

TRANSITION TOWARDS SUSTAINABLE MOBILITY IN
DISADVANTAGED NEIGHBOURHOODS

A CASE STUDY IN ROTTERDAM

A thesis submitted to the Delft University of Technology in partial fulfillment
of the requirements for the degree of

Master of Science in Industrial Ecology

by

Nol van Gerven

September 2021

Nol van Gerven: *Transition towards sustainable mobility in disadvantaged neighbourhoods* (2021)

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The work in this thesis was made in the:



Faculty of Technology, Policy and Management
Faculty of Architecture and the Built Environment
Delft University of Technology

Supervisors: Dr. Aksel Ersoy
Dr. Jan Anne Annema

ABSTRACT

Urban mobility is a complex socio-technical system. An important part is the behaviour of mobility users, which is in this study defined as being driven by mobility opportunities and perceptions of mobility. This case study in the Tarwewijk in Rotterdam explores what influences those opportunities and perceptions, with a specific focus on income and ethnicity. From mobility data and street interviews followed that income is most important to car ownership, while ethnicity is an important determinant of bike ownership. Other important factors for mobility behaviour include the travel time, the distance to important destinations like schools and shops, and the perception of ease of travel. Combining the diversity of driving factors with three pathways towards sustainable mobility leads to the conclusion that effective sustainable mobility policy is aimed at disrupting the car mobility system, designing a more walkable city and targeting groups based on their specific perception of mobility.

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ACRONYMS

ICE	internal combustion engine	3
NGOs	non-governmental organisations	12
IUTS	integrated urban transport systems	12
OBI	Research and Business Intelligence	14
NPRZ	National Programme Rotterdam South	15
EV	electric vehicle	30
ns	Dutch Railroads	17

1

INTRODUCTION

1.1 MOBILITY IN THE CITY

Mobility has a large impact on the liveability of cities and neighbourhoods. The rise of the car in the second half of the twentieth century has left its marks in western European cities, and the dominance of the car impacts the liveability of urban regions (Van Wee et al., 2012), due to pollution, safety issues, congestion and noise.

On top of that, cars take up a large amount of space in most cities. For example, in the German city of Freiburg, car infrastructure takes up 55% of the available space (Gössling et al., 2016). Freiburg is seen as an eco-city (Purvis, 2008), which means these values might be higher in other western European cities. This space used by cars cannot be used as residential or commercial area, or for recreation and green space in the city. As the lack of space is one of the primary concerns of city councils today (Municipality of Amsterdam, 2018), making the mobility system more space-efficient can result in there being more space for new housing, green spaces and economic activity, altogether improving the liveability of the city.

1.2 SUSTAINABLE MOBILITY FOR DISADVANTAGED NEIGHBOURHOODS

In efforts to make our cities more sustainable, multiple transition pathways are possible Marletto (2014) and Moradi and Vagnoni (2018). However, according to Marletto (2014), the most sustainable pathways involve a smaller role for individual-owned cars with an internal combustion engine (ICE). Van Wee et al. (2012) also note that the emergence of the electric car will not solve all of the challenges that cars pose in the urban environment. The scarcity of space will not be tackled by sticking to a car-centred mobility system. More space-efficient modes of transport include walking, public transport, or using smaller vehicles like (e-)bikes, (e-)scooters (both leg-kick and moped scooters). In order to make these low-carbon and low-spatial footprint modes of travel more prominent, the behaviour of mobility users has to change.

According to Van Acker et al. (as cited in Harms et al., 2014), determinants for mobility behaviour include spatial, social and individual factors. It is plausible that not all of these determinants are known. Of the factors that are, some of these are relatively well-understood, and others are not. And finally, interactions between factors can mean that in some contexts, specific factors are more important than others. Some contexts are studied often, like students travelling from home to their school (Plazier et al., 2017a, 2017b). Other contexts, such as a disadvantaged neighbourhood, have been studied less often. It is to be expected that inhabitants of these neighbourhoods view mobility differently when compared to inhabitants of the average European neighbourhood, as they struggle more often with low income and social issues. Therefore, it might be more difficult to trigger a change in mobility behaviour in those neighbourhoods.

1.3 URBAN MOBILITY AND INDUSTRIAL ECOLOGY

The field of Industrial Ecology (IE) emerged as a way of viewing an industrial system “not in isolation from its surrounding systems, but in concert with them” (Graedel & Allenby, as cited in Boons & Roome, 2000). Since then, the field has incorporated complex systems theory as a core approach, as (Ehrenfeld, 2007, 2008) suggested. By doing so, IE evolved from being focused mostly on industrial contexts and ecosystem metaphors, to the broader approach of describing complex systems in the context of sustainability.

The main types of systems that IE concerns are social, technical and environmental systems. The field of mobility lends itself well to this approach, as mobility itself is a complex sociotechnical system (Cohen, 2006; Goyal & Howlett, 2018), which strongly influences both the local environment (e.g. use of space, emissions of polluting gases and safety implications) and the global environment (e.g. greenhouse gas emissions, reliance on global supply chains for fuel and vehicles). According to Jones (2014), this sociotechnical approach challenges the traditional field of transport, which they state is mostly self-contained and focuses on transport supply and demand. Lyons (2018) also calls for using a socio-technological perspective in order to further the goal of smart mobility. They state that studying the interdependence of factors influencing mobility is key to understanding smart urban mobility, which he defines as “affordable, effective, attractive and sustainable” (Lyons, 2018, p.9).

1.4 RESEARCH AIMS

One benefit of combining the social and technical parts of the system allows for comprehensive pathways to be described for the future of the system. Two examples of studies defining transition pathways for sustainable mobility are Marletto (2014) and Moradi and Vagnoni (2018). These pathways can be evaluated on their appeal to policy makers, and can then be used to shape effective policies. The pathways themselves are discussed in more detail in section 2.5.

However, this broad systems perspective can also have disadvantages: when time and resources are limited, an in-depth analysis can be hard to execute on all parts of the system. This study attempts to combine a broad systems perspective on the mobility transition with a more in-depth analysis of two specific factors that are expected to play a relevant role in disadvantaged neighbourhoods: income and ethnicity. This can be beneficial both to scientific understanding of mobility behaviour, and to the policymakers who have the aim to push the mobility transition in a certain direction.

The main goal of this thesis is therefore to study the effects of income and ethnicity on mobility behaviour in the context of a disadvantaged neighbourhood. Knowledge on these factors will be gathered using existing literature and a case study including interviews and field work. On top of studying and identifying determinants of mobility behaviour, another goal is to gain insights into the way in which mobility policy can shape the transition towards sustainable mobility, in the light of how policies can interact with mobility behaviour. This combination leads to the following main research question: How might income and ethnicity affect the transition towards sustainable mobility in the context of a disadvantaged Dutch neighbourhood?

1.5 OUTLINE

The steps taken in order to answer this research question are described in the following chapters. The theoretical framework in chapter 2 includes a literature review

on mobility behaviour, a conceptual framework, a general stakeholder map and a description of pathways towards more sustainable mobility. Chapter 3 describes the research design and the methods used, while chapter 4 contains a description of the case study area, the stakeholders involved and a description of current mobility behaviour. In chapter 5, the results are presented, which include results from mobility data, expert interviews and street interviews. Finally, chapters 6 and 7 contain the discussion of the results, and the conclusion, in which the main research question is answered and suggestions for further research are made.

2 | THEORETICAL FRAMEWORK

2.1 LITERATURE REVIEW

This literature review provides a starting point for researching mobility as a sociotechnical system. Scopus was used in order to search for relevant literature. 2.1 provides an overview of the search terms, filters and the amount of results these yielded. After searching and filtering, the rest of the papers have been checked for relevance manually, which is why the amount of papers cited in this chapter is lower than the amount of studies found using only the search terms and filters. The number of studies cited from each search term is also included in 2.1.

The search terms are based on the sociotechnical system perspective: the first two were used to search for research that approaches mobility from a (sociotechnical) systems perspective and the final two searches were aimed at finding the state of the art on the social aspects of the mobility system. The review also included a search term on the technical aspects of the system as well, but in the end these results were not used as the focus of this study is the social part of the sociotechnical system. In one of the searches, a filter was used to exclude the subject area of computer science, as without this filter it yielded too many irrelevant results to go through manually. In the rest of the searches, the number of results was already small enough to examine manually. Therefore this filter has not been used in those searches.

Search Terms	Filters	# of Results	# Cited
mobility AND sociotechnical AND urban	-	36	6
“mobility regime” AND urban	-	13	2
“mobility behaviour” AND urban AND policy	Exclude subject area of computer science	40	8
“mobility behaviour” AND Netherlands	-	23	3

Table 2.1: Number of results and number of papers used per Scopus search

The four searches broadly yielded two types of studies. A part of the studies studies described pathways the mobility system can take in a transition towards more sustainable mobility. These are discussed in more detail in section 2.5. Other studies approached the mobility system from specific determinants of the transition. In particular, the individual factors from table 2 are studied in-depth within the context of a socio-technical system. Like the studies by Kinigadner et al. (2016) and Plazier et al. (2017a, 2017b), the studies by Berg et al. (2019), Schippl and Arnold (2020) and Weiland et al. (2019) identify existing mobility habits as one of the deciding factors in people’s attitudes to a low-car mobility transition. Schippl and Arnold (2020) and Weiland et al. (2019) also discuss public acceptance for policy measures that are aimed at driving this transition.

The section 2.2) contains the main findings of this literature review. Sections 2.3 and 2.4 contain further research into the key concepts and provide a framework to be used in the rest of the study. Finally, section 2.5 concerns transition pathways, which were also found as a part of this literature review.

2.2 MOBILITY BEHAVIOUR

The main focus of the study are the causes of certain mobility behaviour, especially the travel mode used. Studies into mobility behaviour that were examined follow roughly two different approaches. The first one is used when the authors have the goal of changing commuters' behaviour, either to make it more responsible and more sustainable (Di Dio et al., 2018; Di Dio et al., 2020; Weiland et al., 2019), or to pursue a 'smart city' strategy (Cellina et al., 2020). These four studies look into means to change behaviour or habits, and do not define this behaviour in more details. The other group of papers do not explicitly define mobility behaviour, but they seem to focus either on the mode choice (Tyrinopoulos & Antoniou, 2013), or on both mode choice and the frequency and distance of travels (Harms et al., 2014; Kinigadner et al., 2016; Oke et al., 2019; Plazier et al., 2017a, 2017b). This specification can be helpful, as the choice whether to travel can be based on different factors than the choice for which mode of travel to use. At the same time, if the goal is sustainable development, both lowering travel distance and frequency, and a modal shift away from vehicles with an ICE contribute to that goal (Kinigadner et al., 2016).

The frequency and distance of travels, as well as the travel mode used are influenced by spatial, social and individual opportunities and constraints (Van Acker et al., 2010, as cited in Harms et al., 2014). These dimensions can further be specified into types of factors. For the spatial dimension, these are infrastructure, urban form and the distance to important destinations (e.g. work, city centres or family). In the social dimension, these are demographic, economic and cultural factors. For the individual dimension, the factor types are defined as concerning attitude, perceptions and habits. The spatial and social types of factors were taken from Harms et al. (2014), except for the distance from home to important destinations, which was only explicitly identified by Kinigadner et al. (2016) and Plazier et al. (2017a, 2017b). The individual types of factors were defined using Plazier et al. (2017b) and Plazier et al. (2017a).

None of the studies examined provide a full picture in which all types of factors were used. Harms et al. (2014) provided the most complete list for the spatial and social dimensions, which is why it was used as a basis. But even in that study, although individual factors like mobility attitude and perception were named, they were not taken into account. Liao et al. (2017) use an interesting framework in their study on consumer preferences for electric vehicles, which is added in figure 2.1. They define the larger socio-technical system by adding the utility of different types of vehicles, and their other attributes (costs, technical attributes, policy). This provides a look at the larger system in which the individual-related variables taken from Harms et al. (2014) can be placed¹.

Factor types that were most often used in the studies examined were urban form, distance to important destinations, economic variables and the ones from the individual dimension. Infrastructural and demographic factors were not often used, and cultural factors were only taken into account by Harms et al. (2014). They found that 'immigrant status' is an important variable to bike use in the United States: immigrants were more likely to use a bicycle than citizens born in the USA. As cycling is an even more important mode in the Netherlands, cultural factors might play a relevant role in the context of a Dutch city.

¹ NB. even though Harms et al. (Van Acker et al., 2010, as cited in 2014) defines one of the dimensions as 'individual', all three of their dimensions fit into the category of individual-related variables as used by Liao et al. (2017)

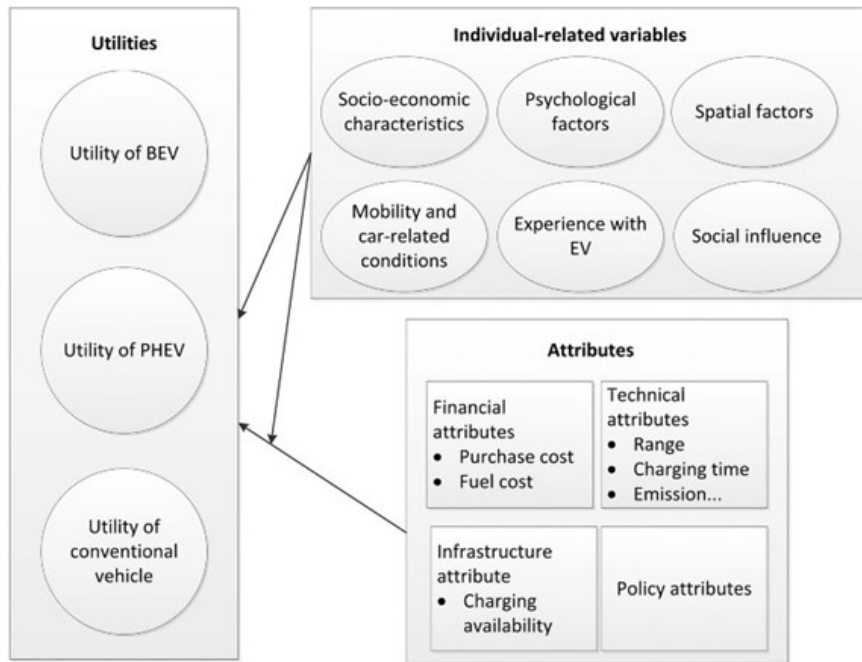


Figure 2.1: Conceptual framework of EV preference by Liao et al. (2017)

2.3 CONCEPTUAL FRAMEWORK

Ideally, a study aimed at providing a holistic picture of mobility behaviour would include all of the factors, but this would take a lot of work as many different research methods are necessary to do so. In order to keep this research focused, the boundaries have been defined, as well as the relations between the different concepts. This can be seen in figure 2.2. The relations are based on the literature described above, along with a couple of hypotheses.

The structure is inspired by figure 2.1 (Liao et al., 2017), and based on the focus of this study: income and ethnic background. The relationships drawn are based on the hypotheses on how these factors might influence mobility behaviour. The hypothesis for income is that this can be a barrier, limiting the opportunities people have. For example, more expensive modes of travel can simply be out of the question for a low-income household. Support for this theory can be found in literature on an extreme case of income determining transport opportunities: transport poverty (Lucas et al., 2016; Martens, 2013; Pot et al., 2020; Sun & Thakuriah, 2021), or, as more specifically defined by Lucas et al. (2016): (the lack of) transport affordability.

Ethnicity is assumed to influence mobility behaviour through cultural and lifestyle differences, which are combined in this framework in mobility perception. The effect of cultural and lifestyle differences on mobility behaviour is supported by Husted (2005) and Syam et al. (2012): they both state that on top of socio-economic and spatial factors, socio-cultural and demographic factors play an important role in determining behaviour related to sustainability (Husted, 2005) and transport (Syam et al., 2012).

However, ethnicity and income are not independent of one another. In 2019, the average income of people with a non-western background in the Netherlands was €25,000, while people with a Dutch background made €34,300 on average (Statistics Netherlands, n.d.-a). People with a western, but non-Dutch background also earned less than people with a Dutch background, at €32,200 on average (Statistics Netherlands, n.d.-a). This relationship makes studying the two factors indepen-

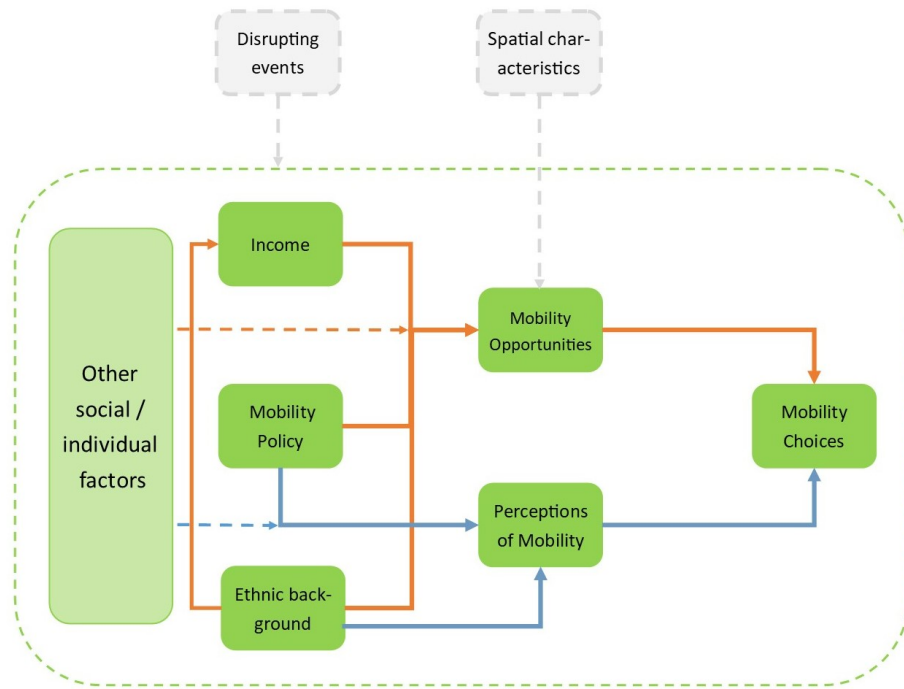


Figure 2.2: Conceptual framework of Mobility Behaviour

dently harder. In section 5.1, an attempt has been made to differentiate between the effects of ethnicity and income on mobility behaviour.

2.4 STAKEHOLDER MAP

In order to provide a better overview of the involved stakeholders in the mobility system, a stakeholder map is used (see figure 2.3). The basis is a stakeholder map of smart mobility by Papa and Lauwers (2015), which was adapted to better resemble the stakeholder types present in the larger mobility system. In section 4.2, this general stakeholder map is used to identify specific stakeholders that are important to the case study.

The arrows in figure 2.3 indicate ways in which the different stakeholder types influence other stakeholders. Vehicle manufacturers and re-sellers influence mobility users, shared mobility providers and (although this is more of a specific niche) public transport operators via the supply of vehicles that they offer, pricing and marketing. Mobility users are also influenced by public transport and shared mobility operators via the services they offer, pricing, marketing and other communication. Finally, public authorities and planners influence all stakeholders in the system with their mobility policies, projects in the physical public space and communication. They also influence public transport operators more directly by providing a part of their funds and setting the minimum requirements for public transport in a certain area. Finally, public authorities can influence vehicle manufacturers and re-sellers, shared mobility providers and mobility users more directly using taxes and subsidies, which can favour one type of goods or services over others.

On the model the stakeholder map in figure 2.3 is based on, Papa and Lauwers (2015) remark that strengthening some of the links between actors are important to reaching collective goals. For the collective goal of transitioning to a more sustainable mobility system, this could mean that the roles of some of the stakeholders change. This can mean a change in mobility behaviour of the mobility users, as

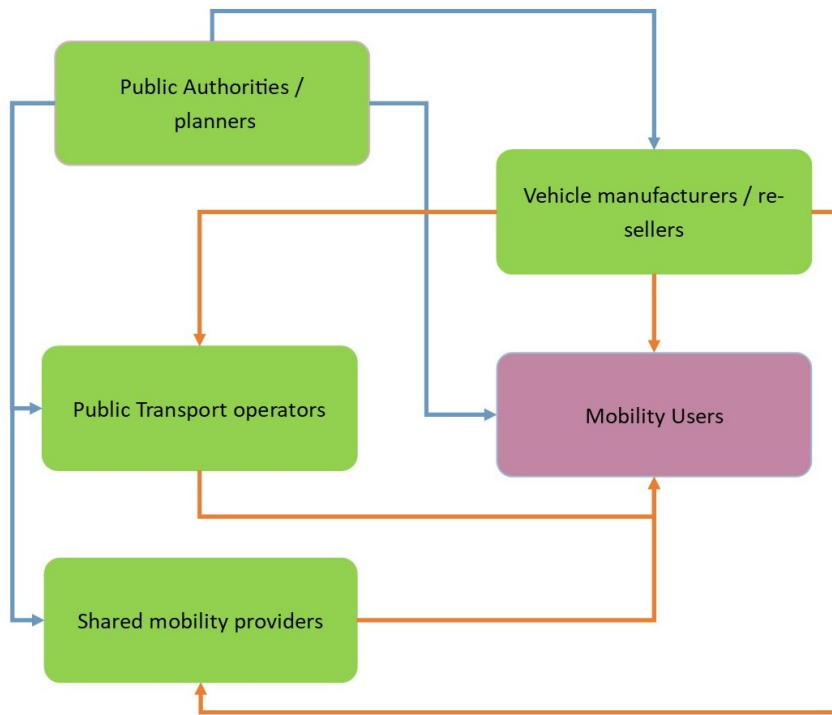


Figure 2.3: Stakeholder map of the mobility system, adapted from Papa and Lauwers (2015)

discussed in sections 2.2 & 2.3: they might become less dependent on vehicle manufacturers and re-sellers if they use public transport and shared mobility more often. It could also mean that the public authorities increase their influence on other stakeholders, in order to steer the mobility transition in a certain direction. The possible directions the transition can go, or transition pathways are the subject of the following section.

2.5 TRANSITION PATHWAYS

On top of understanding the current mobility system and its stakeholders, for sustainability it is important to try and look into the future, specifically into which possible pathways exist for the transition to sustainable mobility. This approach allows for taking the complexity of innovation processes into account (Marletto, 2014).

As a context for his transition pathways, figure 2.4 shows a map of the mobility system by Marletto (2014). It includes three important systems, of which one is dominant: the individual car. The individual bicycle and public transport systems are not to be ignored however. Especially in a city like Rotterdam, where car ownership is a lot lower than the Dutch average: in 2020 there were slightly more than 300 personal vehicles per 1000 inhabitants of Rotterdam, while the national average is almost 500 per 1000 inhabitants (Statistics Netherlands, 2021a, 2021b, 2021c). And especially for cycling, Marletto (2014) names the Netherlands as one of the exceptions to the rule. Nationally, 10% of the total trips are done by bike, and in the city centre of Rotterdam this is estimated to be 29% of trips (Municipality of Rotterdam, 2020).

Marletto (2014) defines three transition pathways to 2030, called 'AUTO-city', 'ECO-city' and 'ELECTRI-city'. Broadly speaking, AUTO-city is the pathway in

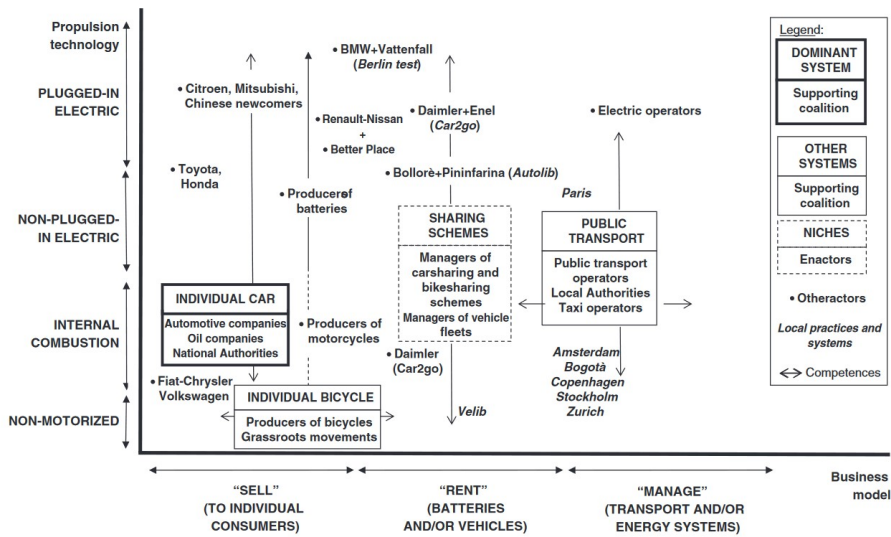


Fig. 1. A socio-technical map of urban mobility: systems and actors.

Figure 2.4: A socio-technical map of urban mobility: systems and actors, from Marletto (2014)

which the main actors remain the same as in the current regime, leading to a continuation of the dominance of the individual car in policy. ECO-city is assumed to require a shift in dominant actors from automotive companies and national authorities to non-governmental organisations (NGOs) and local authorities. In this pathway, integrated urban transport systems (IUTS) become dominant, leading to a large-scale substitution of car use by public transport, shared vehicles and non-motorised transport (Marletto, 2014). Finally, the ELECTRI-city pathway can be reached by a focus on smart grids, in which electric operators and national authorities are among the dominant actors. In this pathway, vehicle sharing becomes prominent and out-competes both the individual car and public transport.

While ECO-city is seen by Marletto (2014) as the most sustainable of these options, the ELECTRI-city pathway also improves the sustainability of the mobility system by reducing the amount of vehicles required and putting the electrical grid above the need for mobility (which could make the grid more efficient and reduce losses). AUTO-city is also an improvement to an ICE-based system, but would still lead to a high spatial footprint because of the focus on individual car ownership (Marletto, 2014). To conclude, a transition to sustainable mobility should ideally not follow the AUTO-city pathway, but rather the ELECTRI-city or, preferably, the ECO-city pathway.

3

RESEARCH DESIGN AND METHODS

3.1 RESEARCH DESIGN

This study is designed as an exploratory case study. According to Saunders et al. (2007), exploratory research is helpful to improve the understanding of the precise nature of a problem. It also allows for flexibility: when new concepts are discovered, this can alter the direction of the research (Saunders et al., 2007). The main goal of this exploratory study is to seek new insights into the nature of the relation between income and ethnicity and mobility behaviour. On top of that, another goal is to identify possible opportunities and barriers for a transition into a more sustainable form of mobility in the city. Finally, some additional factors that influence mobility behaviour were identified along the way, such as the concept of transport poverty. This has altered the questions asked in both types of interviews used.

The strategy of a case study was chosen in order to put a spatial boundary on the exploration. A single case is useful when the case is either unique, or typical (Saunders et al., 2007). The argument that the selected case of the Tarwewijk is typical to many neighbourhoods in Rotterdam and other Dutch cities will be elaborated on in chapter 4. On top of the spatial boundary this case provides, the conceptual framework in chapter 2 provides an overview of the mobility system boundaries used in this study.

To effectively study the case, multiple research methods have been selected: expert interviews, analysing existing mobility data and street interviews. These three methods answer different questions that originate from the main research question. Firstly, the expert interviews answered two questions. Interviews with multiple people who conduct their own research in the neighbourhood or represent the municipality there, helped to better characterise the neighbourhood in chapter 4. On top of that, interviews and informal contact with municipal civil servants provided a better insight in the current mobility policy of the municipality. Secondly, the mobility data was used to test hypotheses on correlations between income and ethnic background on one side, and mobility behaviour on the other. Thirdly, street interviews were done in order to further test these hypotheses, but also to formulate new hypotheses by exploring other factors influencing mobility behaviour.

The case to be studied is the Tarwewijk in Rotterdam. This neighbourhood is reasonably different from the average Dutch neighbourhood in that it is very culturally diverse. On top of that cultural diversity, the average income in the neighbourhood is relatively low, and many households in the neighbourhood have low to median incomes (Municipality of Rotterdam, n.d.). At the same time, its location is peculiar: the Tarwewijk is located close to the city centre, but as it is located on the other side of the Nieuwe Maas, a detour is needed in order to get there. Finally, the neighbourhood will be transformed in the coming years as a part of the National Program Rotterdam South (2013). In these plans, changes in the infrastructure layout are also considered, which means that mobility might become an important issue for residents in the coming years.

3.2 MOBILITY DATA

DATA COLLECTION The municipality of Rotterdam has supplied a dataset in which mobility in the Tarwewijk is compared to the whole of Rotterdam, and Rotterdam South. This data has been supplied by the department of Research and Business Intelligence (OBI) of the municipality of Rotterdam. It consists of additional calculations on data from 2011 to 2020, which can be seen in Appendix A. It provides a basis to compare the Tarwewijk with the rest of Rotterdam South.

DATA ANALYSIS As the data was already aggregated to percentages, and the source data (individual surveys) is not accessible due to privacy concerns, no extensive data analysis is required. The percentages can simply be compared in order to test the hypotheses. The drawback of this is that statistical testing is not possible on this dataset. Therefore, conclusions from this dataset are indicative only.

3.3 EXPERT INTERVIEWS

DATA COLLECTION In order to collect more data on the neighbourhood and to provide a deeper insight into municipal mobility policies, expert interviews were conducted. The interview was designed as semi-open, with a pre-determined topic list that was adjusted based on the specific expertise of the interviewee. The interviewees were identified from contact with Arjen Kamphuis, who is senior advisor mobility and city development at the municipality. Two interviewees have an expertise on the neighbourhood itself, and two interviewees were able to answer questions on municipal mobility policies. The first two were recorded in order to be able to listen to them again for statements on the neighbourhood. The other two interviews were not recorded, as the interviewees mostly referenced policy documents that could easily be consulted afterwards.

DATA ANALYSIS The results of these interviews were used to explore the case and identify important policy documents. The data from these interviews is therefore not analysed as such, but rather used for the case description and for further literature research.

3.4 STREET INTERVIEWS

DATA COLLECTION In order to enrich the data, structured street interviews have been conducted. The goal of these interviews was to explore why inhabitants of the neighbourhood behave the way they do concerning mobility. The form of a structured interview was chosen as an alternative to a survey, in order to make it easier for people to participate. A drawback of this approach can be that it is harder to ask exactly the same questions every time, especially as it is necessary to adapt depending on how the interviewee responds to the questions. After each interview, the responses of the interviewee were summarised, along with a short description of the interviewee. This was done to make the interview feel like a simple conversation the street, making it easier to start an interview. Of course, no personal data of interviewees was collected.

DATA ANALYSIS The notes that result from these street interviews are searched for individual causes of certain mobility behaviour, in order to get a more diverse picture of those causes than generalised and aggregate data supplies. These causes are described and discussed, with the goals of testing existing hypotheses, formulating new hypotheses and generally adding to the theory of mobility behaviour.

4

CASE DESCRIPTION

4.1 TARWEWIJK

The single case of the Tarwewijk is interesting as it is typical for disadvantaged neighbourhoods in Rotterdam (Municipality of Rotterdam, [n.d.](#)), and possibly also for neighbourhoods in other Dutch cities. The municipality calls this type of neighbourhood a 'compact urban neighbourhood'. The neighbourhoods of this category that are located in Rotterdam South were built in the early 20th century to accommodate the workers of the growing Rotterdam harbour (Municipality of Rotterdam, [n.d.](#)). Compared to the rest of Rotterdam, the Tarwewijk and most compact urban neighbourhoods have more low income households, a higher percentage of inhabitants with a non-western background, a high number of children and a low percentage of elderly over 65 years old (Municipality of Rotterdam, [n.d.](#)).

On top of that, many people live in the Tarwewijk only for a short time: every year, a third of its inhabitants moves someplace else (Wijkcomité Tarwewijk, [2018](#)). However, neighbourhood manager Van Altena noted in an interview that this data might already be outdated, as the housing market has gotten more and more stuck (see appendix C) In street interviews by TU Delft students and the Field Academy (Dutch: Veldacademie), residents describe the neighbourhood as dirty, lacking in high quality green or public spaces and some areas as unsafe. On the other hand, the squares have areas for children to play and some of the people are happy with, or don't really need the public space (Speelberg et al., [2020](#)).

Projects that aim to improve the liveability of the neighbourhood include the National Programme Rotterdam South (NPRZ) and Campus Tarwewijk - which aims at creating a green corridor that can be used by slow traffic (cycling, walking) through the neighbourhood. In the light of the NPRZ, a couple of housing blocks are being demolished to make space for new construction. Close to the neighbourhood, the area around metro station and shopping centre Zuidplein is being developed in the project 'Hart van Zuid'. According to Fitskie of the Field Academy, this development is aimed at improving the quality of public spaces so that it becomes more habitable (see appendix B). On a shorter time frame, small elements have been placed underneath the elevated metro at Mijnsheerenplein in order to make the public space more habitable as well. Plans on a longer time frame include a bridge over the Maashaven (see appendix B) and a park in the Maashaven (Municipality of Rotterdam, [2020](#)).

As to mobility, the Wijkcomité Tarwewijk ([2018](#)) notes that the number of cars and vans in the neighbourhood is high compared to the number of parking spaces. On top of that, some of the roads are unsafe. The borders of the neighbourhood are busy roads, which lead to noise and air pollution and are not very attractive to cross by bike or foot (National Program Rotterdam South, [2013](#)). On the other hand, the neighbourhood had multiple important public transport connections and, as most urban areas in the Netherlands, well-developed cycling infrastructure. The most important public transport lines that run through the Tarwewijk are metro lines D and E, which run from Rotterdam Central Station (D) and The Hague Central Station (E) to Spijkenisse (D) and Slinge (E), thus providing a connection to the city centre, to The Hague, and to the most southern parts of the city. Tram line 2 runs from the southwestern edge of Charlois (Wielewaal) to the centre of IJsselmonde at Keizerswaard, providing an east-west connection that connects the Tarwewijk to a

large part of Rotterdam South. The locations of the stops of these metro and tram lines in or near the Tarwewijk are shown in figure 4.1

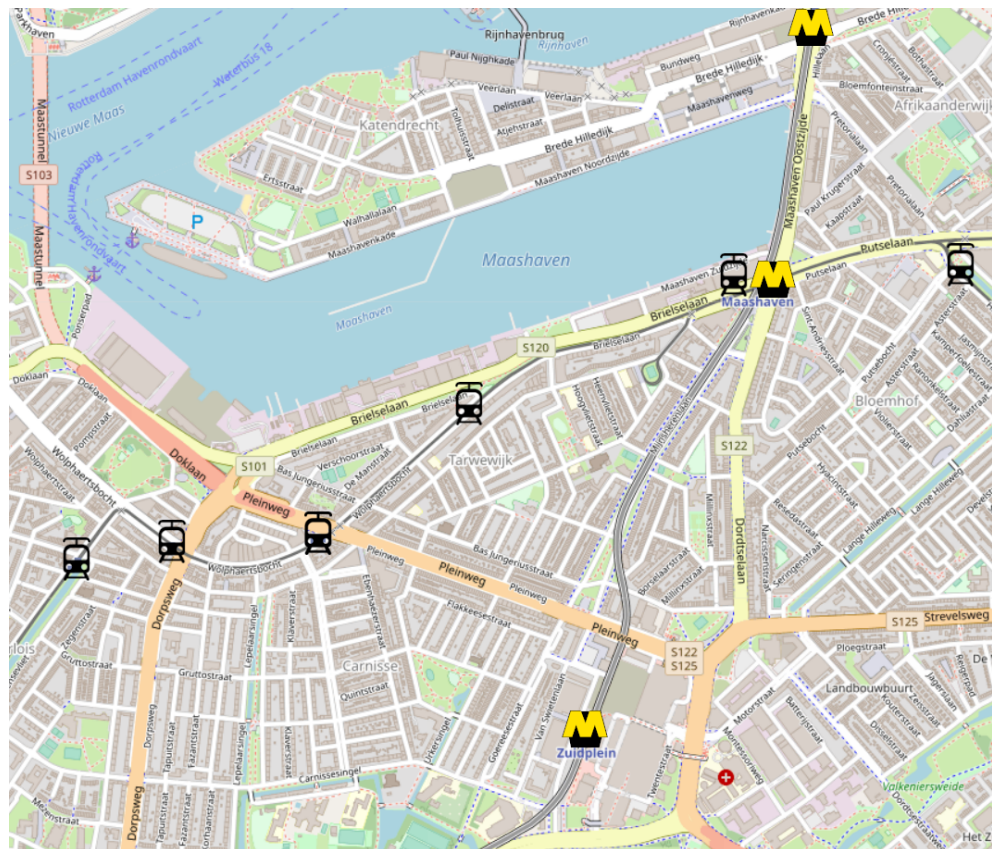


Figure 4.1: Map of the Tarwewijk, with metro and tram in and near the neighbourhood

4.2 STAKEHOLDERS IN ROTTERDAM

Based on the general stakeholder map in section 2.4, a more specific stakeholder map for mobility in Rotterdam has been made. Per actor type, the most relevant actors have been identified, based on the method by Ginige et al. (2018). Table 4.1 shows the results of this mapping. The columns with stake, power and interest per stakeholder are all in relation to mobility in the Tarwewijk.

While more than three public authorities have influence on mobility in the Tarwewijk, these three are the most important: the municipality is responsible for city planning, local transport policy and policies concerning parking, road speed limits and such. Therefore they have a high influence on mobility in the Tarwewijk. Their high interest follows from their stakes. The metropolitan region has a high power over a certain part of mobility in the neighbourhood: they decide on public transport in the region. Their stakes however do not indicate a high interest in the Tarwewijk in particular. The same goes for the national government, but this stakeholder gets its power from the ability to steer mobility on a national level: using fiscal measures, binding laws and nation-wide planning, they can greatly influence the nature of mobility in the country, and thus in the Tarwewijk.

Vehicle manufacturers have comparable stakes in that they need to maximise sales of their product. However, train, tram, subway and bus manufacturers operate in a more specific niche: they do not produce for the general public or shared mobility providers, but only for public transport operators. That makes them more dependant on mobility policy and less on the popularity of public transport them-

selves. It is assumed that no manufacturing company takes a specific interest in the Tarwewijk, although car manufacturers have a large amount of power due to their influence on national and European policy.

The two most important public transport operators are the RET and the NS. The both the power and interest of the NS on mobility in the Tarwewijk are limited, as there is no train station in the direct vicinity of the neighbourhood. The RET, with a metro, a tram line and several bus lines running through the Tarwewijk and along its borders, will have a far greater influence on how people move to, from

Stakeholder Type	Stakeholder Name	Stake	Power	Interest
Public Authorities	Municipality of Rotterdam	Citizen well-being, local economy, sustainable city	High	High
	Metropolitan Region Rotterdam - The Hague	Regional Economy, Ease of travel for inhabitants, sustainable region	High	Low
	National Government	Nation-wide well-being, National economy, Sustainability	High	Low
Vehicle Manufacturers	Car manufacturers	Car sales, Maintaining car-based mobility system	High	Low
	Bicycle Manufacturers	Bicycle sales, promoting cycling	Low	Low
	Rail & Bus manufacturers	Vehicle sales, promoting public transport	Low	Low
Public Transport Operators	RET	Promoting public transport use, ensuring safe & comfortable transit within the region	High	High
	Dutch Railroads (NS)	Promoting public transport use, ensuring safe & comfortable transit nationally	Low	Low
Shared Mobility Providers	Mobike, Donkey Republic, Jump, Felyx, GO Sharing, Check	Promoting shared mobility, increasing the number of vehicles, increasing sales of mobility services	High	Low
Mobility Users	Local inhabitants	Accessibility of work, school, family & friends, shops, leisure activities	Low	High
	Visitors	Accessibility of work, school, family & friends, shops, leisure activities	Low	Low
	Local companies	Accessibility of business for customers and employees	Low	High

Table 4.1: Map of the mobility stakeholders in Rotterdam with stakeholder types based on figure 2.3, and identification using Ginige et al. (2018)

and within the neighbourhood. The RET's interest is estimated to be high as well, as a compact neighbourhood like the Tarwewijk is very well suited for extra public transport options.

The overview of six shared mobility providers in Rotterdam is taken from Tamer (2020). According to Tamer (2020), only Donkey Republic includes all of the Tarwewijk in their service area, and only GO Sharing includes a part of the neighbourhood. The other four providers do not include the Tarwewijk at all. Were they to expand, this could change mobility in the neighbourhood, which means they potentially have a high power. However, at this moment, their interest to do so seems largely absent (Tamer, 2020).

Finally, three types of mobility users have been identified. Firstly, local inhabitants need to be able to reach jobs, schools, family, friends, shops and leisure activities from their homes, whether these destinations are located within the neighbourhood or outside of it. Visitors are the same but opposite: they come to the neighbourhood from outside and have to reach a destination within the neighbourhood. However, depending on how often they visit the Tarwewijk, their interest in the accessibility of the neighbourhood is lower. Finally, local companies are mobility users through their employees and customers, and have an interest in the accessibility to their shop, office or manufacturing plant.

The main stakeholders examined in this study are the municipality, and their mobility and city planning policies, and the mobility users and the drivers of their behaviour.

4.3 MOBILITY IN THE CITY

The municipality holds a yearly survey to gain more insight into the city and its inhabitants. The survey includes questions on which problems are seen as most urgent. The results of these questions show that since 2017, residents name traffic issues as one of the most urgent issues to be tackled (De Graaf, 2020).

On top of that, some questions on mobility are asked. Over the past 15 years, the percentage of car users has declined, albeit very slowly. At the same time, the usage of bicycles and public transport has increased, with the latter experiencing a large increase in the period 2015-2019 (De Graaf, 2020). Other modes of transport, like shared mobility, are known to more than half of the inhabitants of Rotterdam, but are used by only a small group (De Graaf, 2020).

The report by De Graaf (2020) also shows clear differences between the left bank of the Nieuwe Maas river (South Rotterdam) and the right bank, as well as differences within the right bank between the inner city and the neighbourhoods outside of the motorway ring. On the left bank, car use for work or study transit is higher than the city average (46% compared to 40%), while bicycle use is lower (20% compared to 25%). Public transport use is the same as the average: 29% (De Graaf, 2020). Unfortunately, the size of these survey data does not allow for analysis on a neighbourhood level. However, one statistic is shown on the level of city districts: the percentage of car, public transport and bike users. Residents of the district of Charlois, where the Tarwewijk is located, use cars and public transport about as often as the city average. However, bike use is significantly lower in this district: 41% of people use the bike at all (56% on average). On top of that, only 20% of Charlois residents are frequent bike users, while 32% of the residents of Rotterdam use the bike frequently (De Graaf, 2020).

De Graaf (2020) also shows the general correlations between income and ethnicity on one side, and modality choices on the other. These two correlations are very alike. Inhabitants from a lower income household are less likely to own a car or bike than inhabitants with a higher household income. The same goes for ethnicity:

inhabitants with a Dutch or other western¹ background are more likely to own a bike or car than people with a non-western background (De Graaf, 2020). Income does not correlate with public transport card ownership: about 90% of all income groups own such a card. Inhabitants with a non-western background are again less likely to own one, than people with a Dutch or other western background.

¹ Statistics Netherlands (n.d.-b) defines 'western' as originating from Europe (except Turkey), North America, Oceania, Indonesia or Japan

5 | RESULTS

5.1 MOBILITY DATA

5.1.1 Ethnicity and Income

In appendix A, the mobility data that was received from the municipality can be found. It shows the mobility data from a more general survey (Dutch: omnibusenquête), with all of the data from 2011 to 2020 combined. This was done in order to improve the sample size for the Tarwewijk: in one year, the number of respondents for this neighbourhood would be too low to draw conclusions from (P. de Graaf, personal communication, March 9, 2021). The number of respondents from 2011 to 2020 is 163. The total number of valid responses in the city from 2011 to 2020 was 10,873, of which 4,003 lived in Rotterdam South.

In order to analyse the effects of economic and cultural factors, figures 5.1a and 5.1b can be used. These two graphs show the correlations of income and ethnicity with car and bike ownership in Rotterdam South. In the graph on the correlation with income, both car and bike ownership show an increase with income, although this effect is stronger for car ownership than for bike ownership. The most interesting result is that car ownership is especially low in the lowest income group, while the other three income groups show a seemingly linear increase. This supports the first hypothesis, that income is the most important factor determining car ownership. Similarly, ethnicity seems to have a stronger correlation with bike ownership than with car ownership. This suggests that although ethnicity and income are strongly correlated (Statistics Netherlands, n.d.-a), income is the most important factor determining car ownership, while ethnicity is the most important factor determining bike ownership.

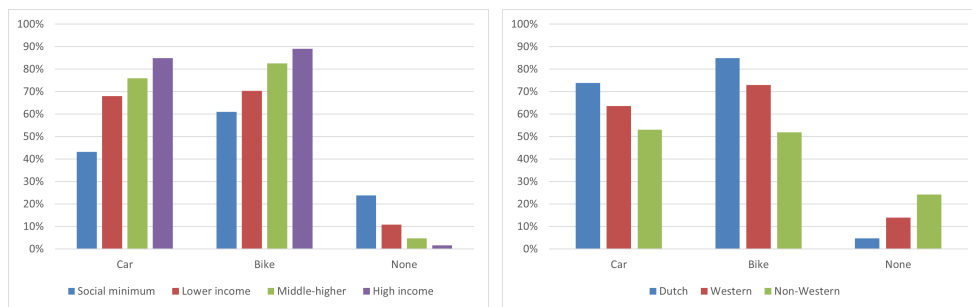


Figure 5.1: Car and bike ownership by income group a and ethnicity b in Rotterdam South

This theory can further be strengthened using figures 5.2a to 5.3b. These four graphs compare the populations of car and bike owners per income group to the total populations per income group in Rotterdam South. The data shows that people with a non-western background are less likely to own a car or a bike in nearly every income group. However, this effect is more pronounced for bike ownership than for car ownership. Additionally, this correlation is strongest in the lowest income groups and seems to decrease in importance as income increases. Especially for car ownership, the populations of middle to higher and high income groups seem to match the total population closely in ethnicity. For bike ownership, ethnicity re-

mains a factor even for households with a high income, although this effect is less pronounced than for lower income households.

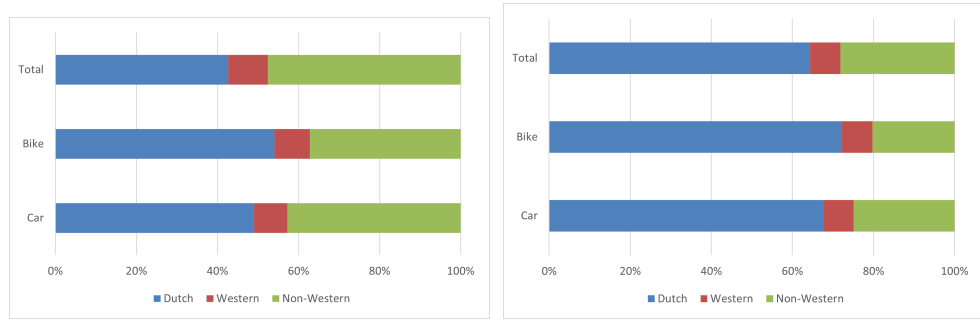


Figure 5.2: Breakdown of Ethnicity of car and bike owners at the social minimum **a** and with low to modal income **b** in Rotterdam South

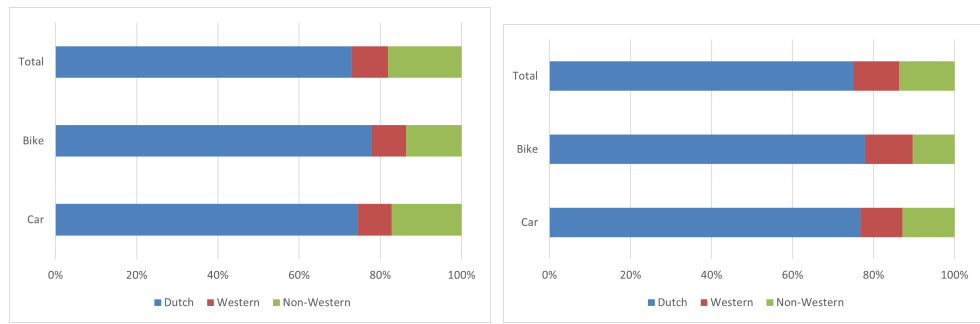


Figure 5.3: Breakdown of Ethnicity of car and bike owners with modal to 2 times modal income **a** and higher than 2 times the modal income **b** in Rotterdam South

5.1.2 Tarwewijk

Using the same dataset, the Tarwewijk ($n=163$) can also be compared to Rotterdam South ($n=4003$) and the whole city ($n=10,873$). Figure 5.4 shows this comparison. From this figure can be concluded that both car and bike ownership are lower in the Tarwewijk than in the rest of Rotterdam South and the rest of Rotterdam. This can have many causes, but an effect of income and ethnicity is to be expected following the data presented earlier in this section.

Figures 5.5 and 5.6 show car and bike ownership in respectively different income groups, and by ethnic background. It is important to note that, while the total group of respondents in the Tarwewijk dataset is 163, splitting them by income and ethnicity could lead to very small groups which may not represent the inhabitants of the Tarwewijk that well. The general correlations hold: the higher the income, the more likely people are to own a bike, a car or both. And people with a Dutch background are more likely to own a bike than people with a non-Dutch western background or non-western background. But in the Tarwewijk, some differences seem to be even larger. For example, only 24% of people living at the social minimum own a car, compared to 43% in the whole of Rotterdam South. And the difference in biking between different ethnic groups is even larger than in the whole of Rotterdam South.

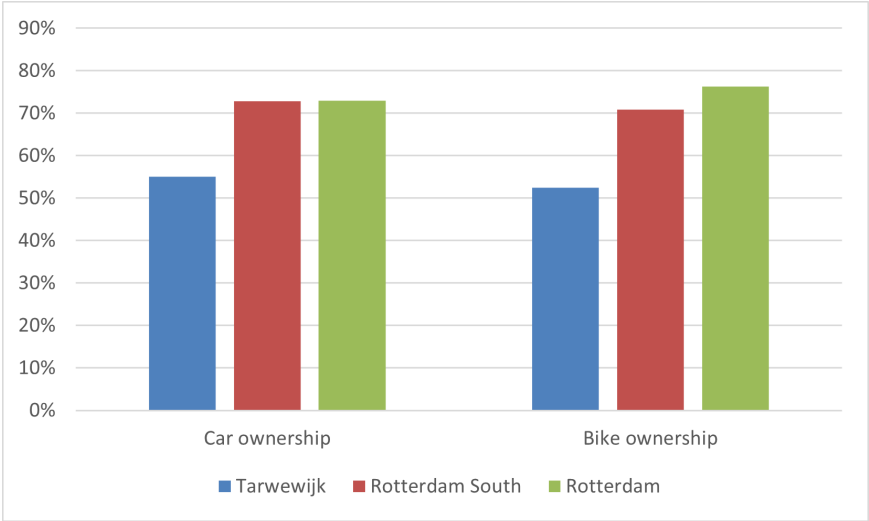


Figure 5.4: Comparison of car and bike ownership

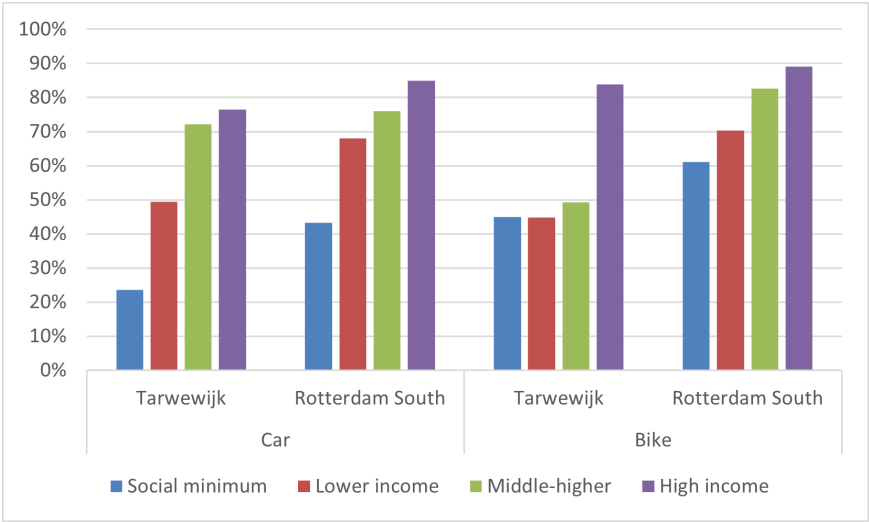


Figure 5.5: Comparison of car and bike ownership by income group

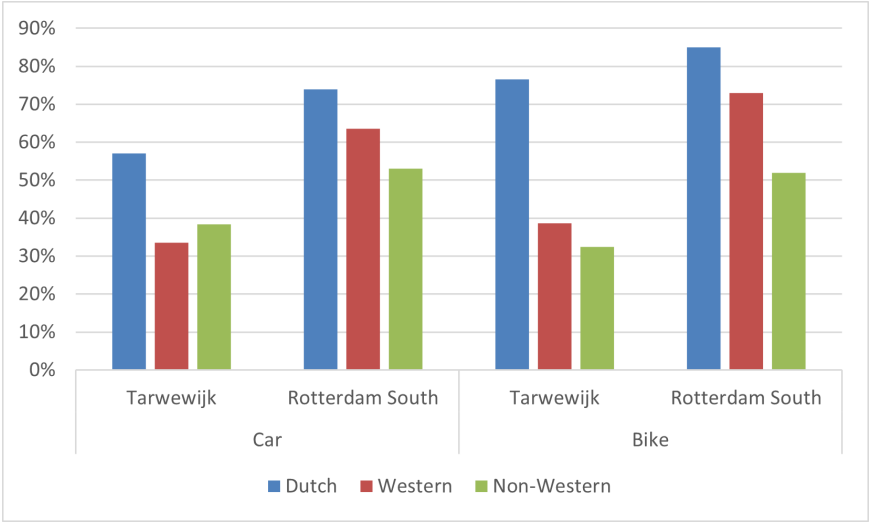


Figure 5.6: Comparison of car and bike ownership by ethnic background

5.2 EXPERT INTERVIEWS

The interviews were aimed at learning more about the current mobility policy of the municipality, as well as getting a better picture of the neighbourhood. The interviews aimed at the neighbourhood were recorded, and reports of these interviews have been added in appendices B and C. These two interviews also helped to improve the case description. The other two interviews mostly led to additional literature and will not be referenced directly as written sources on the city's mobility policy are readily available.

5.2.1 Mobility Policy

The most important document for the mobility policy of the municipality is the Rotterdam Mobility Approach (Dutch: Rotterdamse Mobiliteitsaanpak). It outlines the general policy of the municipality, but also names a couple of large projects concerning mobility (Municipality of Rotterdam, 2020). This document names four guiding principles: ample space for pedestrians, cyclists and public transport (1), safe and healthy connections (2), everyone can participate (3), and vital economic transport (4). The first three principles are relevant to this study: walking, cycling and using the public transport is being stimulated, road layouts are being rethought which also influences the attractiveness of different modes, and the number of possible choices is increased by allowing and stimulating new mobility concepts (Municipality of Rotterdam, 2020).

The mobility policy includes a 'development strategy', which aims to implement the four guiding principles in specific projects. Most of those projects are aimed at improving the quality of life in the inner city and certain neighbourhoods, stimulating cycling and improving public transport connections, especially between Rotterdam South and the rest of the city (Municipality of Rotterdam, 2020). One sentence specifically mentions the mobility transition, in which is stated that the municipality aims to 'improve cycling and mobility chain facilities at hubs, park and ride locations and public transport nodes.

5.2.2 Tarwewijk

The Tarwewijk can be described as a low income, ethnically diverse neighbourhood. The percentage of people living at or just above the Dutch social minimum is high, which has a profound effect on people's lives according to Van Altena (see appendix C). From this interview, the most important conclusion was that mobility is not on top of mind for most people in the neighbourhood. Instead, concerns regarding safety are more important to the people who live there, which is also supported by the wijkprofiel (Municipality of Rotterdam, n.d.). However, this mostly concerns subjective safety, as objective safety (eg. rate of burglaries, robberies and violent crimes) has increased tremendously over the past decades, according to Van Altena.

Van Altena's remarks on the 'survival mindset' that some groups in the neighbourhood have due to poverty, points towards the phenomenon of transport poverty. Transport poverty in Rotterdam South was first studied by Jeroen Bastiaanssen in his master's thesis and his later research. This field, that originated in the United States and United Kingdom, where poverty leads to people not being able to reach supermarkets and jobs, because they do not own a car (Bastiaanssen et al., 2013). In The Netherlands, not being able to reach a supermarket is less often a problem, but access to jobs can be an issue. Figure 5.7 shows this: the number of jobs that can be reached from the Tarwewijk using public transport is smaller than the number that can be reached from the city centre. Indeed, this goes for all of Rotterdam South. This figure is important as Bastiaanssen et al. (2013) note that more than half of job

seekers have had to turn down a job they would have gotten because they could not reach it using public transport (and had no alternative personal transport available).

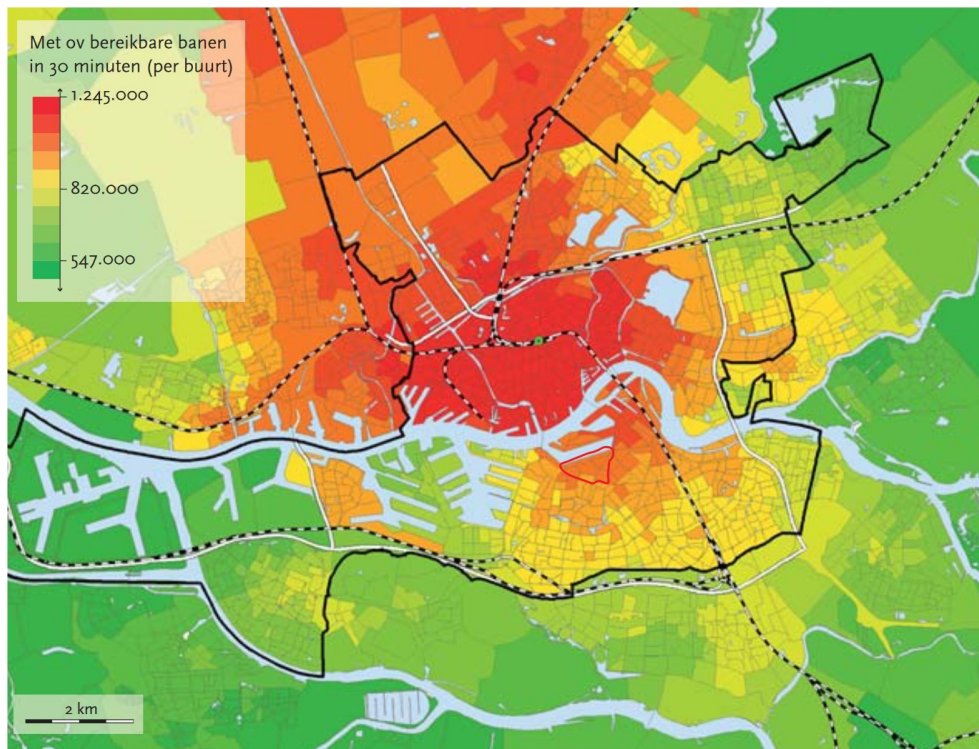


Figure 5.7: Number of jobs that can be reached within 30 minutes by public transport, adapted from Bastiaanssen et al. (2013)

Another interesting remark is about the schools in the neighbourhood. Fitskie noted that there are a lot of primary schools in the Tarwewijk, and that most parents seem to walk their children to school (see appendix B). Observations during field work seemed to support this: bike stands at those schools were scarce and empty, and most parents could be seen picking up their child after school by foot. This may point to another factor that is deciding for mobility use: the proximity of important destinations. Going into the field work, an expectation based on the interviews was that people would walk to primary schools, but use other modes of transport to go to secondary schools (as there are no secondary schools located in the neighbourhood itself).

5.3 STREET INTERVIEWS

In total, eight street interviews were conducted, with nine people in total, in the Tarwewijk to ask people living there about their mobility usage and their motivation. The interviews were loosely based on questions like which mobility modes they use, why they use them, if they would change that and how often they have destinations outside of the neighbourhood. Some of the results seen in the mobility data are supported by the interview results, but the interviews also provided new insights into other factors that influence the mobility outcome.

Regarding the previously presented relations between income and ethnicity, it is important to note that the interviewees were not asked for their ethnicity. As assumptions based on people's appearances can be completely wrong, these have not been made. The interviewees were not asked for their income, although one interviewee noted something specifically about that factor, indicating a low income. In total, seven women and two men were interviewed, all except two teenagers (who

were interviewed simultaneously) are assumed to be above 35 years old. However, the interviewees were diverse in the activities they had in the neighbourhood: two people were found near the supermarket, two were picking up their children after school, the two teenagers were walking home from their school, two were walking their dogs, and one had a coffeeshop as his destination.

As mentioned, only one respondent mentioned something about her income in relation to mobility. She said that a car is not an option because it is too expensive. Only a higher income or lower cost of parking would enable her to use a car for daily transportation. Another interviewee noted that she did not have a driver's licence, which could be caused by their income position, cultural background, gender norms or other individual factors.

One additional factor that arose from the street interviews was the availability and quality of public transport. Even though none of the interviews was not conducted in the direct proximity of the metro station Maashaven, four interviewees identified the metro as their primary mode of transportation for when they need to be elsewhere in the city. When asked why they used the metro, the interviewees answered that it got them where they needed to go, that it was a good connection to the city centre, work and family, and that it is a good alternative to walking and cycling when the travel is longer. On top of the four metro users, one interviewee noted that she always took the bus to the Tarwewijk, in order to visit her grandchildren. When these public transport users were asked if they wanted to use other modes of transport, all five of them said that that is not necessary to go by car. One gave the proximity of their destinations as a reason and three others said that the metro or bus is sufficient for their usual destinations. The final public transport user said they were not able to ride a bicycle or drive a car, so public transport was their only option.

As to reasons not to use specific modes of transport, one interviewee said that he did not like cycling, as he cannot stand the (cold) wind which causes him to experience headaches. Whether this is a medical condition or something caused by lack of habituation to cycling, it is something that greatly influenced how this man moved around the neighbourhood: he said that even though he owns a bike, he almost never uses it, and does his groceries at the supermarket at about 1 km distance using his car, or rarely, when the weather is nice, by foot. Another respondent noted that he likes all modes of transport. He was one of the public transport users discussed before and noted that however a car is not necessary, it is actually easy to get around in as well.

The reasons people gave for travelling varied, but were mostly work, visiting the city centre and going to school or bringing their children there. While no young children were interviewed, a clear observation was that almost all of them were walked to and from school. A few came by car, but no cycling children were observed. This is in line with what Andrea Fitskie said about travel to and from primary schools in the interview (see section 5.2). This could be related to ethnicity: if their parents don't cycle, the likelihood that children will cycle to school is lower.

Finally, most interviewees said that they do not leave the neighbourhood that often. This could be attributed to the Covid19 pandemic, but it is also an expected effect in poorer neighbourhoods: if someone does not have the money for a day out or to go shopping, there are fewer reasons to leave the direct vicinity of their house. Both Andrea Fitskie and Raymond van Altena described in the interviews that the world of many inhabitants of the Tarwewijk is 'small' (see Appendices B and C). This supports the second explanation, and suggests that people did not leave their neighbourhood often before the pandemic as well.

To conclude: most of the respondents used public transport as their primary mode. Cycling does indeed seem less popular compared to other parts of the city, which was already clear from the mobility data in section 5.1. Finally, many individual reasons for travel exist, making it hard to determine important new factors influencing mobility from these eight interviews. The one thing that stood out was

the perception of the ease of travel: the metro seems to be perceived as an easy, maybe comfortable way of travelling longer distances, and is therefore preferred by most of the interviewees to the bicycle.

6

DISCUSSION

6.1 LIMITATIONS AND GENERALISABILITY

This case study is aimed at gaining new insights into the effects of income and ethnicity on mobility behaviour in disadvantaged neighbourhoods. These findings can help to improve policy aimed at the transition towards sustainable mobility, but in order to do so it is important to discuss to what degree it is possible to generalise the results of this study to other neighbourhoods and groups.

Tarwewijk is a very specific case: it is located relatively close to the city centre of Rotterdam, with a good public transport connection (metro lines D and E). As described in section 4.1, it is a compact urban neighbourhood. Many such neighbourhoods exist in Rotterdam: Oude Noorden, Bergpolder, Bospolder-Tussendijken and Crooswijk are examples of somewhat similar neighbourhoods on the right bank of the Maas river, while on the left bank, along with the Tarwewijk itself, Oud-Charlois, Feijenoord and Afrikaanderwijk come to mind. However, some neighbourhoods in Amsterdam and the Hague are quite similar to the Tarwewijk as well. In Amsterdam, parts of Amsterdam Oost and Bos en Lommer have similarities to the Tarwewijk in terms of their age, compactness and disadvantaged position, although gentrification has progressed more quickly in Amsterdam when compared to Rotterdam, which resulted in higher average incomes in these neighbourhoods. The most fitting examples in The Hague are the Stationsbuurt and Schilderswijk, although those neighbourhoods are located directly next to the city centre, which could mean that when it comes to mobility, these neighbourhoods are quite different to the Tarwewijk.

Neighbourhoods in other Dutch cities do not come to mind that quickly. This specific type of neighbourhood might be something that is more prevalent in the three largest cities than in the rest of the country. Nevertheless, this study could prove useful to policymakers who aim to change mobility with low income and ethnically diverse neighbourhoods in general, as some general conclusions regarding those two factors come from a large set of data. A limitation of this data is that only an inspection of aggregated data was possible. Statistical analysis on the source data could have given more definitive and quantitative answers as to which part of the effects on car and bike ownership is caused by income, and which part is caused by ethnicity or other factors.

The main limitations of this study are in the street interviews. With only eight interviews, and nine respondents, it is hard to capture the diversity of the neighbourhood and its inhabitants. Except for two, all respondents are estimated to be aged 35 to 70, which means that especially a younger part, but also an older part of the population was left out. Furthermore, seven out of nine respondents were women, which means that factors specific to or more prevalent among men might have been missed more easily. Time constraints have been the most important cause for the low number of respondents.

Some biases also occur when conducting street interviews. A personal bias is also present when trying to randomly select people on the street to talk to for an interview, and some groups may also be more open to interviews than others. Finally, an important bias when doing street interviews on mobility, is that some groups of people simply cannot be found easily on the streets. For example, people working full time are hard to find on working days in the morning and afternoon,

which were the moments when the street interviews were conducted. Another important example when conducting street interviews on mobility are car users: when they travel, they might spend only a short amount of time outside of their car (walking from the door to the car, or from their car to their destination), at which time they are also unlikely to stop for a short interview. This means that for the street interviews, it is far more likely that cyclists and public transport users were selected, than frequent car users. This is an important limitation to keep in mind when reading about the findings coming from the street interviews, as it may have impacted their overall conclusion.

6.2 INCOME AND MOBILITY

In literature, the nature of the relationship between income and mobility behaviour is described differently depending on the approach of the study. For example, in economic studies on consumer preferences for different types of cars reviewed by Liao et al. (2017), this relationship is usually assumed to be linear. They also name one exception, where the relationship is described as logarithmic (Ziegler, 2012, as cited in Liao et al., 2017). While the mobility data from the municipality uses income groups rather than continuous income data, it seems to support another description: a threshold value. Below this threshold car ownership is simply too expensive to uphold for people, while above it the relationship develops in a more linear fashion. This is a well-understood phenomenon in the area of transport poverty: the price of owning and using a car can be higher than the lowest income households can reasonably afford (Lucas et al., 2016; Sanchez, 2008; Zhao & Yu, 2021).

Of course, these studies serve a different goal: the economic studies are aimed at improving policy to encourage electric vehicle (EV) ownership and use, like Liao et al. (2017), it can be reasonable to omit those groups that cannot afford a conventional ICE car, let alone a usually more expensive sustainable alternative. However, to completely understand the dynamics of the mobility transition, these low income groups need to be taken into account, as way they experience mobility seems to differ greatly from middle and higher income groups.

A correlation was also observed between bike ownership and income, but at first glance this correlation is not strong enough to imply any causation: the third factor that comes into play is the fact that people with a non-western background are over-represented in the lower income groups compared to people with a Dutch background, as shown in data from Statistics Netherlands (n.d.-a), and figure 5.2a. Harms et al. (2014) use another explanation for a weak relationship between income and cycling: while a higher income increases the chance of someone owning a bike, it also increases the chance that that person owns a car. In the end, they make less use of the bike as the car is a preferred option. However, this effect is not that clear in the mobility data used, as the data describes bike ownership rather than use.

The only data available for public transport in appendix A is the ownership of a public transport pass (OV-chipkaart), which does not show the usage of these itself. On top of that, the ownership of these passes is very high (about 90%) among all income groups, suggesting that most people in Rotterdam South use public transport at least every once in a while, regardless of their income.

6.3 ETHNICITY AND MOBILITY

From the mobility data results (5.1) can be concluded that ethnicity has an effect on bike ownership, and by extension cycling in the Netherlands. Harms et al., 2014 is the only study found that takes socio-cultural factors into account in a similar way. Interestingly, they found that people in the United States with an immigrant

status were more likely to own and use a bike than US-born Americans, while in the Netherlands, this relationship is reversed. Of course, this could be attributed to the Dutch cycling culture: many Dutch people learn to cycle from their parents at a young age, and people who did not grow up in the Netherlands or whose parents did not grow up there could be less likely to pick up a bike at a later age. A possible effect of this was also observed: not many children cycled to school in this ethnically diverse neighbourhood.

The main takeaway seems to be that cycling is a highly culture dependant mode of mobility, even though the precise relationship between socio-cultural factors like cultural background, ethnicity or immigrant status differs depending on the cultural context of the studied location. And even then, the Netherlands should be seen as a unique case when it comes to cycling, as more people cycle there than anywhere else in the world.

Car use was not as clearly related to someone's background. While car ownership is lower for people with a non-western background than for people with a Dutch background, this group is also over-represented in lower income groups. The relation seen with ethnic background is not strong enough to conclude causation at face value. As said, for public transport, only pass ownership was included in the data. People with a non-western background had a slightly lower than average rate of public transport pass ownership until 2019, but this changed in the 2020 data (De Graaf, 2020)

6.4 OTHER IDENTIFIED FACTORS

Apart from the two factors studied using the mobility data, the street interviews gave insights into additional factors influencing mobility behaviour. The most often named factor was how easy it was to get around using certain modes of transport, especially by foot and using public transport. Some of the interviewees viewed their most important destinations as easily reachable with these modes. This suggests that both spatial factors like the distance between home and important destinations, and perception can be important to mobility behaviour, like noted by Kinigadner et al. (2016) and Plazier et al. (2017a, 2017b).

On top of those factors, it was noted that most of the interviewees did not leave the neighbourhood often. The most likely explanation is that this has to do with low income, as mentioned in section 5.3. However, it is possible that this does not completely explain why inhabitants of the Tarwewijk don't leave their neighbourhood often, and could be an interesting topic to explore further.

6.5 MOBILITY TRANSITION

Ideas for a transition towards sustainable mobility can be seen in the municipality's mobility policy (Municipality of Rotterdam, 2020). The four principles form a vision of the future of mobility in Rotterdam, and are implemented in several projects across the city. What is not present however, is a complete vision and pathway for the transition.

According to Marletto (2014), not addressing the larger mobility system and not actively pushing for a certain transition pathway can lead to a different outcome than expected. Path dependency can cause the system to move towards AUTO-city if policies are not sufficiently disrupting the regime (Marletto, 2014). On the other hand, the current mobility regime in Rotterdam already has some elements of the ECO-city transition pathway: high public transport usage and high cycling rates, and due to current policy they are set to increase. But probably, IUTS coalitions in the city are not strong enough to destabilise the 'individual car' system as described

by Marletto (2014). The question is whether the municipality aims to strengthen those coalitions, or to transform the city using urban planning in favour of public transport, cycling and sharing mobility in such a way that it can effectively disrupt the current mobility regime.

Multiple respondents in the street interviews remarked that most important destinations are close by in the neighbourhood. This brings to thought the idea of a 'walkable city'. This idea was described by Jeff Speck in his book and TED-talk (Speck, n.d.). It describes a city in which it is possible to reach nearly every important destination by foot and public transport. The street interviews suggest that at least a group of people would travel by foot and public transport, when they are possible to get where they need to be. On top of that, the walkable city can provide opportunities to people who cannot afford a car, and now need a car to get where they need to be: if the city becomes more 'walkable', they might find jobs they are able to reach. While Rotterdam as a whole cannot be described as a walkable city, the Tarwewijk has some of its characteristics. If the municipality chooses so, they could adopt the walkable city as an urban planning principle to support the mobility principles named in section 5.2.

Apart from a change in city planning strategy, policy can be aimed at behavioural change that steers the transition towards a certain pathway. As the results show: different groups of people can have very different reasons to use or not to use a certain mode of travel. For example, some people might not use a bicycle because they have not learned to cycle at a younger age: they might be helped by bicycle lessons. Other groups of people might be persuaded to sell their car if public transport connections improve or shared mobility becomes more readily available. In order to account for these different groups, personality profiles can be used. This idea originally stems from marketing studies, but can also help in achieving this type of behavioural change, according to Anagnostopoulou et al. (2020) and Kamoen and Karahanoğlu (2021). In Kamoen and Karahanoğlu (2021), an example has been given on residual waste separation behaviour, while Anagnostopoulou et al. (2020) is an example of mobility, but using a completely data-driven approach. Nevertheless, such profiles could also be made based on general mobility data combined with street interviews, and could be helpful both to policy makers, and to scientists looking for a better understanding of mobility behaviour.

7 | CONCLUSION

7.1 MAIN FINDINGS

This thesis set out to explore factors influencing mobility behaviour, and the consequences of those relations for the transition towards sustainable mobility. In literature, many possible relations were found, and two of those were studied in-depth using mobility data from the municipality: income and ethnicity. The results show possible causations between income and car ownership, and ethnic background and bike ownership.

The relation between income and car ownership was shown to have a threshold value: below a certain threshold income, car ownership is dramatically lower than expected when assuming a linear relationship. The relation between ethnic background and bike ownership can be explained using the specifics of Dutch culture: learning to ride a bike at a young age may be an important determining factor for cycling in the rest of someone's life. Apart from income and ethnicity, the distance between home and important destinations seemed to be an influential factor for mobility behaviour, as well as perceptions of mobility. This could be the perception of the same distance, or the perception of the easy of travel to important destinations.

The mobility policy examined in the case study is not explicitly aimed at a certain transition pathway towards more sustainable mobility. However, the policy does include steps that could lead to one of the transition pathways described by Marletto (2014), specifically the ECO-city pathway. However, it is unclear whether the approach of the municipality would be sufficient to prevent path dependency causing the system to move towards the AUTO-city pathway.

The relationship between these two researched subjects remains difficult to describe. One takeaway is that bike ownership is lower in non-western groups. If the goal is to increase the amount of trips made using a bike, specific policy can target these groups. Another interesting result came from the street interviews: people noted that their most important destinations were not that far away and perceived travelling there as easy, be it by foot or using public transport. This shows the potential of a 'walkable city': if it is possible to get everywhere you need to go by foot and public transport, this will become the preferred mode of transport for a could group of people. Even more, a walkable city can help people who struggle because they cannot afford a car to find new jobs and improve their quality of life.

7.2 RECOMMENDATIONS

These findings do not yet fully answer the main research question. To definitively answer this question, if that would be possible, many factors should be researched in more depth. This study resulted in a couple of suggestions for that.

RESEARCH INTO INCOME AND ETHNICITY Even though these factors were studied using different methods, some questions have not yet been fully answered. The relationship between income and car ownership was assumed to be linear in most studies, but seemed to have a threshold value in the data. The question then arises whether that is specific to this case, or a general rule: does this theory of a threshold

income for car ownership hold up in other locations and other datasets, and which factors determine how high this threshold is?

Ethnicity was not used in any of the reviewed studies to explain mobility behaviour, so there were fewer examples to look at. In this study, ethnicity is defined using an already outdated and flawed definition: the definition by Statistics Netherlands (n.d.-b) that uses only three groups: people with a Dutch, western and non-western background. New research into differences between specific ethnic groups based on the country where someone's roots lie would be very interesting. If this research becomes available, policy can be made aimed specifically at certain ethnic groups.

FIELD WORK The field work yielded relevant results with only eight interviewees. However, it does not nearly provide a complete picture. A repetition of this type of field work could add to the understanding of mobility behaviour and the possible success of mobility policies. The data would also be more reliable with a higher number of interviewees. When doing so, it is important to keep track of the diversity of interviewees: differences in age, gender, ethnicity, occupation, outside activity and many others can impact the results of the field work, as explained in section 6.1. When talking about mobility, extra effort should go into talking to car users, as they can be harder to access on the street than pedestrians, cyclists or public transport users.

An interesting goal of further field work could be to construct personality profiles based on people's perceptions or use of mobility. The large diversity in explanations of mobility behaviour found in the street interviews might make this hard, but it can help other scientists and policy makers alike to get a better overview of the different target groups there are when studying mobility behaviour, as previously mentioned in section 6.4.

POLICY RECOMMENDATIONS The transition towards sustainable mobility can broadly be achieved in two ways by policy makers: by planning the city to be more suitable for bikes and public transport and less for cars, and by aiming to directly change mobility perceptions. Of course, these are not completely separate: city planning can influence perceptions as well, but its main result is expected in mobility opportunities (see figure 2.2). However, the most important recommendation to policy makers follows from Marletto (2014): policy that aims to result in a mobility system that is based on cycling, public transport and/or shared mobility should be disrupting to a car-centered view of mobility.

Changing perceptions of mobility is hard, but not impossible. As mentioned above, personality profiling could help the municipality in this, so they can target specific groups with specific needs more effectively. In general, disadvantaged neighbourhoods have more defining characteristics than just low income, so studying those characteristics, and using the knowledge from that to make policy that is aimed at specific groups can help improve the effectiveness of the policy in question.

Spatial planning is also an important determining factor in mobility behaviour, as the example of the walkable city (see section 6.5 shows: the locations of homes, jobs and other important destinations like schools, shopping centres and cultural centres can influence mobility behaviour. The strength of this relationship would be an interesting subject for further research, but most in-world examples show that shorter distances between these destinations can lead to more walking and cycling, and less driving (Speck, n.d.).

7.3 CONCLUDING REMARKS

In the end, this case study offers an exploration of mobility behaviour and its causes, and of its possible implications for the mobility transition. It serves as an example

of combining data from quantitative and qualitative methods, and of how they can strengthen each other and improve the understanding of the subject. Transitioning to more sustainable mobility is a challenging goal, as a part of a complex socio-technical system. This study shows some of this complexity and encourages further research. On top of that it encourages critical assessment of the goals of mobility policy, and how likely the policy will lead to reaching those goals. By encouraging this, this thesis can hopefully contribute ever so slightly to a more sustainable society.

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A

APPENDIX A: MOBILITY DATA

Municipality, Omnibus surveys 2011-2020, additional calculations by
P.A. de Graaf

Berekeningen op de Omnibusenquêtes van 2011 t/m 2020. We hebben dan 4.003 inwoners van de Linker Maasoever (LMO):

STADDEEL

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	RMO<ring	3627	33.1	33.4	33.4
	RMO>ring	3243	29.6	29.8	63.2
	LMO	4003	36.5	36.8	100.0
	Total	10873	99.1	100.0	
Missing	onbekend	95	0.9		
Total		10968	100.0		

Rijbewijs-, auto- en fietsbezit in de drie delen van Rotterdam:

[Q12] Heeft u een autorijbewijs? * STADDEEL Crosstabulation

		STADDEEL			
		RMO<ring	RMO>ring	LMO	Total
[Q12] Heeft u een autorijbewijs?	ja	74.7%	79.0%	69.3%	74.0%
	nee	25.3%	21.0%	30.7%	26.0%
Total		100.0%	100.0%	100.0%	100.0%

Beschikbaarheid auto, uitgebreid * STADDEEL Crosstabulation

		STADDEEL			
		RMO<ring	RMO>ring	LMO	Total
Beschikbaarheid auto, uitgebreid	altijd	49.0%	67.1%	53.2%	56.0%
	alleen 's avonds en/of weekend	4.0%	2.9%	2.1%	3.0%
	soms / nooit / geen rijbewijs	47.0%	30.0%	44.7%	41.1%
Total		100.0%	100.0%	100.0%	100.0%

Autos in het huishouden * STADDEEL Crosstabulation

		STADDEEL			
		RMO<ring	RMO>ring	LMO	Total
Autos in het huishouden	Ja	64.5%	82.5%	72.8%	73.0%
	Nee	35.5%	17.5%	27.2%	27.0%
Total		100.0%	100.0%	100.0%	100.0%

[Q16] Heeft u een fiets? * STADDEEL Crosstabulation

		STADDEEL			
		RMO<ring	RMO>ring	LMO	Total
[Q16] Heeft u een fiets?	ja	75.8%	83.4%	70.8%	76.3%
	nee	24.2%	16.6%	29.2%	23.7%
Total		100.0%	100.0%	100.0%	100.0%

Alleen op de Linker Maasoever:

Auto- en fietsbezit * Etniciteit Crosstabulation

		Etniciteit			Total
		autochtoon	westerse migratieachtergrond	niet-westerse migratieachtergrond	
Auto- en fietsbezit	beide	63.6%	50.4%	29.2%	52.6%
	auto	10.3%	13.1%	23.8%	14.4%
	fiets	21.3%	22.5%	22.8%	21.8%
	niets	4.8%	13.9%	24.2%	11.2%
Total		100.0%	100.0%	100.0%	100.0%

Auto- en fietsbezit * Huishoudensinkomen Crosstabulation

		Huishoudensinkomen				Total
		sociale minima	minimum tot modaal	modaal tot 2x modaal	meer dan 2x modaal	
Auto- en fietsbezit	beide	28.0%	49.1%	63.3%	75.5%	54.1%
	auto	15.2%	18.9%	12.7%	9.4%	14.2%
	fiets	33.0%	21.2%	19.3%	13.5%	21.8%
	niets	23.8%	10.8%	4.7%	1.6%	10.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

Op de Linker Maasoever:

Auto- en fietsbezit * Etniciteit Crosstabulation

		Etniciteit			Total
		autochtoon	westerse migratieachtergrond	niet-westerse migratieachtergrond	
Auto- en fietsbezit	beide	65.7%	54.7%	31.6%	56.9%
	auto	7.9%	10.3%	22.1%	11.4%
	fiets	22.9%	26.5%	24.3%	23.6%
	niets	3.5%	8.5%	22.0%	8.2%
Total		100.0%	100.0%	100.0%	100.0%

Auto- en fietsbezit * Huishoudensinkomen Crosstabulation

		Huishoudensinkomen				Total
		sociale minima	minimum tot modaal	modaal tot 2x modaal	meer dan 2x modaal	
Auto- en fietsbezit	beide	28.4%	51.4%	64.0%	77.1%	58.4%
	auto	13.4%	16.1%	10.3%	5.7%	10.8%
	fiets	38.6%	23.1%	21.4%	16.1%	23.5%
	niets	19.6%	9.4%	4.3%	1.2%	7.4%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

Geen auto en geen fiets; Linker Maasoever:

Etniciteit * Huishoudensinkomen Crosstabulation

		Huishoudensinkomen				Total
		sociale minima	minimum tot modaal	modaal tot 2x modaal	meer dan 2x modaal	
Etniciteit	autochtoon	12.1%	10.7%	6.9%	1.0%	30.6%
	westerse migratieachtergrond	7.5%	1.8%	1.7%	0.4%	11.5%
	niet-westerse migratieachtergrond	34.3%	15.4%	6.5%	1.8%	57.9%
Total		53.9%	27.8%	15.0%	3.2%	100.0%

B | APPENDIX B: INTERVIEW REPORT ANDREA FITSKIE (DUTCH)

Interview Andrea Fitskie (Veldacademie) on 04-03-2021 – Gespreksverslag

N: Nol van Gerven (Interviewer)

A: Andrea Fitskie (Interviewee)

N: legt uit waar het onderzoek over gaat: mobiliteitskeuzes die inwoners van de Tarwewijk maken, in relatie tot duurzame mobiliteit (CO₂-arm én ruimte-efficiënt). Daarvoor gebruik ik drie transitiepaden richting duurzame energie. Vraag is of inkomenspositie en culturele achtergrond invloed heeft op mobiliteitskeuzes en op draagvlak voor transitie naar duurzame mobiliteit. Daarom wil ik weten hoe de wijk eruit ziet, betere indruk krijgen.

A: wil je ook veldwerk doen?

N: is lastig nu vanwege corona, maar ik wil wel een dagje erheen om mensen te spreken

A: wat anders: objecten die eerst bij Kruisplein stonden gaan nu naar de Tarwewijk. Misschien interessant om ook daarnaar te kijken. Er wordt onder de metrobaan een ontmoetingsplek gemaakt, op een plek waar veel mobiliteit samenkomt.

A: Als achtergrond: in de Tarwewijk doen wij op twee pleinen een project. Het wordt nu bij stadsontwikkeling ontwikkeld. Dat heet 'campus Tarwewijk' en het doel is om de wijk te vergroenen, vanwege klimaatvraagstukken en het leefklimaat, maar het verbindt ook plekken met elkaar. Er komt dan een groene voetgangersroute van Balkon aan de Maashaven, via een aantal schoolpleinen, het Mijnsherenplein, onder de metro door naar het Zuidplein. Het is een relatief jonge wijk, 20% van de mensen is onder de 15. Dat is in vergelijking met andere wijken echt veel. Er zijn ook veel karakteristieke schoolgebouwen. Wij zijn bij het project betrokken om participatie te organiseren voor het ontwerp van twee pleinen, dat doen we via een openbare ontwerpprijsvraag. Hiervoor kunnen lokale organisaties, bedrijven, bewoners en studenten meedoen. De kaders zijn ook door bewoners en lokale organisaties bepaald. Bij Balkon aan de Maashaven moet uiteindelijk ook een brug komen, dat is de voor de langere termijn.

N: En daarnaast heb je ook het project Hart van Zuid? Dat ligt net niet in de Tarwewijk, maar heeft er wel invloed op

A: Klopt. Het Zuidplein is naast een kern met voorzieningen ook een OV-knooppunt, daar zit ook een mobiliteitsonderzoek aan vast. Collega's hebben onderzoek gedaan naar hoe mensen de ruimte daar ervaren. Het wordt vaak ervaren als een plek van komen en gaan, maar het doel is dat het meer een verblijfsruimte wordt. Het is veel gericht op businfrastructuur, waardoor er weinig ruimte is voor andere vormen van mobiliteit, zoals fiets en voetgangers. Er wordt gemonitord wat de waardering van de ruimte is, en of dat verbeterd tijdens en na de ontwikkeling, vergeleken met vooraf.

A: Maar over de Tarwewijk: het is dus een jonge wijk. Veel basisscholen: zo'n 6 of 7. Wat voor specifieke vragen heb je over de wijk?

N: Eerst nog wat over de Veldacademie: hebben jullie nog andere onderzoeken en rapporten over de wijk naast Hart van Zuid en de ontwerpprijsvraag?

A: Op onze website kun je die terugvinden op de kaart. Op Tarwekracht.nl kun je ook nog veel vinden. Eigenlijk staan alle relevante documenten daar verzameld. En ook veel links die doorverwijzen naar andere databronnen. Je zou bijvoorbeeld ook naar gezondheidsdata kunnen zoeken als je wil weten hoe vaak mensen fietsen of lopen.

N: Dankjewel. Hiernaast heb ik ook mobiliteitsdata gekregen van iemand van de gemeente, maar dat bestaat helaas niet op wijkniveau.

A: Op welk niveau is dat er wel? Stadsniveau of gebiedsniveau?

N: Op stadsniveau en uitgesplitst naar rechter- en linkermaasoever. Waarbij de rechtermaasoever

nog wel binnen en buiten de ring is. Het aantal respondenten is helaas te laag om verder in te zoomen op de gebieden of wijken.

A: Begrijpelijk. Er is nog wel data over hoe kinderen naar school gaan, daar zou je nog even naar kunnen kijken. Daarnaast hebben we ook veel interviews met organisaties uit de wijk, bijvoorbeeld over sportvoorzieningen en andere onderwerpen. Dat kan helpen om een beter beeld te krijgen van de wijk. Vast ook over mobiliteit of bereikbaarheid. Wat je bijvoorbeeld vaak ziet is dat de wereld van kinderen die hier opgroeien vaak heel klein is, dat ze niet vaak buiten de grenzen van de wijk gaan. Dat terwijl er veel voorzieningen missen, bijvoorbeeld een middelbare school of sportclub. Als ze geen fiets hebben of die niet gebruiken, of geen geld hebben voor het OV, dan gaan ze niet naar een sportclub.

N: Ik kan me wel voorstellen dat je liever niet hebt dat je kind die grote wegen oversteekt

A: Nee, en er zijn wel rode fietspaden, maar die sluiten niet overal goed aan, dus je moet toch vaak wegen oversteken. Wat me ook opvalt is dat sommige scholen geen fietsenstalling voor leerlingen hebben, of veel minder dan ik uit mijn jeugd gewend ben. Ik kan me wel voorstellen dat dat niet uniek is voor de Tarwewijk: in oude stadswijken die zo dichtbevolkt zijn is er lang niet altijd ruimte voor de fiets. Dat is heel anders dan bijvoorbeeld de Tuinsteden verder in het zuiden van de stad.

N: Dankjewel, nu heb ik wel een goed beeld van de Veldacademie en deze projecten, maar ik heb eigenlijk nog niet gevraagd naar je eigen achtergrond, kun je daar wat over vertellen?

A: Ja, eerst nog over de Veldacademie. Die bestaat nu twaalf jaar en is begonnen op Zuid, hier in Oud-Charlois. Het doel is om in de haarvaten van de wijk te onderzoeken om zo ook meer wijkspecifieke kennis op te doen. Het is vooral vanuit Bouwkunde van de TU Delft begonnen, maar we werken ook samen met de Hogeschool Rotterdam, EUR, Universiteit Leiden en in internationale samenwerkingen. Het is veel breder geworden: we onderzoeken sociaal-ruimtelijke vragen. Bijvoorbeeld mobiliteit is ruimtelijk: verplaatsen van A naar B, maar heeft ook een sociale waarde, als onderdeel van je leven.

A: Zelf ben ik ook hier afgestudeerd, in 2016. Ik heb een master architectuur gedaan. Ik wilde toen de vragen van echte mensen onderzoeken en mijn kennis inzetten voor mensen die niet vanzelfsprekend meebeslissen. Na mijn afstuderen ben ik ook hier gebleven. Je krijgt hele andere inzichten door met mensen te spreken. Een voorbeeld: zelf heb ik geen kinderen, dus ik weet niet hoe het is om je kinderen naar school te brengen. Of als het gaat om fietsen: mensen laten de fiets niet staan omdat ze lui zijn, maar omdat ze geen fiets kunnen betalen, of angstig zijn, of om andere redenen. Uit gezondheidsonderzoek blijkt dat ook: je moet heel veel factoren op orde hebben om tijd te kunnen besteden aan gezond eten. Die sociale factoren beïnvloeden ook wat voor oplossingen werken.

Een ander voorbeeld: ik heb ooit een onderzoek gedaan naar scootmobielen. Toen kwam ik erachter dat je mensen wel een scootmobiel kan geven, maar dat die dan vaak alsnog stil staat. Bijvoorbeeld omdat ze niet ermee durven te rijden, of omdat opladen in de gemeenschappelijke gang lastig is. Zo spelen er vaak dingen mee waar je niet meteen aan denkt.

A: Als het gaat om mobiliteit kan ik me voorstellen dat financiële problemen belangrijk zijn. Er zijn veel mensen in de wijk die echt heel weinig te besteden hebben. Voor de prijs van een ritje met de tram kun je ook eten kopen. En daarnaast veiligheid en cultuur. Of je opgroeit met het idee dat het gewoon is om te fietsen.

N: En fietsen is ook enger als je het niet al heel jong hebt geleerd

A: Ja. Gymdocenten geven dat ook aan: dat de motorische ontwikkeling van kinderen achterloopt. Bijvoorbeeld omdat ouders bang zijn dat hun kind valt, waardoor ze niet leren vallen. Als je dat als kind niet leert, kan dat op latere leeftijd ook veel schadelijker zijn. Er zal in ieder geval niet één reden

zijn waarom mensen weinig fietsen. Denk ook nog aan de voorbeeldfunctie van ouders of leeftijdsgenoten. Afgelopen zomer deden we een workshop met kinderen, toen vroegen we ook hoe ze naar school gingen. Eigenlijk komen er maar heel weinig kinderen met de fiets, dat vond ik opvallend. Wel veel die wandelen, maar er kwamen er meer met de auto dan met de fiets.

N: Dat viel mij ook op in de resultaten van de omnibusenquête, daar kwam de factor inkomen ook duidelijk naar voren. Mensen met een laag inkomen hebben in ieder geval minder vaak een auto, maar ook minder vaak een fiets. Bij OV-chipkaart zie je dat effect niet echt, maar daar zie je wel een effect van culturele achtergrond. Het is ook wel lastig om inkomen en culturele achtergrond uit elkaar te trekken in de data, omdat daar ook een correlatie tussen zit.

A: Het is ook wel lastig omdat je het op zo'n schaal vergelijkt. Bijvoorbeeld de linkermaasoever, dat zijn 300.000 mensen. Je kan die data wel gebruiken om algemene patronen te zien, en die vervolgens te vergelijken met de wijk. Zie je in de wijk een bevestiging of een ontkrachting van wat er uit de bredere data komt? Ook interessant: zijn er voor OV lagere tarieven op de een of andere manier?

N: Misschien zit dat ook een beetje in de informatievoorziening, dat mensen met een niet-westerse achtergrond minder vaak een OV-chipkaart hebben

A: Zou ook goed kunnen

A: Wat ik weet over de wijk is dat de parkeerdruk enorm hoog is. Het is gericht op de auto, maar er is niet genoeg ruimte daarvoor. Wat ik me nog wel afvraag is hoe het zit met de link tussen mobiliteit en werk. Er zit niet zo veel werkgelegenheid in de wijk zelf. De gemiddelde Nederlander woont 19km van zijn werk. Wat betekent dat voor mobiliteit in de wijk? Want als je altijd heel ver naar je werk moet en je hebt daar een auto voor nodig, wat betekent dat dan voor de rest van je leven. Misschien ben je dan heel veel tijd kwijt aan je te vervoeren, en heb je minder tijd om bijvoorbeeld je burens te ontmoeten. Dat komt uit een podcast, ik dacht van De Correspondent.

N: Ja volgens mij heb ik een artikel van hen gelezen met dezelfde strekking, dat we ons even lang blijven verplaatsen, maar steeds verder van ons werk wonen. Je sneller verplaatsen levert dus geen extra tijd op.

A: Ik vraag me wel af wat het zou betekenen als je die auto niet meer nodig hebt voor je werk, wat dat dan betekent? Dat scheelt tijd en ruimte.

N: Ja ik realiseer me nu dat die auto echt een vaststaand feit is als je die sowieso nodig hebt voor je werk. Misschien heb je dan geen geld om fietsen aan te schaffen.

A: Ja of je doet toch al alles met de auto, dus geen reden om dat te doen. Waar ik ook aan dacht: ik was verbaasd dat hier geen Felyx-deelscooters staan. Dit is juist een wijk waar een grote mobiliteitsvraag is, maar hier worden ze niet aangeboden. Welke rol spelen organisaties in die rechtvaardigheid. En die bedrijven, denken die dan dat er hier alleen maar vandalisme is?

N: Toevallig heb ik een scriptie hierover gelezen, waarbij de schrijver ook die bedrijven heeft geïnterviewd, en dat was wel een factor. Maar ook de verwachting dat er in rijke wijken meer winst wordt gemaakt. Rechtvaardigheid is daarin dan geen factor.

A: Ja, en juist de gemeente zou op die rechtvaardigheid kunnen sturen. Die bedrijven betalen niet mee aan fietsenrekken voor zover ik weet. Daar komen langzaam wel regels voor maar ze gebruiken nog steeds de openbare ruimte. De vraag is dan: moeten zij als ze ervan profiteren niet ook bijdragen aan de openbare ruimte?

A: Ik weet natuurlijk ook niet precies wat je focus is, maar het zou volgens mij een gemiste kans zijn als je mobiliteit niet kan koppelen aan andere thema's

N: Dat is ook het doel, maar ik kan er natuurlijk ook niet alles bij betrekken

A: Wat is het product dat je aan het einde wil neerleggen?

N: De vraag die ik wil beantwoorden is hoe de eigenschappen van een wijk, specifiek inkomen en culturele achtergrond van inwoners van invloed is op de effectiviteit van gemeentelijk beleid, dat gericht is op de mobiliteitstransitie. Die transitie definieer ik aan de hand van drie transitiepaden: één gericht op individueel autobezit, één gericht op mobiliteit als keten met een grote focus op OV, fiets en deelmobiliteit, één gericht op het energiesysteem als basis van het mobiliteitssysteem, waarbij het OV vervangen wordt door bijvoorbeeld deelmobiliteit.

A: Kijk je ook naar de implementatie van die paden?

N: Meer de stap ervoor: hoe kansrijk zijn die paden in deze specifieke wijk? Waar loop je tegenaan als je een bepaalde richting kiest? Dan kun je ook barrières identificeren en die aan de gemeente doorspelen

A: Dus dat is ook de doelgroep eigenlijk, de gemeente. Je zou naast je wetenschappelijke analyse ook een discussiestuk toe kunnen voegen, waarin je je eigen visie op de mobiliteitstransitie toevoegt. Een voorbeeld is wat we bij een project rond speeltuinen hebben gedaan, daar hebben we ook een extra ongevraagd advies toegevoegd waarin we de suggestie gaven om het beleid ook echt te veranderen. Laat het ook een soort visie zijn om het ook in een bredere context te plaatsen

N: Ik kan me voorstellen dat dat ook wel energie kan geven ja. Wat me bijvoorbeeld uit de literatuur opvalt is dat je een duidelijke keuze moet maken voor een ander pad dan het eerste, het autopad, omdat je anders vanzelf die kant op wordt gestuurd. Volgens mij is dat autopad namelijk niet waar de gemeente heen wil, maar ze lopen het risico daar toch naartoe gestuurd te worden door een path dependency.

A: Maar ook dat pad met deelmobiliteit: het idee was om bij Maashaven deelfietsen neer te zetten. In eerste instantie vond ik dat een goed idee. Maar nu denk ik: ga nou eerst onderzoeken waarom mensen niet gaan fietsen. Misschien moet je dan eerder fietslessen aanbieden?

N: Veel van mijn vragen zijn beantwoord. Bijvoorbeeld over de samenstelling van de wijk, daarover zei je dat het een jonge wijk is, veel kinderen

A: Let daarbij wel op: er zijn ook juist veel eenoudergezinnen. Soms is dat echt één ouder met vijf kinderen. Wat ook opvalt is de enorm hoge doorstroom: de meeste mensen verhuizen binnen een jaar weer de wijk uit. Dat heeft te maken met arbeidsmigranten, bijvoorbeeld uit Oost-Europa, die wisselen snel. Maar ook goedkope huizen waar mensen komen wonen, maar zo gauw ze de kans hebben om mooier te gaan wonen weer weggaan. Dat heeft veel invloed op de sociale samenhang.

N: Maar ook op hoe je je verplaatst. Je neemt ook je gewoontes mee. Als dat autorijden is, dan blijf je dat vast doen

A: Ja, en taalvaardigheid speelt daarin ook mee. Als je de taal niet begrijpt is dat ook een barrière om je te verplaatsen. Dat kan bijvoorbeeld gelden voor het openbaar vervoer.

N: Wat we nog niet benoemd hebben is de culturele diversiteit van de wijk. Het is echt heel divers: niet alleen bepaalde minderheidsgroepen maar van alles door elkaar.

A: Ja, maar wat wel opvalt is het grote aantal Oost-Europeanen, in een deel van de wijk zitten ook veel Poolse supermarkten bijvoorbeeld. Het is lastig om precies te achterhalen wie waar woont. Je kan wel kijken naar bijvoorbeeld winkels. Het is wel lastig, ook uit ethisch oogpunt op basis waarvan je precies onderscheid maakt

N: Klopt. Maar wat je wel ziet is een duidelijk verschil tussen mensen die opgroeien in Nederland en mensen die buiten NL opgroeien, in of je fietst of niet

A: Het zou wel interessant zijn om naar specifieke doelgroepen te kijken. Bijvoorbeeld op leeftijd: jonge mensen kunnen geen auto rijden dus pakken vast vaker de metro of de tram.

N: Hier kan ik al veel mee, enorm bedankt. Ik ga nog even kijken hoe ik het veldwerk precies doe

A: Je kan bijvoorbeeld ook observeren in de wijk. Ik zal je in contact brengen met Emil Janssen

C | APPENDIX C: INTERVIEW REPORT RAYMOND VAN ALTENA (DUTCH)

Interview Raymond van Altena (Wijkmanager Tarwewijk) op 16-03-2021 – Gespreksverslag

N: Nol van Gerven (Interviewer)

R: Raymond van Altena (Interviewee)

N: Even voorstellen. Nol van Gerven, student. Onderzoek hoe de manier waarop mensen zich verplaatsen samenhangt met inkomen en culturele achtergrond. Wil graag meer leren over de wijk, vandaar dit gesprek.

R: Raymond van Altena, wijkmanager van de Tarwewijk. Even uitleggen wat dat is: van alle ambtenaren zijn er twee fulltime in de wijk: wijknetwerker en wijkmanager. Die hebben geen inhoudelijke rol, maar zijn de schakel tussen bewoners en ambtenaren van de gemeente. We horen dus ook goed te weten wat er speelt bij bewoners, dat is ons vak. Leuk dat je naar de Tarwewijk komt. Daarom: waarom deze wijk?

N: Via gesprekken met mogelijke begeleiders op gekomen: ik wilde iets doen met mobiliteit in de stad en toen zei mijn huidige begeleider dat hij al een student had die in de Tarwewijk bezig was. Daarnaast: het is een achterstandswijk, in NPRZ, maar ligt tegelijkertijd ook heel dicht bij het centrum.

R: Grappig dat je dat zegt. Op Funda wordt de wijk ook aangeprezen vanwege de goede locatie. Verandert snel.

N: Ik was ook al bij de Veldacademie, daar ging het over Campus Tarwewijk, een groene loper door de stad

R: Dat is een wat kleinschalig project eigenlijk, je zou eens moeten opzoeken wat voor ideeën Francine Houben (Mecanoo architectenbureau) heeft over Zuid. Ik merk dat er eigenlijk steeds stukjes van haar visie worden gerealiseerd.

N: Gaat dat over leefbaarheid dan?

R: Nou echt over de fysieke leefomgeving en infrastructuur. Als voorbeeld: Brielselaan, die is nu heel moeilijk oversteekbaar. Wat zij zegt: je moet daar eigenlijk een heel groot park van maken, langs de Maashaven. Dan steken mensen die Brielselaan sneller over. Het uitzicht over het water is ook enorm mooi. Geldt ook voor de Waalhaven, daar zitten nu nog veel bedrijven. Je moet eigenlijk wonen en werken meer gaan combineren daar. In Charlois moet dat gebeuren bijvoorbeeld. Daarnaast, wat er al gebeurt: een dependance van de universiteit komt hier, en hogescholen. Allemaal binnen nu en een paar jaar. Dat heeft een enorme impact op de wijk, het wordt heel aantrekkelijk om hier te komen wonen.

N: Naast al die ontwikkelingen heb je ook Hart van Zuid

R: Dat maakt het ook tot een mooier gebied inderdaad

N: Wat ik van te voren kon vinden over wat je doet was de wijkagenda, en die is in samenwerking met het wijkcomité opgesteld begrijp ik?

R: Niet helemaal, omdat dat wijkcomité ook pas wat later is samengesteld

N: Daarin gaat het veel over leefbaarheid en veiligheid. Zijn dat ook de grote problemen of uitdagingen hier volgens jou?

R: Toen zeker. Dat halen we ook uit de wijkprofielen. Wat veel bewoners tijdens de onderzoeken daarvoor hebben aangegeven is dat ze zich onveilig voelen. Dat kan komen doordat er een keer iets van ze is gestolen, of doordat dingen uit het verleden blijven doorwerken. Op basis van die cijfers hebben we een plan gemaakt om die te verbeteren. Dat doe je samen met ambtenaren: die bedenken wat er dan moet gebeuren. Dat gaat langs de burgemeester [of B&W] en dan mogen we het gaan uitvoeren. En dan heb je plekken zoals deze, wijkhubs, zodat we zichtbaar zijn voor

bewoners en kunnen meedenken met alles wat er speelt. Er komt ook politie langs, mensen van werk en inkomen enzovoorts. Allemaal zodat de gemeente mensen in de wijk zelf kan helpen. En dus die wijkagenda, daarin staan verschillende lijnen waarmee we aan de slag willen. En we zijn bezig met kijken hoe we dat kunnen doen. Dat is dus deels gebaseerd op die wijkprofielen.

N: Dan snap ik wel waarom mobiliteit er minder in voorkomt, omdat die niet in de wijkprofielen staan. Dat hangt misschien ook niet zo 1 op 1 samen met de leefbaarheid. Al werden parkeerproblemen wel genoemd in de wijkagenda

R: Ja dat is een probleem: na 7 uur 's avonds is het gratis parkeren en dan komen mensen uit andere wijken ook hier hun auto neerzetten. Vanaf april wordt dat 11 uur 's avonds. Alles binnen de ring moet betaald parkeren worden, maar omdat het stapje voor stapje gaat zijn er wat problemen.

R: Het is wel goed dat je constateert dat mobiliteit hier niet zo'n hot topic is. Omdat mensen ook nog in een overlevingsstand zitten. Als je de objectieve veiligheid vergelijkt met de subjectieve, dan rechtvaardigt bijvoorbeeld het aantal inbraken, moorden en schietpartijen het gevoel van onveiligheid niet. Dat gebeurt bijna niet namelijk.

N: Interessante observatie, die overlevingsmodus. Ik zou mobiliteit niet direct een luxe noemen, maar dat is dus iets wat later komt.

R: Doet me denken aan een lezing die een tijdje terug had, over dat je 'salamanderbrein' het enige is wat werkt als je in de problemen zit. Dat heeft een grote impact op waar je mee bezig bent. Dan kun je wel een mooi verhaal houden over Felyx-scooters en dat je daar geld mee kan besparen, maar dat landt dan helemaal niet.

N: Wat me opvalt is dat er ook niet veel data over is op wijkniveau, over hoe mensen zich verplaatsen. Wat ik wel weet is dat bijna 40% van de bewoners geen auto en fiets heeft. Of misschien wat dat alleen niet-westerse migratieachtergrond. Misschien dat zij het OV pakken, maar het lijkt er ook op dat er sprake is van vervoersarmoede

R: Wat mensen niet doen, zie ik ook niet. Maar we hebben contact met ambtenaren, die zich bezighouden met de hulpvragen van bewoners. Dat team voor de Tarwewijk is heel groot: er zijn heel veel hulpvragen uit de wijk.

N: Waar gaan die hulpvragen over?

R: Echt van alles, taal, armoede, eten & drinken. We gaan echt met gezinnen aan de slag omdat er zo veel vraagstukken zijn. Opvoeden is er ook eentje. De hulpvraag is relatief hoog in deze wijk. Dat geeft aan dat je een groep mensen hebt die bijvoorbeeld geen twee auto's voor de deur heeft staan.

N: Ik wil het toch nog eens vragen: op welke manier zou de gemiddelde inwoner van Tarwewijk zich te verplaatsen?

R: Dat kan ik niet zeggen, maar lijkt me heel goed voor jou om die gesprekken eens te gaan voeren.

N: Dat ben ik ook van plan inderdaad.

N: Ik snap het nu al wat beter. Het gaat weinig over mobiliteit als je met bewoners praat.

R: Ja, maar de gemeente is er wel voorstander van om daarover te praten. Een voorbeeld: we hebben de Pleinweg, daar heeft Houben ook een fantastisch verhaal over. Vroeger was dat een snelweg naar Den Haag. De Coolsingel was ook zo'n doorgaande snelweg, dat wordt nu ook een soort Parklaan. Bij de Maastunnel is nu ook een experiment om de fijnstofuitstoot te verminderen. Je wil niet weten wat voor discussies dat oproept. Bij dat soort vraagstukken praat je met het wijkcomité en de gebiedscommissies. Die mensen stellen vragen hoe dat dan zit, want ze willen niet dat de straat smaller wordt. Je kan de stad al moeilijk in, en ze hebben last van die verkeersopstoppingen. Maar het doel waar het eigenlijk om gaat, wordt niet besproken: die mensen wonen met kinderen die ze opvoeden in een van de ergste luchtverontreinigde stukken van Rotterdam, waardoor de levensverwachting een stuk minder is dan als je ergens anders woont, dat

wordt niet besproken. Je kan ook zeggen: die mensen die hier doorheen rijden, bijvoorbeeld uit Barendrecht, die verontreinigen onze lucht, dus laat ze maar via de ring rijden. Maar dat wordt niet gezegd. Het is echt meer vanuit jezelf: ja ik wil met de auto naar de stad. Het is echt lastig om in dat soort discussies tot de kern te komen.

N: Het is dus ook lastig om mensen een andere keuze te laten maken. Als je eenmaal een auto hebt is het misschien wel de makkelijkste manier om naar de stad te gaan. Alhoewel..

R: Nee dat vraag ik me persoonlijk dus ook af. Toen ik in Kralingen woonde ging ik ook altijd op de fiets boodschappen doen, want met de auto was dat zo'n gedoe. Ondanks dat we twee kinderen hadden en steeds boodschappen op de Goudesingel gingen doen. Dus het kan ook anders.

Wat anders: nu woon ik buiten Rotterdam, maar ik ben weer op zoek naar een woning hier. Een van de projecten waar ik naar kijk is Sawa in het Lloydkwartier. Wat ze daar doen is voor 150 woningen maar 30 parkeerplaatsen realiseren. En 5 tesla's als deelauto's. Dus je kan het ook zo inrichten. Op een andere plek, bij De Hef, dus ik vroeg me af of je daar ook een elektrische auto kwijt kan. En dat kan niet, je kan hem niet opladen. Dat moet nog gebouwd worden, en daar wordt geen rekening mee gehouden. En op een andere plek had je twee parkeerplaatsen bij je appartement, midden in de stad. Heel vreemd om dat zo te doen. Eigenlijk zou het heel normaal moeten zijn zoals er bij Sawa naar gekeken wordt, maar het is nog bijzonder.

R: Terug naar die 'campus'. Daar heb je een plein in de wijk, het Mijnsherenplein. Laten we eens kijken wat je daar kan doen. Misschien wat deelscooters, laat zien dat het verandert, dat er wat gebeurt. Als je dat niet doet, gebeurt het niet.

R: Een anekdote: een keer fietste ik vanaf het station hiernaartoe, en zag ik een meisje fietsen. Die was helemaal in paniek. Ze moest een examen doen, maar ze wist niet precies waar en haar telefoon was leeg. Ze woonde in Zuid en ze was nog nooit in Noord geweest. Ben toen een stukje meegefietst om haar te helpen. Maar toen ik weer verder fietste bedacht ik 'huh, nog nooit in Noord geweest?'. Dat geeft wel aan wat voor een verschil dat is met bijvoorbeeld mijn eigen kinderen: er zijn weinig continenten waar die nog niet geweest zijn.

N: Dat laat zien hoe groot of klein je wereld kan zijn inderdaad.

R: Ja, en als je het niet ziet en niet ervaart, dan zie je dat niet. Dat heb je ook als je naar bijvoorbeeld Zuid-Afrika gaat, dan beleef je daar de armoede en dan zie je het ook echt. Dat is een hele andere wereld. Op het moment dat je daar nooit mee in aanraking komt, heb je dat niet.

N: Heel interessant verhaal. Toen ik begon met mijn scriptie dacht ik heel erg in de keuzes die mensen maken, waar denken ze dan over na en baseren ze het op. Ook vanuit economie en ratio gedacht. Maar dit gaat zo veel verder dan een economische of rationele afweging.

R: dat zit daar inderdaad niet in

N: Volgens mij moet ik dan ook schrijven vanuit dat oogpunt, vanuit vervoersarmoede en of mensen hun wijk niet uitkomen. Dit verandert wel echt mijn perspectief.

R: Ja, het verandert natuurlijk wel: het wordt steeds duurder en er komen ook meer mensen met geld naar deze wijken. Die denken weer anders over die dingen, daar zit wel wat verschil in.

R: Maar terug naar die campus: ik probeer dan mijn collega's aan te jagen om verder te gaan, niet alleen een boom neer te zetten maar verder te gaan. Ik wil ze vertellen: kom dan hier ook met je spullen. Is wel een lastige balans tussen op hun stoel gaan zitten en helpen. Ik wil ze vooral uitnodigen om bijvoorbeeld naast de snelbus door de maastunnel ook andere dingen te doen in de wijk.

R: Daarnaast heb je ook veel arbeidsmigranten in de wijk

N: Daar wilde ik ook aan denken inderdaad, ook omdat er zo'n hoge doorloop is

R: Nou dat zijn cijfers van een paar jaar geleden, ik vraag me af of dat nog steeds zo hoog is als 3 of 4 jaar geleden.

R: Maar hier wonen dus redelijk veel arbeidsmigranten, omdat het een redelijk goedkope wijk is. We houden dat ook in stand, want mensen moeten ook naar de stad kunnen komen. Veel arbeidsmigranten worden 's ochtends vroeg opgehaald met een busje en gebracht naar de kassen, of de haven of andere plekken.

N: Wonen die in een bepaald deel van de wijk of ook verspreid?

R: Niet in het deel dat van de woningcorporaties is (1/3^e van de wijk), maar in het private deel (de rest).

COLOPHON

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