2023). These cycling lessons are part of the school and neighbourhood approach (Policymaker interview 1; Policymaker interview 4). The municipality provides bicycle lessons for multiple citizen groups: adults, AZCs (centres of housing for refugees), children, and children with special needs (Policymaker interview 1). This thesis focuses on bicycle lessons for adults.

The cycling lessons for adults are coordinated by Sport Utrecht (Policymaker interview 1; Initiative coordinator interview 2). Formerly, multiple independent organisations and citizens started their cycling lessons for adults. This led to the loss of oversight over these cycling lessons, underlying competition and double subsidies. Thus, the municipality put out a tender in order to have one party coordinate the cycling lessons in the city. This tender was won by Sport Utrecht (Initiative coordinator interview 2). Sport Utrecht provides cycling lessons across 8 locations in Utrecht, including Parkwijk and Kanaleneiland. Sport Utrecht works closely with the municipality to monitor and improve cycling lessons (idem). The objective is to teach 160 citizens to cycle per school year (idem). The lessons are most popular in Kanaleneiland and Overvecht. The bicycle lessons cost €15 for 10 lessons across 10 weeks twice a year (Policymaker interview 1; Policymaker interview 4; Initiative coordinator interview 2). The lessons are taught by the Cycling masters (Fietsmeesters), who are volunteers; these volunteers receive an education before teaching others to cycle. The participants of the lessons are often Moroccan or Turkish immigrants, and far more women participate than men (Initiative Coordinator interview 2; Cycling Master interview 6; Cycling Master interview 7). Currently, there is a waiting list for joining the cycling lessons (Initiative coordinator interview 2; Citizen interview 8).

4.4.1 Motivations and effects of the cycling lessons

4.4.1.1 Motivations

Cycling has multiple advantages, such as increased accessibility to people and places. This accessibility and the ease of travelling were one of the core motivations to start cycling and join the cycling lessons for one of the women I interviewed:

“What was my motivation? [Yes,] transportation, travelling from A to B” (Citizen interview 8, pos. 16).

The bicycle also allows easy access to places where the car would be less convenient; for example, another citizen mentioned:

“In my experience, the care is (indeed) very annoying around the school. The supermarket and appointments like the dentist and the GP are near the school. Thus (for these appointments), I would rather cycle.” (Citizen interview 9, pos, 22).

Another reason why women want to cycle is their children. One of the interviewed citizens mentioned that she wanted to buy a cycle to cycle with her children (Citizen interview 10). Another citizen reported that she often cycles to school with her daughter and son in the summer (Citizen interview 9). Likewise, the initiative coordinator, cycling masters and the researcher mentioned that children are one of the main reasons women decide to learn how to cycle (Initiative Coordinator 2; Researcher interview 3; Cycling Master 6; Cycling Master 7). Other research also supported this result, such as the KiM (Kennisinstituut voor mobiliteitsbeleid et al., 2023)

Some women liked how the bicycle helped them carry heavy bags and luggage (Researcher interview 3; Citizen interview 8), which is incredibly convenient when doing the groceries (Initiative Coordinator interview 2; Cycling Master interview 7; Citizen interview 8). Lastly, bicycles are often cheaper than public transportation; thus, some women use them to reduce transportation costs (Researcher interview 3; Initiative Coordinator interview 2; Cycling Master interview 6; Cycling Master interview 7; Citizen interview 8).

4.4.1.2 Discouragements

However, some factors may discourage individuals from cycling and even cause them to quit cycling lessons. The first discouraging factor relates to learning the skills to cycle, as cycling can be pretty challenging to learn. As one citizen mentioned about their husband: “I can tell him to cycle, however, it is quite a big and difficult step for him as a grown-up. How can I do it? Does someone have to hold the bicycle to learn it?” (Citizen interview 8, Pos. 76). Additionally, the current skills taught in the cycling lessons might not be sufficient. As mentioned before, women like to use bicycles to cycle with their children and to transport heavy luggage. Carrying heavy things on the bike is currently not taught in cycling lessons, and thus, women will not learn this important skill (Researcher 3, pos. 31; Labyrinth et al., 2023).

Secondly, the weather can negatively impact participation (Cycling Master interview 6, pos. 14). Research by the Kennisinstituut voor mobiliteitsbeleid et al. (2023) found that immigrants are more easily discouraged from cycling when faced with bad weather. One of the citizens I interviewed mentioned that the weather and time are the most significant factors in deciding if she wants to cycle (Citizen interview 9, pos. 16).

The third factor is the absence of bonding activities, such as drinking tea, before or after the lessons. These bonding activities might increase the attractiveness of the lessons, decrease the number of no-shows and increase social and cultural connection. One of the Moroccan citizens who is very involved in her neighbourhood and has organised some bicycle lessons herself said the following:

“Right now, they (volunteers) enter the building, take their equipment and start cycling [...] What we did during GROZ is make it a social activity. Back then, we had coffee and tea and the whole story. Not only bicycle lessons but more... Yes, attractive, maybe more impactful, and more expanded.” (Citizen interview 8 Pos. 82).

The last factor is related to maintenance costs. Although bicycles are relatively cheap, the cost of keeping them in good condition is relatively high (Researcher interview 3, Kennisinstituut

voor mobiliteitsbeleid et al., 2023). Goetgeluk mentioned that maintenance does not only entail costs but also relates to providing bicycle repair shops at suitable locations (Researcher interview 3, pos. 82).

4.4.1.3 Effect of the cycling lessons

Research shows that women do, in fact, slowly incorporate cycling more often into their routine (Van Voornhoven, 2021; Labyrinth, 2023). This is because the participants intentionally chose to follow the lessons and are thus intrinsically motivated to keep cycling (Labyrinth, 2023). However, they do not necessarily change their travel pattern (Van Voornhoven, 2021). After the lessons, women also replaced public transport with bikes and tended to adopt a more positive attitude towards bicycles (Van Voornhoven, 2021).

4.4.2 Improvements

The cycling lessons appear to be quite effective in attracting and teaching immigrant women to cycle. There are waiting lists for the cycling lessons, and after the lessons, women seem to incorporate the bicycle into their daily lives. Nevertheless, some improvements can be made to increase the quality and effectiveness of these lessons. After the analysis, Three major improvement points were identified: communication, monitoring, and bonding activities in lessons. Additionally, three adaptation points could further improve the quality of the cycling lessons: additional skills to be taught, paid employees, and the coupling of projects.

The first point is communication. This relates to increasing public awareness of cycling lessons. Promoting the cycling lessons is not public as most communication about the cycling lessons runs through social brokers, community centres and health care professionals (Initiative coordinator interview 2). As one professional stated:

“The target groups are reached by employing their (social) network, which seems obvious. However, the community centres where we host the cycling lessons employ social brokers. These social brokers are in contact with the target groups. Furthermore, neighbourhood teams, physical therapists, and doctors refer the target groups to them.” (Initiative coordinator interview 2, pos. 29).

However, no advertisements or campaigns publicly promoted these cycling lessons. The lack of publicity was also mentioned in the thesis by van Voornhoven (conducted in Tilburg) (2021):

“During the interviews, the question was posed about how the respondents applied to the cycling lessons and why they wanted to cycle. The resulting answer was that most respondents did not actively look into cycling lessons. The most important reason is because they didn't know the lessons existed.” (Van Voornhoven, 2021, p. 29).

Likewise, in Utrecht, most citizens did not know about the existence of cycling lessons. One of the citizens said she only knew about it because she works as a caretaker, yet she did not see any posters near the school or grocery stores (Citizen interview 9). Nevertheless, the existence of the waiting list may lead one to argue that public advertisements and posters are unnecessary. That said, raising awareness allows people to be reached who otherwise would be more challenging to approach. Though, the advertisements and campaigns should be tailored to the target groups to be most effective. For example, there could be text in Arabic underneath the Dutch text or posters with women who wear a hijab. Additionally, showing how the bike can help with groceries or help accompany children to school might increase the interest in cycling.

The second point is monitoring. This is related to both the monitoring of attendance in the lessons and the monitoring of bicycle use after the lessons. Firstly, attendance monitoring is crucial as there are waiting lists. However, many participants did not show up for the lessons. One of the Bicycle masters mentioned:

“It differs per group (the number of participants). Right now, there are quite many participants, around 10, and a few have stopped after initially showing up [...] a friend of mine also teaches cycling in another neighbourhood and noticed the same thing [...] We have had a list of 20 potential participants, and only four showed up to the lesson. Therefore, the list that the Bicycle masters (organisation) develop is not always the actual attendance.” (Cycling Master interview 7, pos. 42).

Secondly, monitoring the cycling behaviour after participants successfully finish the cycling lessons is also important. There are multiple reasons why a follow-up after the cycling lessons is important. First, the old participants can give feedback about the lessons and how they might be improved. Secondly, collecting data about the locations they visit by bicycle and the issues they encounter might also aid research concerning the habits of immigrants. Last but not least, collecting extra data might improve the advertisements, allowing them to be more targeted.

The coordinator also mentioned that Sport Utrecht would be interested in this data but has some difficulty acquiring the information, mentioning:

“It is difficult to, for example, contact them three months after the lessons ended [old participants]. You want to know how much they cycle, where they cycle, and which distance. Are there some issues they encounter? We would like to know these things, but getting a clear view of them is difficult. Yes, and it might be a bit easier if someone who speaks the same language is part of the organization.” (Initiative coordinator interview 2, Pos. 38).

One of the bicycle masters mentioned that she thinks the target group uses WhatsApp more often and would not mind forwarding a survey to the participants. This might be more effective as the migrants know and build more of a bond with the Bicycle Masters as they teach the lessons.

The third point, bonding activities, relates to the barrier mentioned in the section discouragements. Implementing more bonding activities might increase attendance. The researcher mentioned:

“Sometimes you have to address it via a detour. [...] I was a trainer for 15 years for a Kampong women's team, and talking with each other was the most fun of the training. The same is true for men; however, it works slightly differently. The fact is, doing something fun with the group. For some people, it is talking because it's often with the group of women who would like to cycle that they have children and don't often come outside [alone]. Thus, you use the social aspects. [...] Time is our most valuable and limited thing. Therefore, if you can enjoy your time with others, you would like to go to the cycling lessons even if you cycle for half an hour or less. You won an hour; otherwise, you would lose some participants. This is all part of design thinking. What would make it enjoyable for people to participate [in the lessons]?” (Researcher interview 3, Pos. 95)

Lastly, allowing participants to learn valuable skills, such as carrying heavy luggage, could improve the quality of the cycling lessons (Researcher interview 3, Labyrinth et al., 2023; Kennisinstituut voor mobiliteitsbeleid et al., 2023). Secondly, the coupling of projects is beneficial (Van der Steenhoven & Hulshof, 2022, p. 13). The rapport by Van der Steenhoven and Hulshof (2022, p 13) states that the parts of the cycling system are all available, but the individual parts are not connected. They advise to connect and coordinate these parts together. Thus, connecting bicycle repair projects like BikeFlip, bicycle purchasing projects like the U-pas, and bicycle lessons could increase the overall effectiveness of all the projects. The provincial policymaker mentioned that the province is working on an integrated toolkit for the municipalities to address the (cycling) behaviour of different target groups (Policy maker interview 5, pos. 54). The aforementioned coupling could be a part of the toolkit. Though some people can learn how to cycle in 10 lessons, the teachers see that others cannot progress quickly. Research performed by Labyrinth shows the same results (Cycling Master interview 6; Labyrinth et al., 2023).

Chapter 5 Conclusions and Reflections

The following chapter seeks to answer the sub-questions and main questions based on the results found in the last chapter. Additionally, chapter five presents various recommendations for future research and policy based on the results. Lastly, the chapter reflects on the research process and experience.

5.1 Sub-questions

5.1.1 Sub-question 1: What is the cycling behaviour of Moroccan women in Utrecht.

As mentioned in Chapter 2.4, Behavioural Sciences, behaviour is influenced by self-efficacy, social norm, and attitude (Aarts et al., 2015). Self-efficacy was slightly explored in the interviews. The lack of skill or confidence in skills did stop some individuals from learning how to cycle or even prevent them from trying to learn. Additionally, excluding specific skills for cycling education might also decrease the effectiveness of the cycling lessons (Labyrinth et al., 2023). Thus, it can be concluded that self-efficacy does play a role in cycling. However, the impact of self-efficacy has not been determined within this study.

The survey pointed out that most Moroccans have quite a neutral opinion towards cycling (Mean score 2,9) (see Table 4). The neutral score of the social norm toward cycling in the Moroccan community in Utrecht is potentially influenced by both Moroccan and Dutch social norm towards cycling. In Morocco, cycling is unusual, especially for women (Pikala bikes, n.d.). Women in Morocco often walk or take public transit; when money allows, they prefer private transport such as taxis or their own cars (Saadoui, 2019; Chamseddine & Boubkr, 2021). Moreover, first-generation Moroccans often do not teach their children how to cycle, which also signals that cycling is not the norm in Moroccan culture (Kennisinstituut voor mobiliteitsbeleid et al., 2023).

Furthermore, both men and women in the Netherlands cycle often, showing how cycling is an appropriate behaviour (injunctive norm) (Mackie et al., 2015; Hewstone et al., 2015). Additionally, exposure to cycling behaviour might positively influence attitude, which will be discussed in the next paragraph. Thus, cycling is not viewed as “inappropriate” in the Moroccan Dutch community, and persons who cycle, as well as women, are less likely to get adverse reactions as the norms around cycling are not violated (Hewstone et al., 2015).

The personal opinion or attitude towards cycling is slightly more positive than the social norm (mean score 3,2) (Table 4). According to the researcher and initiative coordinator, the bicycle is often considered convenient, cheap, and easy. The survey also points this out (see Appendix 7). The positive personal view/attitude might be partly due to exposure to the Dutch cycling culture, as referred to in the last paragraph. The emotions and feelings towards cycling can be influenced by exposure (Hewstone et al., 2015, p. 175). Overall, the more an individual is exposed to a behaviour, the more positive the attitude becomes. The exposure to cycling by native Dutch citizens and the Dutch culture has made for a positive shift in attitude in the Moroccan population.

The survey pointed out that the following categories affect the frequency of cycling. First, the bicycle's high theft risk compared to other modes negatively influences the cycling frequency (See Table 5). By reducing the theft risks for bicycles, cycling frequency could thus be increased. The municipality is aware of problems with bicycle parking, including theft risk, as mentioned in paragraph 4.3.2, and already developed some strategies and plans on this topic

(Gemeente Utrecht, 2021c, Gemeente Utrecht & Verlaan, 2023). Secondly, the ranking of the car within the safest transport mode affects the cycling frequency. When individuals rank the car lower, they are more likely to cycle. However, neither the survey nor the interview definitively answers why this occurs.

Thirdly, age affects cycling. The survey points out that young adults 20-30 tend to stop cycling. The researcher mentioned that women might stop cycling because of the clothes they wear. After puberty, young women tend to wear longer clothing, and if they are housewives, there is potentially less need to travel long distances because of their household duties. The shorter trips, many work-related trips and trips close to home are characteristics of the mobility of care pattern (Saadoui, 2019). The mobility of care is potentially culturally motivated, as in Morocco, the women are often the primary caretakers of the children and the home (Saadoui, 2019; Chamseddine & Boubkr, 2021).

Fourthly, the regression found that more positive word associations make an individual more likely to cycle. The positive associations could be indicative of a positive attitude towards cycling. The fact that a more positive attitude leads to behaviour is directly supported by Ajzen's theory of planned behaviour (Aarts et al., 2015).

Lastly, there is a difference in cycling frequency between Parkwijk and Kanaleneiland. In Parkwijk, people tend to cycle more often. This is likely due to the high number of teens and adults surveyed in this neighbourhood.

The rank of the bicycle in the category favourite transport mode is affected by the availability of the bicycle. The bicycle's availability positively impacts its ranking in the category of favourite transport mode, as it allows for more opportunities to cycle. The increased exposure to the cycle and the increased potential for interaction positively influence the personal attitude towards the bicycle (Hewstone et al., 2015).

5.1.2 Sub-question 2: What are the mobility inequality issues faced by Moroccan women in Utrecht.

The Moroccan women who were interviewed did not struggle with mobility inequalities. However, they feel that first-generation immigrants might struggle more with this issue. This is in-line with previous literature. This literature mentions how the second-generation and later generations tend to have a travel pattern similar to the native population and a more positive attitude towards the bicycle (Kennisinstituut voor mobiliteitsbeleid et al., 2023). The first generation might experience some disadvantages due to not using or not being able to use the bicycle, as the bicycle increases the accessibility of various amenities (Planbureau voor de Leefomgeving et al., 2022).

Although the women do not mention any issue regarding mobility inequality, there are some concerns regarding this topic. First of all, the car-centric design of the city, such as moving jobs to the outer rings of the city and decreasing the effectivity of the transport system, might increase the mobility inequality among immigrants and lower-income groups (Planbureau voor de Leefomgeving et al., 2022). However, it should be noted that many Moroccan households have a car, as it is the favourite mode of many Moroccans, and they tend to have a higher car ownership rate than native Dutch (Kennisinstituut voor mobiliteitsbeleidsbeleid et al., 2023). Nevertheless, the increased necessity of the car, and thus the inability to choose another mode, is also a form of mobility inequality. Though the Dutch Moroccan population tends to have a

car, the first-generation female immigrants have a lower car-license ownership. Additionally, the sustainability incentives might make the car too expensive for lower-income groups, including (some) Moroccan immigrants (Benjamin, 2024; Hendriksma, 2024; Jongen et al., 2019). Bicycles can be a potential option for these groups (immigrants and women) if the car is inaccessible (Kennisinstituut voor mobiliteitsbeleid et al., 2023). Bicycles are often cheaper than public transportation and, in most cases, are socially accepted. There is a drawback, the monetary costs of the bike, and this issue is further highlighted in the following section.

It should be mentioned that the monetary costs of the bike are quite high. Yet, the bicycle does not seem to suffer from the other inequality points Anaya-boig (2021) mentioned, see paragraph 2.2.3. The municipality does support the maintenance costs through the U-pas, though this is for only one year (Kennisinstituut voor mobiliteitsbeleid et al., 2023; van der Steenhoven & Hulshof, 2022, p. 4). Some initiatives, like BikeFlip, are concerned with maintenance, which could be included in the current strategies addressing bicycle inequality. This inclusion would make the whole strategy more effective (van der Steenhoven & Hulshof, (2022). It should be mentioned that the Province of Utrecht is working on such a package for municipalities that includes providing bicycles, bicycle lessons, and maintenance.

All three women mention that some neighbourhood crossings are quite dangerous. This increases the safety risk for cyclists and pedestrians, especially children. A solution might be Design Thinking, as the focal point is the vision of the inhabitants of the neighbourhood for a design.

5.1.3 Sub-question 3: What are relevant local mobility policies addressing mobility inequality and cycling in Utrecht.

5.1.3.1 Mobility inequality

The thesis analyses six policies that might be relevant to addressing mobility inequality. The best-scoring policy is the *Implementation Program Mobility Inequality*. The **integration of policies** was well implemented in all analysed policies, including integration across levels, other departments and transport modes (Gemeente Utrecht, 2021c; Gemeente Utrecht, 2021b). Additionally, the **shared and public transportation strategies** are well executed in some of the policy documents, especially in the strategy on mobility 2040 (Gemeente Utrecht, 2021b). This cohesion reduces the chances of mismatches between policy documents and mismatches in operationalisation (Hidayati, 2020).

However, some issues exist with the characteristic **products of communication** and **(social) monitoring**. Looking at products of communication, the lack of implementation of this characteristic in most policy documents negatively affects the awareness of mobility inequalities and their effects on some individuals (Hidayati, 2020). This awareness is crucial as it can lead to socio-cultural innovation in society (Hidayati, 2020, p. 210). Additionally, due to the lack of communication, there are potentially some missed opportunities to promote safer routes and labelling/reserving spaces for those affected (e.g. women) (Pass, 2022; Anaya-Boig, 2021; Aarts et al., 2015).

Secondly, monitoring is implemented in all documents. However, most monitoring is technical rather than social, and quantitative data is collected over qualitative data. Qualitative data is needed for an in-depth review of the user's experience, and quantitative data is not as effective in this area (e.g. the interview vs the survey) (Hidayati, 2020; Ashenqeeti, 2014; Thiel, 2014). The policymaker has mentioned the difficulty of collecting this qualitative data. Nevertheless,

it would be beneficial to look into such instruments to improve current policies. Because by qualitatively (as well as quantitatively) measuring the effect of policies, the municipality might determine more quickly if the policy was effective for the target groups (Hidayati, 2020).

5.1.3.2 Cycling

The thesis considered seven policies that might be relevant to addressing cycling. The best scoring policies are *Spatial Strategy on Mobility 2040* and *Regional Vision of Cycling 2.0 U10*. In addition, most characteristics are well implemented. One of the most well-implemented characteristics is **infrastructure**, which is a primary focus of the *Spatial Strategy on Mobility 2040*. Infrastructure is a crucial part of cycling policies as a lack of it might prevent individuals from cycling, and poorly implemented infrastructure raises some safety concerns (Anaya-Boig, 2021; Adam et al., 2018). Though, the focus on infrastructure might be even slightly overboard, and more focus could be given to social programs and projects, mainly regarding budget.

The two characteristics that are least implemented are safety and communication strategies. The lack of these characteristics might be because these characteristics are already well founded in policy and practice as the Netherlands is a cycling country. Many citizens are Dutch and learn to cycle at a young age; thus, the need to promote and (re)frame cycling is less pressing (Anaya-Boig, 2021). Though, communication towards other groups who cycle less, such as Moroccans, could be improved as they might not have the same views on cycling (Anaya-Boig, 2021; Kennisinstituut voor mobiliteitsbeleid et al., 2023). There are also some safety concerns. SWOV has pointed out in their rapport how the number of traffic accidents with bicycles is increasing. This lack of action regarding safety could negatively impact cyclists' perceived and actual safety, and safety is one of the main concerns for cyclists (Adam et al., 2018).

5.1.4 Sub-question 4: What role do cycling lessons play in mobility inequality.

Cycling lessons are an effective instrument for reducing mobility inequality, and they attract participants (Van Voornhoven, 2021; Labyrinth, 2023). Additionally, the participants who successfully finished the course incorporated cycling into their daily life. Completing the course could have positively boosted their self-efficacy and confidence, which is why they continue to cycle (Bubou & Job, 2020; Hewstone et al., 2015). Additionally, the act of cycling, thus performing the behaviour, positively influences attitude, specifically related to the behavioural component of attitude (Heweston et al., 2015). Cycling, as mentioned in sub-question 2, reduces mobility inequality by providing more access to work, health care and other amenities.

However, there are some efficiency issues regarding these bicycle lessons;

- First, there is a lack of public awareness of the bicycle lessons, so it might be harder to reach certain individuals.
- Secondly, there is a lack of monitoring of attendance as well as a lack of evaluation after the lessons. The lack of oversight in attendance causes long waiting lists. Additionally, if the participants are surveyed after the lessons about their behaviour and the quality of the lessons, it could improve the lessons.
- Lastly, the lack of social bonding activities might reduce the attractiveness of the cycling lessons. If the lessons become more attractive, people might make more effort to show up, increasing attendance. This makes the lessons more impactful.

There were also some minor points mentioned by previous research:

- Adding lessons that teach skills such as cycling with heavy luggage and children (Labyrinth et al., 2023)

- Combining existing bicycle projects, such as the U-pas, BikeFlip and bicycle lessons, could increase the overall effectiveness of these projects (Van der Steenhoven & Hulshof, 2022, p.13)
- Adding lessons or separate lessons for simple bicycle maintenance (Researcher interview 3; Kennisinstituut voor mobiliteitsbeleid et al., 2023).
- Adding a theoretical part to the bicycle lessons, explaining traffic rules and the basic elements of the bike (Researcher interview 3; Labyrinth et al., 2023)
- Increasing the number of cycling lessons (Cycling Master interview 6; Labyrinth et al., 2023).

5.2 Main question: How can cycling contribute to diminishing mobility disadvantages faced by Moroccan women in the city of Utrecht, and what role can local mobility policies and cycling lessons play in this issue?

According to research and interviews, first-generation Moroccan citizens are most likely to be impacted by mobility inequality (Kennisinstituut voor mobiliteitsbeleid et al., 2023). Second and younger generations are less likely to encounter such problems. Additionally, first-generation immigrants might not actively encourage their children to cycle due to the lower cultural importance of the bike, and the children would learn it from their peers (exposure through living in the Netherlands) (Kennisinstituut voor mobiliteitsbeleid et al., 2023).

5.2.1 Cycling and mobility inequality

Cycling can reduce mobility inequality by allowing easier access to facilities such as health care, grocery stores, schools and work (Planbureau van de Leefomgeving et al., 2022). However, it should be noted that the maintenance costs are a financial barrier (Kennisinstituut voor mobiliteitsbeleid et al., 2023). When a bicycle breaks, it tends to be left behind rather than repaired. Other factors influencing cycling behaviour are theft risk, car safety compared to other modes, age, and neighbourhood. Additionally, the availability of bicycles increases the perception of bikes.

To conclude, cycling can also be affected by policies. Although the Dutch cycling policies tend to be well written, two characteristics could be improved. The **strategies of safety** and the **products of communication**. It might be that safety strategies are already well formulated in older policies due to the Netherlands being a cycling country. Nevertheless, the number of traffic accidents involving bicycles has increased. Thus, this safety might be an illusion. Regarding products of communication, communication about cycling could receive more inclusive advertisements, focussing on immigrant groups.

5.2.2 Policy and mobility inequality

Mobility inequality is a new field within policy; however, the Implementation Program for *Mobility Inequality* shows much potential. Two characteristics that could be improved upon in all documents are the **products of communication** and **social monitoring**. The products of communication could be used to raise awareness about mobility inequality issues experienced by certain groups and increase awareness of safe routes and labelling or reserving spots for those affected. Social monitoring could be used, together with technical monitoring, to measure citizens' experiences more accurately, and this could significantly improve policies.

5.2.3 Bicycle lessons and mobility inequality.

Cycling lessons might effectively reduce mobility inequality as they attract participants and those who successfully learned to cycle incorporate cycling into their lives. However, it should be mentioned that a lack of effective communication, promotion and monitoring limits these lessons' full potential. Additionally, adding social elements might increase the attractiveness and impact of the lessons.

5.3 Recommendations

The following section summarises the main recommendations in the thesis.

5.3.1 Cycling behaviour recommendations

One of the main factors impacting cycling frequency is the relatively high theft risk of the bicycle compared to the other modes. Bicycle usage could be increased by decreasing the theft risk, such as by more guarded cycling spaces or increasing places to fasten the bike. Increasing parking safety could be combined with the existing goal of increasing bicycle parking overall (Gemeente Utrecht, 2021b).

The document analysis pointed out how cycling is not promoted a lot. Although, for some citizens, such as Moroccan women between 20 – 30 years of age or first-generation immigrants, it might be interesting to reframe cycling. The municipality should create specific advertisements to entice this group.

Lastly, the content analysis and the interview point out that the bicycle infrastructure is one of the focus points in policy and gets a lot of funding. The quality of the infrastructure is crucial. Though, I would advise reserving more space for social programs and projects, as some people cannot cycle even when the infrastructure is in place (e.g., cycling is unattractive or people who feel unsafe or lack the skills). Another option could be simplifying the process to get funding for social programs or projects.

5.3.2 Mobility inequality policies recommendations

The content analysis shows a lack of communication about mobility inequality. Increasing public awareness of the issue is essential as it can lead to socio-cultural innovation (Hidayati, 2020, p. 210). Additionally, communicating about safe routes or reserving or labelling safe places for marginalised groups could make transportation more accessible.

Furthermore, the content analysis also shows a lack of social monitoring. This might be due to a lack of reliable measurement tools, instruments, or techniques for social monitoring. The policy could be greatly improved if such instruments are developed as the experience of citizens is difficult to quantify.

Lastly, the interviews mention that certain infrastructure was poorly developed (dangerous crossings in Parkwijk and Kanaleneiland). This can be prevented by designing infrastructure through a more participatory process, such as design thinking. However, it should be pointed out that the participatory process of the policy documents was not reviewed in this thesis. See section 2.6.1.1, characteristics of policies.

5.3.3 Mobility inequality cycling lessons recommendations

First of all, there is a lack of monitoring, which greatly impacts the effectiveness of the cycling lessons. Sport Utrecht should start monitoring attendance and try to monitor the results. Monitoring after the cycling lessons could be more difficult. They could ask the Bicycle Master who teaches the lessons to send some surveys through WhatsApp. A second method might be in-person surveys in the neighbourhood.

Secondly, a lack of publicity might prevent the cycling lessons from reaching certain individuals. This was also one of the issues in Tilburg (van Vroonhoven, 2021). Adding

advertisements around schools or grocery stores could significantly improve interest. They should ensure that these advertisements are attractive to the target groups; otherwise, the message might not be as impactful (Aarts et al., 2015).

Lastly, adding social bonding elements might greatly improve the attractiveness and impact of the cycling lessons, resulting in higher and more consistent participation.

I would also like to address some recommendations mentioned in previous research to be as complete as possible:

- Adding lessons that teach skills such as cycling with heavy luggage and children (Labyrinth et al., 2023)
- Combining existing bicycle projects, such as the U-pas, BikeFlip and bicycle lessons, could increase the overall effectiveness of these projects (Van der Steenhoven & Hulshof, 2022, p.13)
- Adding lessons or separate lessons for simple bicycle maintenance (Researcher interview 3; Kennisinstituut voor mobiliteitsbeleid et al., 2023).
- Adding a theoretical part to the bicycle lessons, explaining traffic rules and the basic elements of the bike (Researcher interview 10; Labyrinth et al., 2023)
- Increasing the number of lessons given (Cycling Master interview 6; Labyrinth et al., 2023).

5.4 Reflection

The following paragraphs reflect on the research process, the methods, strategies and the results. The following section will address the literature and framework, research philosophy, approach and strategy & and methods, results and conclusions in this exact order.

The literature and framework did have some difficulties. First, I had trouble coherently writing down my thoughts and literary findings. Additionally, the additions to the theoretical framework might not be different enough, as I added some specifications operationalisations and did not necessarily change the framework. I, however, liked the framework/ grading system I developed for grading mobility inequality and cycling policies. I think this might have some potential (especially for mobility inequality). Yet, this optimism might be because I developed it.

Further testing should point out the usefulness of this grading system for policy. Moreover, the excluded characteristics of 'Participatory practices' and 'Strategies addressing mobility inequalities and development in urban transport and planning' should also be tested. Participatory practices could need a particular method, as collecting data about these processes is hard to evaluate without being part of the process.

Likewise, the research philosophy and approach did encounter some issues. First of all, the interpretative philosophy and the case study have some generalisability issues (a.k.a. external validity). The thesis tried to counter this with the survey. However, due to the small sample size (40 respondents), the generalisability of the research could be called into question. Additionally, the survey's sample size and the uneven distribution of surveys between the neighbourhoods heavily affected the case study, making it more difficult to compare one neighbourhood to another. The case study was supposed to be a multiple homogenous case study (multiple cases with similar characteristics), creating generalisable data through replicability. However, this was not possible in the end, resulting in a single case study. If it were determined from the start that this study would be a single case study, I would have added Overvecht as a neighbourhood. Participants recommended this neighbourhood a few times to me, and it is similar to Kanaleneiland in terms of income and inhabitants.

There were some positive experiences with the survey. Firstly, the survey was in person. This was a good choice as many citizens were friendly and willing to take the survey. Secondly, the survey was pre-tested. This allowed some mistakes to be corrected before the real data was collected.

The interviews encountered just a few issues. Moreover, they were an excellent addition to the research, providing a lot of depth and generating plenty of data. I wish that I had been able to interview more citizens. However, I could not interview more than three people due to my shyness in approaching random persons on the street and difficulty reaching these citizen groups.

The data analysis encountered some issues. The thesis employed MAXQDA for the textual analysis and SPSS 26 for the statistical analysis. I did not have a lot of experience with SPSS 26 and did not have any experience with MAXQDA. Learning two new software programs was not easy and time-consuming. However, I think these two programs were the right choice as they specialised in their respective fields (MAXQDA, 2023; IBM, n.d.). Furthermore, both software programs have extensive tutorials on YouTube, so knowledge about these programs is available and accessible.

This paragraph contains two minor comments about the research methods. Firstly, I encountered some problems with the scoring within the survey. I haphazardly constructed the Likert scales, which led to me having to recode some of the answers as I reconstructed the system. Secondly, the research would initially feature a cognitive map. However, this method was cut due to lack of time and experience.

Lastly the formulation of the conclusions did not encounter any major issues. The sub-questions facilitated and contributed to the main research question. The results revealed some interesting things about the policies and the bicycle lessons that could improve policies and practices. However, I thought my statistical results were slightly unsatisfactory, as the sample sizes were too small. Additionally, some of the results confused me. For example, I would have expected both personal view and social norm to affect behaviour more, mainly because the *Theory of Planned Behaviour* states that social norm affects intention.

Additionally, the result that car safety does affect cycling frequency surprised me quite a bit. I think that future research should delve deeper into this. The data in this thesis does not explain why this happens. Correlated to the previous points, I would have liked to have a larger sample size to gather more generalisable data about my survey. Additionally, I would have liked to collect some additional data in my interviews to support and explain the surveys better. However, this was impossible due to time constraints and the lack of citizen interviews.

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Appendix

Appendix 1: Survey

Survey Mobility

Start of Block: Block 1 Personal information

Q1 Participant number

Q2 What is your gender

- Male (1)
 - Female (2)
 - Non-binary/third gender (3)
-

- 1 -

- I understand the collected data is anonymized and protected
- I understand that I can withdraw form the research at any point
- I consent to other researchers using my anonymized data for their research. The data is not retractable to you
- I consent to the data being stored for 1 year

Q3 What is your age group

- 15 - 20 (1)
- 20 - 30 (2)
- 30 - 40 (3)
- 40 - 50 (4)
- 60- 70 (5)
- 70+ (6)

End of Block: Block 1 Personal information

Start of Block: Block 2 Mobility inequality: access to transport modes

Q4 How often do you use the following transportation modes?

	Daily (5)	Several times per week (4)	Weekly (3)	Several times per month (2)	Monthly (1)	never (0)
Public transport (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Car (either as passenger or driver) (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Walking (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cycling (or electric bicycle) (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Motorised bicycles (Scooter etc.) (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- I understand the collected data is anonymized and protected
- I understand that I can withdraw form the research at any point
- I consent to other researchers using my anonymized data for their research. The data is not retractable to you
- I consent to the data being stored for 1 year

Q5 Which transport modes are available to you within a 15-minute walk?

- Train (1)
 - Car (2)
 - (Shared) Bicycle (3)
 - Bus (4)
 - Tram (5)
 - Metro (6)
 - (Shared) Scooter/ small motorised vehicles (7)
-

Q6 What is your preferred transport mode?

Please rank them from 1- 8, 1 being your favourite transport mode

- _____ Bus (1)
- _____ Car (Either as passenger or driver) (2)
- _____ Walking (3)
- _____ Cycling (or electric bicycle) (4)
- _____ Moterised bicycles (Scooter etc.) (5)
- _____ Tram (6)
- _____ Train (7)
- _____ Metro (8)

End of Block: Block 2 Mobility inequality: access to transport modes

Start of Block: Block 3 Mobility inequality: stereotypes of transport modes

Q7 Which words do you associate with "public transport"?

- Convenient (1)
 - Cheap (2)
 - Expensive (3)
 - Easy (4)
 - Difficult (5)
 - Rich (6)
 - Poor (7)
 - Fun (8)
 - Fast (9)
 - Slow (10)
 - Boring (11)
 - Safe (12)
 - Dangerous (13)
-

Q8 Which words do you associate with "car"?

Convenient (1)

Cheap (2)

Expensive (3)

Easy (4)

Difficult (5)

Rich (6)

Poor (7)

Fun (8)

Fast (9)

Slow (10)

Boring (11)

Safe (12)

Dangerous (13)



Q9 Which words do you associate with "bike"?

Convenient (1)

Cheap (2)

Expensive (3)

Easy (4)

Difficult (5)

Rich (6)

Poor (7)

Fun (8)

Fast (9)

Slow (10)

Boring (11)

Safe (12)

Dangerous (13)



Q10 Which words do you associate with "walking"?

Convenient (1)

Cheap (2)

Expensive (3)

Easy (4)

Difficult (5)

Rich (6)

Poor (7)

Fun (8)

Fast (9)

Slow (10)

Boring (11)

Safe (12)

Dangerous (13)

End of Block: Block 3 Mobility inequality: stereotypes of transport modes

Start of Block: Block 4 Review of the generalised costs of transport modes

Q11 What are the advantages and disadvantages of the bicycle compared to the other modes according to you?

	Disadvantageous (1)	Slightly Disadvantageous (2)	Neutral (3)	Slightly advantageous (4)	Advantageous (5)
Monetary costs (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Travel time (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comfort during traveling (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Traffic safety (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personal safety (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Risk of theft (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Block 4 Review of the generalised costs of transport modes

Start of Block: Block 5 Mobility inequality: Safety

Q12 In which transport mode do you feel the safest and most comfortable while travelling through your neighbourhood?

Please rank them from 1- 7, 1 being the safest transport mode.

- Car (1)
 - Bike (2)
 - Walking (3)
 - Bus (4)
 - Tram (5)
 - Metro (6)
 - Train (7)
-

Q13 Do you feel unsafe while travelling within your neighbourhood in the dark?

- No (1)
- Sometimes (2)
- Yes (3)

End of Block: Block 5 Mobility inequality: Safety

Start of Block: Block 6 Mobility inequality: Infrastructure

Q14 How do you rate the quality of your neighbourhood's infrastructural categories?

	Extremely bad (1)	Somewhat bad (2)	Neither good nor bad (3)	Somewhat good (4)	Extremely good (5)	Not applicable (0)
Sidewalks (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bicycle lanes (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bicycle parking (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Roads (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Car parking (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bus stops (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Crossings (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Q15 What are the main problems with the bicycle lanes in your neighbourhood

- Insufficient amount (1)
 - Broader (2)
 - Insufficient maintenance (3)
 - Insufficient lights (4)
 - Unsafe (5)
 - No physical barrier between modes (6)
 - None (7)
 - Other (8) _____
-

Q16 What are the main problems with the bicycle parking/storage in your neighbourhood

- Insufficient amount (1)
 - Broader (2)
 - Insufficient maintenance (3)
 - Insufficient lights (4)
 - Unsafe (5)
 - None (6)
 - Other (7) _____
-

Q17 What are the main problems with the crossings in your neighbourhood

- There are no traffic lights (1)
- People ignore the signs/rules (2)
- No barriers between transport modes (3)
- Insufficient lights (4)
- None (5)
- Other (6) _____

End of Block: Block 6 Mobility inequality: Infrastructure

Start of Block: Block 7 Cycling

Q18 Do you own a bicycle?

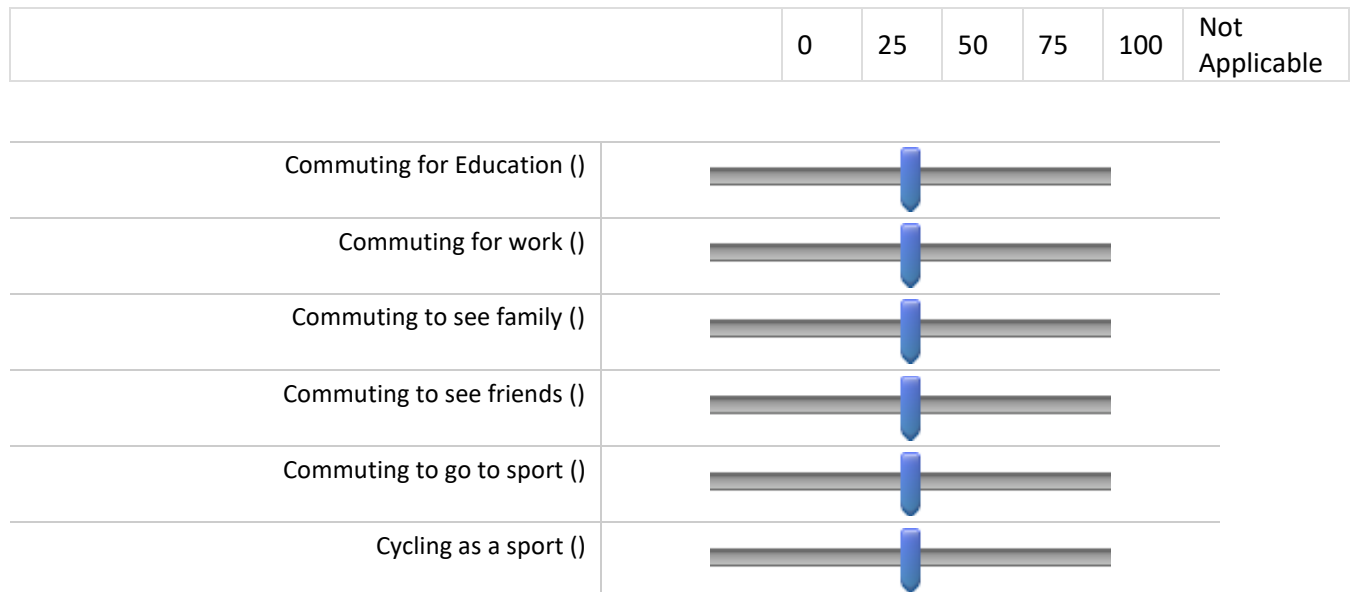
- Yes, non-electric (1)
 - Yes, an electric bicycle (2)
 - No (3)
 - No, but planning to buy one (4)
 - No, but I use shared bicycle transport (ov/swapfiets) (5)
-

Q19 Do your children own a bike?

- Yes (1)
 - Yes, and electrical bike (2)
 - No (3)
 - No, but planning to buy one (4)
 - No, but they use shared bicycle transport (ov/swapfiets) (5)
 - Not applicable (6)
 - Other (7) _____
-

Q20 Within a week, what percentage of the time do you use the bicycle for the following categories?

Not Applicable



Q21 Do you think the current cycling experience could be improved by adapting the following infrastructural elements?

	Definitely no (5)	Probably no (4)	May or may not (3)	Probably yes (2)	Definitely yes (1)
Bicycle parking (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bicycle infrastructure (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Travel time (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Traffic safety (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personal safety at night (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personal safety in some neighbourhoods (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q22 What could the municipality of Utrecht do to improve your cycling experience

- Advertise cycling (1)
- Subsidies for bikes and electric bikes (2)
- Actively invest in cycling education (3)
- Increase safety (4)
- Invest in cycling infrastructure (5)
- Other (6) _____

End of Block: Block 7 Cycling

Start of Block: Block 8 Social norm

Q23 Whose opinion is more valuable when making important decisions?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	
Family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Friends

Q24 How standard is cycling among your friends/family who live in Utrecht?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	
Not common (less than 2 times a week)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very common (every day)

Q25 Do your friends/family living in Utrecht think positively or negatively about cycling

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	
Negatively	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Positively

Q26 Do your friends/family living in Utrecht usually use the bike for short distances, or do they use the car

	5 (5)	4 (4)	3 (3)	2 (2)	1 (1)	
Bike	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Car

Q27 Do your friends/family living in Utrecht commonly encourage you to cycle?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	
Uncommon	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Common

End of Block: Block 8 Social norm

Start of Block: Block 9 Personal opinion

Q28 I think cycling is a convenient mode to travel with

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	
Very inconvenient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very convenient

Q29 I think more people in my community should cycle

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	
Completely disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Completely agree

Q30 I think more people in my community encourage me to cycle

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	
Completely disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Completely agree

End of Block: Block 9 Personal opinion

Appendix 2: Interview guide policymakers

Introductie

Ik ben een student van de Radboud en doe de Master Urban and Regional Mobility. Op dit moment ben ik bezig aan mijn eindproefschrift/thesis. Het onderwerp van mijn thesis is het fietsgedrag van Marokkaanse vrouwen, specifiek hoe fietsen bij kan dragen aan eventuele verkeersarmoede die deze bevolkingsgroep kan ondervinden. Verder ben ik ook geïnteresseerd in hoe de gemeente en fietsinitiatieven een rol kan spelen in het fietsgedrag.

Het interview is geheel anoniem, maar het wordt wel opgenomen. Dit is nodig voor het onderzoek. De opname wordt namelijk getranscribeerd. Na dat de transcriptie gemaakt is, zal de opname verwijderd noemen.

Duur: 45 minuten tot 1 uur

Vragen

Vraag 1:

Wat is uw functie?

Vraag 2:

Op welke manier houdt u zich bezig met Mobiliteitsongelijkheid en mobiliteit rondom immigranten?

Beleid

In het Mobiliteitsplan is er aangegeven dat de gemeente de prioriteit geeft aan gezond en ruimte-efficiënt vervoer. De gemeente wil dit berekenen door vijf samen hangende stappen.

1. Slim bestemmen
2. Anders reizen
3. Netwerken op orde
4. Slim parkeren
5. Slim sturen

Verder neemt heeft de fiets ook een grote rol in binnen het provinciaal beleid. In het Programma fiets 2019-2023 wordt beschreven hoe de provincie de fiets plaats wilt geven binnen de provincie.

Provinciaal beleid is gefocust op het verbinden van de verschillende woonkernen d.m.v. snelfietspaden.

Anaya-Boig (2021) en Adam et al. (2018), definieerde de volgende onderwerpen voor dat goed (mobiliteit)beleid moet behandelen:

- Infrastructuur en infrastructurale aanpassingen
- Fietsprogramma's
- Regels en richtlijnen
- Producten voor communicatie

De doelen van goed mobiliteitsbeleid zijn:

- Het verzorgen van goede infrastructuur
- Het zorgen voor veiligheid
- Het verzorgen voor participatieruimte

Verder moeten goed beleid rechtvaardig zijn.

In het IenW heeft in het rapport *Rechtvaardig mobiliteitsbeleid* drie verschillende definities van gelijkheid omschreven.

- Utilitarisme, het grootst mogelijk algemene nut van alle mensen samen.
- Egalitarisme, verminderen kansenongelijkheid
- Sufficiëntarisme, minimum-standaarden voor iedereen

Daarnaast zijn de volgende opmerkingen gemaakt in het rapport.

- Als we het over mobiliteitsbeleid hebben, is een kerndoel van brede welvaart niet zozeer het verkorten van de reistijd, maar het vergroten van de bereikbaarheid van activiteiten (Huibregtse e.a., 2021; Snellen e.a., 2021).
- Daarnaast moet rechtvaardigheid als punt meegenomen in de evaluatie van het beleid naast effectiviteit en efficiency.

Er zijn ook vier problemen geïdentificeerd die een beleidsmedewerker tegen kunnen komen bij het ontwikkelen van (nieuw) mobiliteitsbeleid:

1. Fiets context, de fysieke context rond het fietsen zoals heuvels.
2. Afstemming tussen beleid en wetten
3. Het balanceren van het stimuleren van de fiets en het ontmoedigen van auto gebruik
4. Het verwerven van sociale en financiële middelen.

De volgende vragen zullen gaan over het mobiliteitsbeleid, rechtmatigheid en de barrières van het beleid.

Vraag 3:

Heeft u ervaring met mobiliteitsongelijkheid?

Vraag 4:

Anaya-Boig (2021) en Adam et al. (2018) hebben verschillende kenmerken van (goed) mobiliteitsbeleid beschreven. Een van deze kenmerken is het op zetten en ondersteunen van zo genoemde fietsprogramma's (cycling programs).

Welke fiets programma's verzorgd te gemeente? Zijn er nog ideeën die op tafelliggen maar nog niet uitgevoerd zijn?

Vraag 5:

Het 10 minuten concept zorgt voor een zekere gelijkheid in bereikbaarheid, het IenW heeft het volgende gelijkheidsprincipe aan dit concept gekoppeld:

- Sufficiëntarisme, verschillende voorzieningen zijn op minimaal 10 minuten afstand.

Wat was de overweging achter het 10 minuten concept?

Zijn alle voorzieningen in het 10 minuten concept gelijkwaardig?

- Het PBL gebruikt het 15/30/45/60 minuten concept waarbij er een onder en boven grens gedefinieerd wordt.

Vraag 6:

In het Mobiliteitsplan wordt er veel aandacht gegeven aan de elektrische fiets. Dit is een nieuwe ontwikkeling met veel potentie, hierdoor kunnen er langer afstanden afgelegd worden met de fietsen en kortere afstanden sneller bereikt worden. Echter wordt er in het mobiliteitsplan weinig gerefereerd naar Nederlanders met een immigratie achtergrond. Deze bevolkingsgroep heeft wellicht meer ondersteuning nodig, zoals aanvullende fietslessen of aanvullende voorzieningen.

Op welke manier zijn de Nederlanders met een immigratie achtergrond meegenomen? Zijn ze bijvoorbeeld meegenomen in het algemene idee van gelijkheid?

Vraag 7:

Hoe zou de gemeente een rol kunnen spelen in de ongelijkheid die vrouwen met een immigratie achtergrond ervaren?

Vraag 8:

Welke barrières bent u tegen te komen tijdens het formuleren van dit beleid.

Er zijn vier problemen geïdentificeerd die een beleidsmedewerker tegen kunnen komen bij het ontwikkelen van (nieuw) mobiliteitsbeleid:

1. Fiets context, de fysieke context rond het fietsen zoals heuvels.
2. Afstemming tussen beleid en wetten
3. Het balanceren van het stimuleren van de fiets en het ontmoedigen van auto gebruik
4. Het verwerven van sociale en financiële middelen.

The ladder of government participation:

- 5 Reguleren
- 4 Netwerk sturen

- 3 Stimuleren
- 2 Faciliteren
- 1 Loslaten

Vraag 9:

Welke rol neemt de gemeente aan tegenover de fiets initiatieven?

Vraag 10:

Welke rol neemt de gemeente aan tegenover de bewoners (van parkwijk en Kanaaleiland)?

Appendix 3: Interview guide citizens

Introductie:

Ik ben een student van de Radboud en doe de Master Urban and Regional Mobility. Op dit moment ben ik bezig aan mijn eindproefschrift/thesis. Het onderwerp van mijn thesis is het fietsgedrag van Marokkaanse vrouwen, specifiek hoe fietsen bij kan dragen aan eventuele verkeersarmoede die deze bevolkingsgroep kan ondervinden. Verder ben ik ook geïnteresseerd in hoe de gemeente en fietsinitiatieven een rol kan spelen in het fietsgedrag.

Het interview is geheel anoniem, maar het wordt wel opgenomen. Dit is nodig voor het onderzoek. De opname wordt namelijk getranscribeerd. Na dat de transcriptie gemaakt is, zal de opname verwijderd noemen.

Het interview duurt 45 minuten tot 1 uur

Vragen:

Vraag 1:

Kan u uzelf kort introduceren?

Vraag 2:

Wat is uw favoriete vervoersmiddel en waarom?

Vraag 3:

Bent u in bezit van een fiets?

- a. Waarom heeft u besloten om er wel/niet eentje te kopen?

Vraag 4:

Welke overwegingen maakt u wanneer u gaat fietsen?

Als ze een fiets heeft aangeschaft:

Vraag 5:

Voor welke voorziening gebruikt u de fiets?

Vraag 6:

Voelt u zich veilig tijdens het fietsen in de wijk/buurt? Waarom wel/niet?

Vraag 10:

Heeft u gehoord van het initiatief dat fietslessen verzorgt voor volwassenen?

Vraag:

Hoeveel fiets je?

(Makkelijke taal of voorbeelden)

Als ze geen fiets heeft

Vraag 5:

Als u een fiets zou hebben, voor welke voorzieningen zou u de fietsen gebruiken?

Vraag 6:

Ik heb een korte survey gehouden in Kanaaleiland en Parkwijk onder Marokkaanse bevolking over de mobiliteitsvoorkeuren. Uit deze survey is de volgende top drie gerold: 1) Auto 2) Bus 3) Lopen/Fietsen.

Wat is voor u het voor en – nadeel van de auto en de bus vergeleken met de fiets?

Vraag 7:

Heeft u gehoord van het initiatief dat fietslessen verzorgt voor volwassenen?

Gezamenlijke vragen:

Vraag 8:

Tijdens het opstellen van het mobiliteitsplan van de gemeente heeft de gemeente ook de input gevraagd van verschillende bewoners in de gemeente over wenselijke verkeersnetwerken en bijbehorende maatregelen.

- a. Bent u gevraagd door de gemeente om uw mening te geven?
- b. Zou u uitgenodigd willen worden als de gemeente nogmaals een bijeenkomst zou houden om onderwerpen rond verkeer en transport te bespreken?
- c. Vind u dat de gemeente de Marokkaanse bevolking genoeg betreft?

Vraag 9:

Ik heb een korte survey gehouden in Kanaaleiland en Parkwijk onder Marokkaanse bevolking over de mobiliteitsvoorkeuren. Een van de onderdelen van de survey was benieuwd naar welke houding de Marokkaanse bevolking in Utrecht (Parkwijk/Kanaaleiland) heeft naar het fietsen.

Uit de survey blijkt dat de Marokkaanse bevolking is positief over fietsen. Sluit dit aan bij wat u vindt? En sluit het aan bij wat u ziet in uw omgeving?

Vraag 10:

Uit dezelfde survey blijkt dat Marokkanen in Utrecht vinden dat andere mensen in hun omgeving meer moeten fietsen. Bent u het hiermee eens? Waarom wel/niet?

Appendix 4: Interview Guide Initiatives

Introductie

Ik ben een student van de Radboud en doe de Master Urban and Regional Mobility. Op dit moment ben ik bezig aan mijn eindproefschrift/thesis. Het onderwerp van mijn thesis is het fietsgedrag van Marokkaanse vrouwen, specifiek hoe fietsen bij kan dragen aan eventuele verkeersarmoede die deze bevolkingsgroep kan ondervinden. Verder ben ik ook geïnteresseerd in hoe de gemeente en fietsinitiatieven een rol kan spelen in het fietsgedrag.

Het interview is geheel anoniem, maar het wordt wel opgenomen. Dit is nodig voor het onderzoek. De opname wordt namelijk getranscribeerd. Na dat de transcriptie gemaakt is, zal de opname verwijderd worden.

Duur: 45 minuten tot 1 uur

Vragen

Vraag 1:

Zou u een korte toelichting kunnen geven van het initiatief waar u voor werkt en wat het hoofddoel van het initiatief?

Normen en waarden van het initiatief (organisational capacity) hoe verhoudt deze normen en waarden zich met de community.

Vraag 2:

Wat is uw rol binnen dit initiatief, en wat was u motivatie om te werken voor het initiatief?

Personal capacity

Vraag 3:

Hoe vindt u aansluiting met de deelnemers aan van het initiatief?

(Cultural capacity, hoe wordt het fietsen relevant gemaakt voor de community)

Rol van de overheid gemeente Utrecht

Volgens de literatuur (Anaya-Boig, 2021; Adam et al., 2018) ondersteund goed fiets beleid educatieprogramma's, trainingen en fietsprogramma's. De volgende vragen zullen gaan over welke rol de overheid speelt en kan binnen uw initiatief.

Vraag 4:

Werkt uw initiatief samen met de gemeente (Utrecht)? Waarom wel of waarom niet?

4.1 Bent u benaderd door de gemeente of heeft u te gemeente benaderd? Wat was het proces?

Er zijn verschillende rollen die de gemeente kan vervullen deze zijn beschreven in Mees et al (2019). Ze hebben de ladder of Government Participation ontwikkeld, deze ladder beschrijft welke rollen er zijn en welke taken de gemeente vervolgens vervuld per taak.

De rollen:

Regulating: de overheid heeft reguleert de interventies in de ruimte, ze nemen de beslissingen en coördineren de interventies.

Network steering: de overheid co-initieert de interventie en coördineert het beslissingsproces. Verder stellen brengen ze verschillende relevante partijen met elkaar in contact.

Stimulating: de overheid werkt meer op de achtergrond, ze stimuleren het vormen van initiatieven. De initiatieven coördineren zichzelf en beslissen wat er moet gebeuren.

Facilitating/enabling: het initiatief zet zichzelf op en de overheid heeft een beperkte rol in het ondersteunen. De initiatieven zijn onafhankelijk van de overheid.

Letting go: het initiatief zet zichzelf op en onderhouden zichzelf zonder dat de gemeente een rol speelt.

Vraag 5:

Welke rol neemt de gemeente (Utrecht) in binnen uw initiatief?

Vraag 6:

Welke rol zou u willen dat de gemeente (Utrecht) inneemt?*

*Welke vormen van support zou u graag willen ontvangen van de gemeente?

Deelnemers van de fietslessen

Vraag 7:

Welke nationaliteiten zijn maken er gebruik van uw fietslessen? (geef eventueel top 3)

Vraag 8:

Wat is de motivatie van de deelnemers om mee te doen aan de fietslessen?

Vraag 9:

Heeft u over de laatste een stijging in het aantal deelnemers gezien of blijft het aantal constant? (of neemt het zelfs af)

9.1 Heeft u ook in zicht op de trend betreft Marokkaanse vrouwen?

Appendix 5: Interview guide Researcher

Introductie

Ik ben een student van de Radboud en doe de Master Urban and Regional Mobility. Op dit moment ben ik bezig aan mijn eindproefschrift/thesis. Het onderwerp van mijn thesis is het fietsgedrag van Marokkaanse vrouwen, specifiek hoe fietsen bij kan dragen aan eventuele verkeersarmoede die deze bevolkingsgroep kan ondervinden. Verder ben ik ook geïnteresseerd in hoe de gemeente en fietsinitiatieven een rol kan spelen in het fietsgedrag.

Het interview is geheel anoniem, maar het wordt wel opgenomen. Dit is nodig voor het onderzoek. De opname wordt namelijk getranscribeerd. Na dat de transcriptie gemaakt is, zal de opname verwijderd worden.

Duur: 45 minuten tot 1 uur

Vragen

Vraag 1:

Kan u zichzelf voorstellen?

Vraag 2:

Wat is uw expertise?

Vraag 3:

Op welke manier houdt u zich bezig met Mobiliteitsongelijkheid en mobiliteit rondom immigranten?

Fietsgedrag en mobiliteitskeuzes immigranten

De volgende vragen gaan over de mobiliteitskeuzes van de Marokkaanse populatie. Hierbij is er extra aandacht voor de vrouwen en het fietsen.

Vraag 4a: Wat is het meest gekozen vervoersmiddel onder de Marokkaanse populatie, en waarom?

Persoonlijke motivatie en culturele kaders, focus op fietsen

b: Wat is het minst gekozen vervoersmiddel onder de Marokkaanse populatie, en waarom?

Persoonlijke motivatie en culturele kaders, focus op fietsen

c: Wat is de motivatie van Marokkaanse vrouwen om te fietsen?

Vraag 5: Hoe beïnvloeden de volgende kenmerken het fietsgedrag van Marokkaanse vrouwen?

- a. Culturele achtergrond
- b. Geslacht
- c. Leeftijd
- d. Inkomen

Vraag 6: Welke fysieke en sociale obstakels ondervinden Marokkaanse vrouwen tijdens het reizen (met de fiets)?

(Cultureel, infrastructuur, geslacht gerelateerd (intimidatie, culturele rollen))

Vraag 7: Welke voordelen heeft fietsen voor deze bevolkingsgroep? (naast gezondheid)

Beleid

De volgende vragen gaan over de rol van de gemeente en het beleid dat ze maken in het (promoten van) fietsgedrag van de Marokkaanse (vrouwelijke) populatie.

Anaya-Boig (2021) en Adam et al. (2018), definieerde de volgende onderwerpen voor dat goed (mobiliteit)beleid moet behandelen:

- Infrastructuur en infrastructurale aanpassingen
- Fietsprogramma's
- Regels en richtlijnen
- Producten voor communicatie

De doelen van goed mobiliteitsbeleid zijn:

- Het verzorgen van goede infrastructuur
- Het zorgen voor veiligheid
- Het verzorgen voor participatieruimte

Verder moeten goed beleid rechtvaardig zijn.

Vraag 8:

Kijkend naar de theorie van Anaya-Boig (2021) welke elementen in het mobiliteitsbeleid zouden wat verder ontwikkeld kunnen worden?

Vraag 9:

In mobiliteit en bereikbaarheid spelen *capability constrained*, *coupling constrained* en *authority constrained* een belangrijke rol, wat houden deze concepten in uw eigen woorden? En hoe kan de gemeente op deze beperkingen in spelen

Initiatieven

De volgende vragen gaan over de rol die initiatieven kunnen in nemen om het fietsen te promoten. Er zijn al initiatieven in Utrecht die het fietsen ondersteunen zoals fietslessen in elke wijk en de fietsdeal, in met deze deal kunnen de bewoners in bezit van een U-pas een fiets kunnen kopen voor 30€ en een jaar onderhoud.

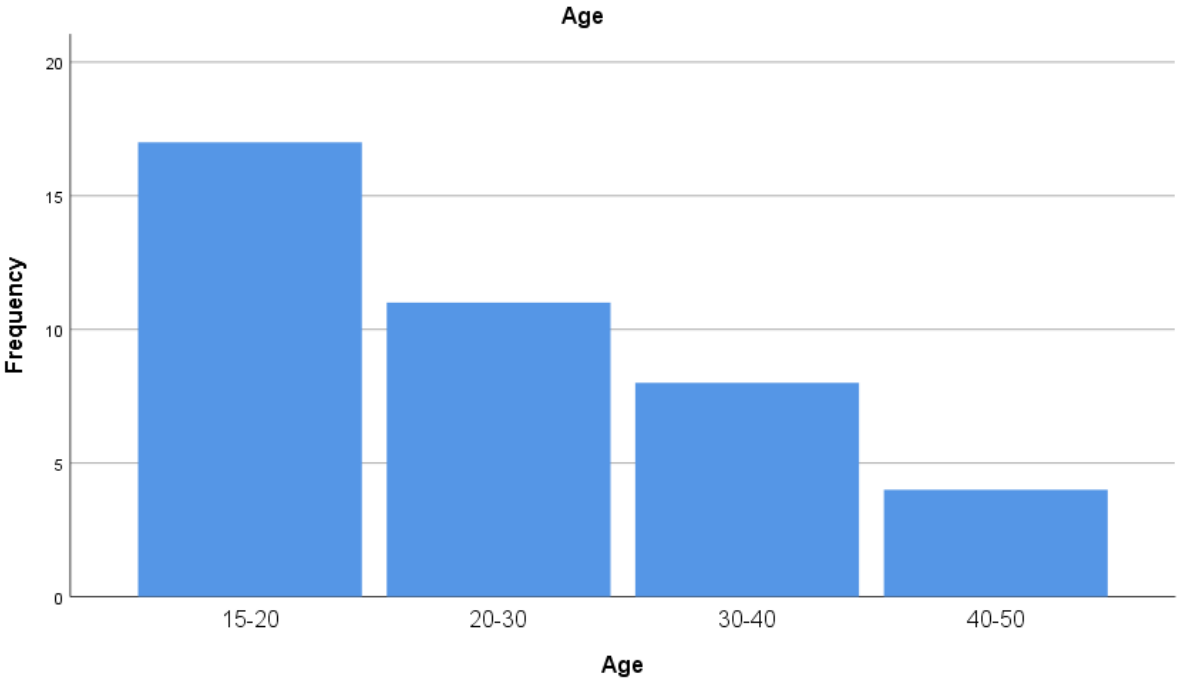
Vraag 10: Welke elementen zijn essentieel bij de fietslessen en de fietsdeal om deze zo effectief mogelijk te maken?

Vraag 11:

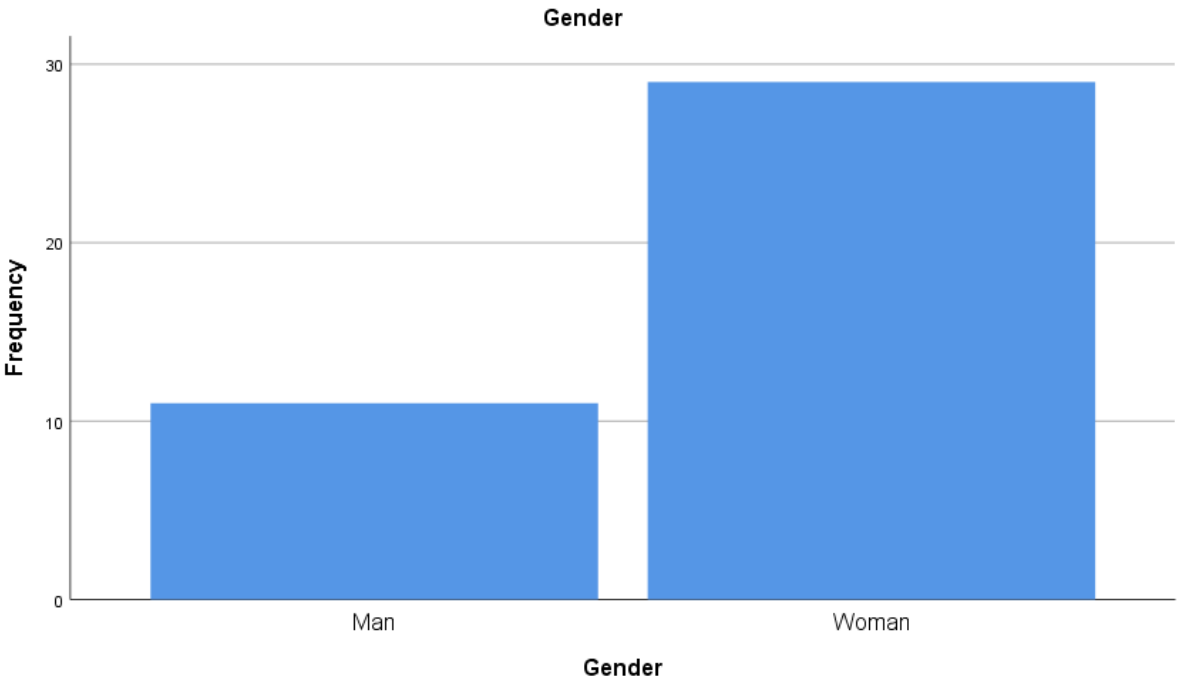
Welke andere initiatieven zouden een goede aanvulling zijn aan het huidige aanbod?

Appendix 6: Single statistics

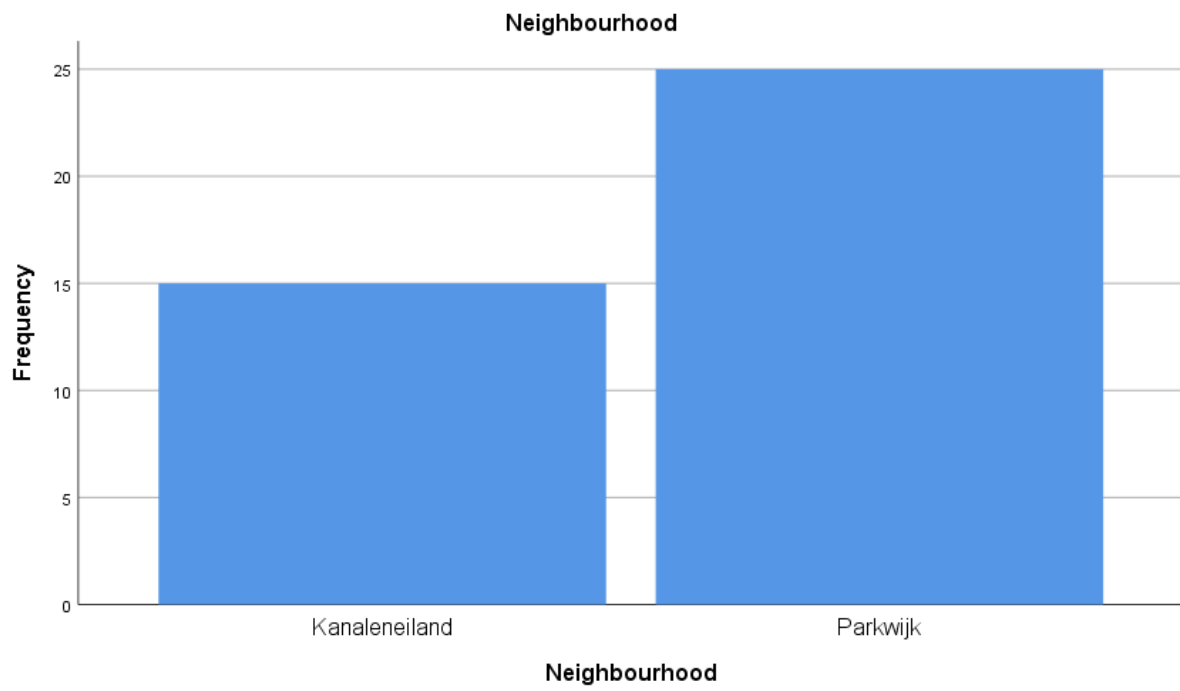
Age



Gender

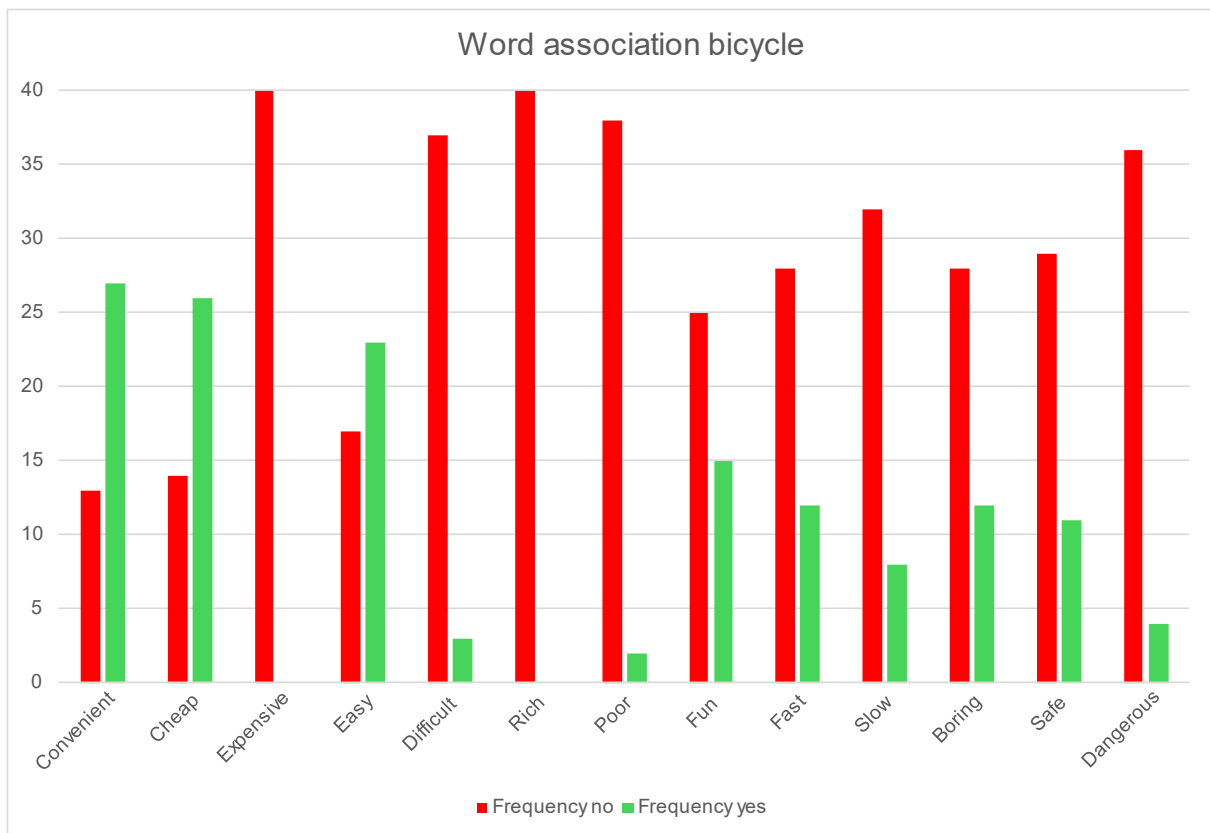


Neighbourhood



Appendix 7: Word associations

As seen in the figure below the best characteristics of the bicycle it the low costs and the convenience of this mode. Most citizens also found the bicycle easy.



Appendix 8: Example T-test of survey question 5

Question 5 asks, “Which transport modes are available to you within a 15-minute walk (from home)?”. An independent sample t-test was conducted on this, as well as the other questions. The independent testing variable is the availability of a (shared) bike within 15 minutes from home, and the dependent variable is the frequency of use of the transportation modes. The results are presented in Table 9. These results indicate that a bike's availability influences the bicycle's frequency within 15 minutes of home ($P < 0,10$); the availability of the bike does not influence the frequency of use for the other modes.

Table 9 Independent sample t-test group statistics for Frequency of transport mode X Availability of bicycle

Dependent variable	Availability of the bike within 15 minutes from home (yes/no)	N	Mean	Std. Deviation
Frequency public transport	No	15	2,87	1,807
	Yes	25	2,20	2,062
Frequency car	No	15	3,53	1,642
	Yes	25	4,12	1,269
Frequency pedestrian	No	15	3,73	1,534
	Yes	25	3,80	1,555
Frequency bike	No	15	1,07	1,907
	Yes	25	2,16	1,951
Frequency scooter	No	15	1,07	1,438
	Yes	25	0,44	0,768

For Levene’s Test for Equality of Variances, a P-value of $p < 0,05$ is significant.

For the Independent Samples T-test, a P-value of $p < 0,05$ is significant and is labelled with **. Furthermore, a P-value of $p < 0,1$ is also significant and labelled with *.

Table 10 Results Independent sample t-test Frequency of transport mode X Availability of bicycle.

Dependent variable	Equal variances yes/no	Levene’s test F	Levene’s test Significant	T-test t	T-test df	T-test Significant (2-tailed)
Frequency public transport	Yes	0,558	0,460	1,035	38	0,667
Frequency car	Yes	0,820	0,371	-1,267	38	0,213
Frequency pedestrian	Yes	0,195	0,661	-0,132	38	0,896
Frequency bike*	Yes	1,279	0,265	-1,730	38	0,092
Frequency scooter	No	7,427	0,01	1,560	18,884	0,135