Urban Transport Policy Paradigms

A philosophical and engineering analysis

Master thesis

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Preface

Throughout my school and university years, I have always wondered why things are as they are. During my civil engineering studies, I have been taught about infrastructures, planning and different engineering methodologies. In my master though, two issues came up. Firstly, all kinds of engineering solutions do not work in practice. Congestion for example cannot be solved by building more infrastructure alone. Secondly, I discovered that the why behind our built environment does not relate only to infrastructure itself, but also to thinking about what it means. Why is congestion a problem in the first place? This is why I chose to do a second master and combine philosophy with civil engineering.

My master thesis has given me the opportunity to research philosophical concepts in an engineering context. Combining both fields has benefits in my view. Engineers can and should learn about the normative implications of their work, a subject I discuss in this thesis. Infrastructural choices and practices on the other hand reveal to philosophers and sociologists many interesting aspects of society, such as power structures and moral norms held by policy makers. Finishing this thesis, I see myself as a bridge between these two worlds that do not often meet.

Integrating both researches into one set of questions and conceptual framework was harder than I thought. More than once I had to take a step back and overlook the whole project. Doing two theses at a time has also practical benefits. Writing on civil engineering texts made me forget earlier texts I wrote on philosophy and vice versa, which enabled me to 'kill my darlings' quite easily.

I would especially like to thank all my supervisors for their feedback and guidance, open-mindedness and flexibility. Karst, I thank you for your broad view on what transport planning is and should be, and your constructive response to my all work. Tom, you have helped me with out-of-the-box thinking and statistical analysis, I thank you for that. Marco and other colleagues from CROW, I thank you for having me in your team. Your input from a practical perspective have helped me in my research and more importantly, I have enjoyed being in Ede while I could also have sat at home. I would also like to thank my PSTS supervisors from the STePS department, Adri and Fokko Jan, for their supportive feedback on this thesis. Finally, I would like to thank my friends, family – heit, mem en Jesse – and David. Your interest, enjoyable being-together and care have helped me doing this research.

Cover image: Painting by Gerrit Adriaensz. Berckheyde, 'De bocht van de Herengracht' (1671-72)

Summary

Problem context and research aim – In order to promote sustainable urban development for all citizens, transport policies have to change from exclusively traffic-oriented to integral visions with a focus on active modes and transit. Universities and other knowledge organizations create new calculating tools, models and general knowledge on sustainable and just transport. It is often experienced however by the same researchers that it is difficult to let this knowledge 'land' at the policy maker in the field, let alone that something is done with it by creating better policies. Some Dutch municipalities are developing sustainable transport policies whereas other municipalities stay behind. The central aim of this thesis is retrieving the circumstances and conditions of policy change in urban municipalities through the analytic entry of the paradigm concept.

Theoretical background and philosophical basis – Many transport and geography researchers advocate to move from one paradigm to another in both academia and transport planning. They often refer to paradigms as world views exemplified by accepted problem and solution sets, in the classic Kuhnian scientific sense. Based on such literature, two different types of conceptual paradigms in an urban context have been distinguished: a dominant mobility-based paradigm which views traveling as a disutility, and an alternative newer accessibility-based paradigm that builds on reaching destinations and the social dimension of transport. In order to analyse transport policies and their historic development, the paradigm concept should be extended by adding institutional elements to it. This so-called planning paradigm can function as an explanatory theoretical model for policy change in a practical context. Policy making is an activity in which the planner works forth-and-back with technology and other planners in a specific organizational context. Therefore, a definition a planning paradigm has been proposed, consisting of *conceptual* elements on the one hand and of an *institutional* embedding of these conceptual elements through groups of actors, rules, norms and practices on the other hand. This second part of a planning paradigm is based on the regime concept of the Multi-Level Perspective theory.

Historically, the institutional context of a planning paradigm explains better why policy makers and their organizations do not adopt new policies. Transport planners have implemented minimization of travel time as a norm since the 1920s, through standardization of knowledge and building on the belief that the fast car will win. Speed as a norm has worked through in urban design, by separating traffic flows and distribution of space. Transport modelling with its focus on numbers supported this norm, as it was regarded as a quantitative and objective analysis. Empirical research shows that there are many (institutional) barriers experienced by policy makers for adopting different policies, such as lack of knowledge and data, lack of political support and conflicting interests because of sectoral planning.

Research methodology – To analyse transport policy paradigms empirically, 172 Dutch municipal transport policy documents have been analysed and scored based on criteria of the mobility-based and accessibility-based framework respectively. A mobility-based paradigm is defined through its focus on speed and efficiency on a network scale. It places car infrastructures and mobility for users central as a policy instrument. Time thresholds or I/C ratio's are used as the main evaluator of a transport system. An accessibility-based paradigm connects the travelling realm (i.e. a trip) with the spatial realm. Policy goals on promoting liveability, social equity and decreasing poverty issues are important. Policy instruments also include promoting public transport and cycling, as well as influencing travel behaviour and connecting spatial and mobility policies. To monitor accessibility policies, location-based accessibility measures are used, which focus on the number of activities an individual can reach by different modes.

The planning paradigm scores have been related with transport, spatial, demographical and institutional characteristics of municipalities. Also, document characteristics like publication year and consultancy involvement have been related with the scores. A descriptive statistical analysis has been carried out to look for relations, using independent factor scores created by principal component analysis. Furthermore, four interviews have been executed with local municipal policy makers in order to retrieve local organizational and political triggers for paradigmatic change. An important part of policy and decision making happens namely in an informal sphere through organizational networks of policy makers.

Results – This research shows that most municipalities adopt policies based on the mobility-based paradigm instead of the accessibility-based paradigm. Moreover, progressive policy plans are mostly implemented in highly urban municipalities, which can often be characterized as progressive (student) cities. Social urbanity, exemplified by a higher share of low income households and lower share of commuting citizens do correlate positively with accessibility-based scores. High levels of physical urbanity, exemplified by densities and air pollution, do not correlate uniformly with high accessibility scores however. Organizational and institutional characteristics of municipalities fill this explanatory gap, such as the municipal political orientation and the year of publication of the document. Older policy documents are generally more conservative than newer policy documents. Municipalities that have explicitly chosen to prioritize active modes and deprioritize the car have a higher electoral share of progressive parties.

Furthermore, through interviews six organizational conditions have been found that support paradigmatic change: Knowledge and attitude of employees (1), political triggers and support (2), cooperation with external (knowledge) parties (3), positive leadership (4), coupling with provincial/national developments (5) and local air quality problems (6).

Conclusion – Through document analysis, it is concluded that paradigmatic policy change is slowly starting to happen in Dutch municipalities, although not on a large scale. Most municipalities are somewhere in between the extreme positions of a mobility-based paradigm and an accessibility-based paradigm. Through interviews, it is concluded that the most important organizational condition for paradigmatic change is the local knowledge basis of policy makers and their willingness to innovate and cooperate with external parties. All in all, a local combination of urban mobility problems, political mandate and local organization of a municipality explains the presence of paradigmatic transport policy change in Dutch urban municipalities. More research is necessary though to understand how the planning paradigm concept can be applied in the grey area of policy making, beyond the extremes of the mobility-based and accessibility-based paradigm. Applying the term in a non-urban or non-Western context is also possible.

Table of contents

1. Introduction

This thesis connects Philosophy of Technology (PSTS) and Civil Engineering (CEM). In the classic view, philosophy is about ideas, concepts and non-material aspects of our world. Questions like why do we live and how should we live the good life, are classic philosophical questions. Civil engineering on the other hand in this classic view deals with intervening in the material world through design, constructing and maintaining infrastructures. In short, philosophers *think* about the world whereas engineers *build* the world. This dualism and separation between the material and the cognitive remains attractive, but is too simplistic. In fact, both approaches are not that distinct from each other as one might think. Philosophers, especially after the so-called empirical turn, build rationales and cognitive frameworks to understand how and why certain 'things' are made, also helped by engineering practices that shape these conceptualizations. Civil engineers develop and use (often unconsciously) rationales which are embedded within philosophical concepts about justice, rationality, certainty and truth.

Particularly transport policies operate at the merge of philosophy and civil engineering, through presenting a narrative of problems and solutions, tied together with political ambitions and (often) social problems. These narratives can change however. New ideas from academia and different social problems and issues influence the way traveling is conceptualized. Transport planning should therefore not only be approached from a conceptual perspective. To capture both the cognitive and social aspects, this thesis will focus on paradigms and paradigmatic changes in transport policies by looking at their interrelated cognitive, social and institutional aspects. I will introduce and operationalize the term 'transport planning paradigm' to approach transport planning policies in an integral way.

Civil engineering and society are interwoven. This is illustrated by actual social challenges of sustainability, CO_2 emissions, climate change, population growth, increasing differences between rich and poor and urban liveability, which will strongly affect policy making in the field of (urban) transport systems. Transport policy making will also influence the social aspect of sustainability in the form of social equity and social inclusion. Moreover, the social challenge of increasing population growth in cities and urbanized areas like the Dutch Randstad is a trend that is expected to continue for the next 20 years (De Jong & Daalhuizen, 2014). This gives all the reason to reflect upon actual and future urban transport policies. In this thesis, this will be done by investigating (underlying) paradigms in urban transport policy reports. Based on literature study, two types of paradigms will be distinguished in the Dutch policy making context. Consequently, the presence of both paradigms is scored through policy document analysis of municipal documents. These scores are then related to different kinds of municipal characteristics, including organizational variables. Finally, organizational and social conditions for paradigmatic change are retrieved through interviews with several municipal transport policy makers.

1.1 Problem context

According to the Dutch law[1], each governmental layer in the Netherlands such as a municipality has to create a policy plan which includes a vision on long-term development of transport policies. Explicitly, this vision includes defined transport problems and their possible solutions. Also part of

[1] See 'Planwet Verkeer en Vervoer' Par. 4 Art. 8-10, https://wetten.overheid.nl/BWBR0009642/2015-01-01#Opschrift (Accessed 20th of August 2019). Note that this law will be replaced by a new Environmental and Planning Act, which will integrate all spatial planning and transport planning rules into one coherent regulatory framework. This new law will highly influence all future urban planning projects in the Netherlands. It is therefore extra interesting to see how current transport policy plans are prepared for the new planning act.

the vision are transport policy aims the government has set, like improving public transport or setting the parking costs at 2 euros per hour at a maximum. Implicitly however, the vision also reveals what ideas a government has on traveling and infrastructure, usually described in terms of mobility and accessibility. Problems mentioned in municipal mobility plans have a historical, an organizational and a social context which influence why and how problems and their possible solutions are described. These contexts become socially and institutionally embedded in paradigms which implicitly and/or explicitly shape policy choices, which help framing problems and their solutions, and which become visible in urban transport plans. This paradigm-based process of policy choice and problem framing in urban transport plans is the subject of this multidisciplinary thesis.

In the long term development of transport policies, an economic meaning through the concept of mobility has become dominant as I will show in this thesis. Improving mobility means that travel times are reduced so that individuals can travel faster and further. Policy instruments and measures have been constructed and adopted based on the aims of flow and speed, especially for cars. Transport planning in the form of 'predict-and-provide' places (car) mobility and car infrastructure central as a policy goal and instrument respectively. Success is mostly measured through saved vehicle hours or average flow. For example, ex-ante standardized cost-benefit analysis (CBA) has been used as an instrument to calculate whether a proposed investment is worth the costs or not, given certain benefits (Annema, Koopmans & Van Wee, 2007). In such a format, a possible decrease in travel time through infrastructure investment and ecological effects are monetarily translated through assigning a value to travel time and CO_2. One of the hypothesis of this thesis is that car mobility and car infrastructure-based conceptions are still much used and practiced in most of the Dutch governmental layers, including municipalities.

In recent decades however, other planning conceptions have been developed in academia and other knowledge institutions as a response to social problems and challenges. These new conceptions have challenged dominant problem framing, by linking traveling to accessibility, including social equity. Accessibility can be defined as an indicator for individuals to have the opportunity to participate at activities at different locations (Geurs & van Wee, 2004). Through accessibility, it is challenged what is considered to be a transport problem in the first place and what a suitable transport solution is. Where mobility focuses on the trip and infrastructure between location A and B, the concept of accessibility incorporates also the value of destination and social dimension of transport. Building physical infrastructures is not the only policy tool anymore, as it requires integrating transport policies with spatial planning policies. From 2021 on, this integration is obligatory in a new national Environmental and Planning Act. Another possibility is to change travel behaviour by smart apps and new transport packages.

1.2 Research aim and hypothesis

As stated previously, a range of institutions and actors are developing new knowledge about transport systems and policies. For example, universities and other knowledge organizations such as CROW create new calculating tools, models and general knowledge on sustainable and just transport. It is often experienced however by the same researchers that it is difficult to let this knowledge 'land' at the policy maker in the field, let alone that something is done with it by creating better policies. In fact, some municipalities are changing towards sustainable transport policies whereas other municipalities stay behind. It is unknown however under which conditions governments change their transport policy plans. Or to put it in other words, why for example does one municipality implement transport policies in line with new insights, while another municipality does not. In order to make future change possible in the direction of equity and sustainability, it is important to know under which circumstances municipalities learn with regard to transport policies. Retrieving the

circumstances and conditions of paradigmatic change in municipal transport policy making is the central aim of this thesis.

In order to analyse policy making at a municipal level, I will introduce the term 'transport planning paradigm' in this thesis. This term is defined as a social and cognitive way of conceptualizing and intervening in the transport system by transport policy makers. This is exemplified by philosophical assumptions (1), policy goals (2), policy instruments (3) and evaluative criteria of the transport system (4). Finally, the planning paradigm needs institutional embedding of policy practices through organization and values. The four elements enable to analyse and quantify transport policy plans in a structured way which does right to literature on policy making through the so-called policy cycle: problem detection and rationale can be related to philosophical assumptions, setting objectives with policy goals, the appraisal of policy instruments with monitoring and different evaluative criteria of the transport system (Bochel & Duncan, 2007; HM Treasury, 2018; Stopher & Stanley, 2014). The institutional embedding of a paradigm represents different types of policy practices, value orientations and organization of the paradigm. I will go now shortly into both main aspects of a transport policy paradigm.

Theoretically, it is possible that governments change their plans based on *content*. For example, if numbers show that pollution by car traffic has increased in the last four years, a municipality adopts a new policy instrument to solve this problem. Also, new insights from for example academia on good policy instruments could lead to setting different policies. The classic policy cycle incorporates such changes based on epistemic insights. This cycle assumes a linear policy process which starts with a rationale or problem. Based on this problem, objectives are stated which are translated into certain instruments. The effect of instruments is monitored and evaluated, which eventually leads to a different rationale or problem. A conceptualization of the policy cycle can be found in Figure 1.

Figure 1: Policy cycle after the HM Treasury (2018)

The assumed linearity of policy making and process of change in general is not accurate though, which is advocated by for example Geels (2012) through the Multi-Level-Perspective (MLP). In this framework, interactions between three levels are the basis for socio-technical transitions: the landscape (macro trends like changes in economy and politics), the regime (patterns of actors, rules, institutions and practices) and niches (local individual actors, technologies or innovations). Especially the regime concept describes why transitions do not happen, as it is 'geared towards the status quo and thus towards optimization and protecting investments rather than system innovations' (Van Der

Brugge, Rotmans & Loorbach, 2005, p. 167). The institutional embedding of a planning paradigm through groups of actors, rules and practices could therefore explain why a municipality does (not) change its conceptualization of the transport system and eventually policies. For example, a change in organizational structure like top-down or democratic participation can lead to different policy objectives, instruments and monitoring measures. Also, (lack of) political support could explain why a policies are not changing. All in all, this thesis will test the hypothesis that institutional reorganization is at least as important for paradigmatic change as epistemic learning can be. Connecting this hypothesis with the central aim of this thesis, this means that organizational circumstances are just as important for paradigmatic policy change as progressive insight is through epistemic learning.

1.3 Research questions

All in all, this leads to the following main research question of this thesis:

- How can changes, orientations, and practices of Dutch urban mobility policies be explained by using the paradigm concept?

Firstly, this question relates to philosophy and STS (Science, Technology and Society) concepts and questions. An analysis of different conceptualizations of traveling throughout the history of transport planning and an operationalization of the paradigm concept will therefore form the theoretical PSTS basis for this thesis. The main research question will be worked out from a PSTS perspective through answering the following two sub questions:

1. How can travelling be conceptualized in terms of paradigms in a planning context?
2. How did the historical processes of modelling and institutional embedding make the mobility-based paradigm dominant?

Secondly, this research is about policy practices in municipalities. An empirical analysis of municipal policy documents will be the main body of the Civil Engineering thesis. The main research question will be worked out from a CEM perspective through answering the following three sub questions:

1. What kind of transport policy paradigms are present in Dutch urban municipal transport policy plans?
2. Which transport-related, demographic, spatial and institutional characteristics relate with the transport policy paradigm of municipal documents?
3. Which factors of a transport policy paradigm are promotors and barriers for a paradigm shift?

1.4 Reading guide

The outline of this thesis is as follows. In Chapter 2, the theoretical background and context of paradigmatic change is explored. The largest part of this chapter is based on the results of the PSTS thesis and research questions. In Chapter 3, the research methodology for this thesis is described. Chapter 4 presents the results of the policy document analysis and interviews, and in Chapter 5 these results are reflected upon in the discussion section. Chapter 6 presents the overall conclusions for each part and further research possibilities.

2. Theoretical background and context

In this chapter, a theoretical background of transport planning paradigms is presented, largely based on the PSTS thesis. Sub research questions 1 and 2 are thereby (implicitly) answered, although more extensively in the PSTS thesis. Firstly, two conceptual paradigms are distinguished. Then, the concept of a planning paradigm is defined based on Kuhn's original definition and more practical interpretations of paradigms. Based on historical analysis, it is consequently shown that it is so hard to change planning paradigms, because of its institutional embedding. Finally, these results are reflected upon by reviewing empirical studies of experiences and barriers of policy makers for adopting different transport policies. The scope of this literature study is focused on planners and planning activities rather than consumers and human (travel) behaviour, simply because consumers have had no significant influence on transport planning processes until the 1970s and 80s

2.1 Mobility based paradigm

Based on literature study, I distinguish a first conceptual paradigm related to urban transport planning. This mobility-based paradigm has a basis of travel time reduction, thus increasing the possible distance radius of traveling. Travel time reduction has been one of the main aims in transport policies in the Netherlands and other Western countries. Transport policies on for example road safety and sustainability were developed later on, subordinate to the prime goal of travel time reduction (Norton, 2015; Schwanen, Banister & Anable, 2011). In fact, the focus of speed and flow creates safety problems and negative externalities such as air pollution. Policy instruments and measures have been constructed and adopted based on the aim of speed. According to Lyons and Urry (2005, p. 258), 'economically, transport connects people to opportunities and hence yields positive benefits. Yet journey time itself is judged in economic terms as wasted time'. Travelling itself is thus considered to be a disutility. The policy maker assumes thus that one can decrease his or her traveling disutility either by living closer to points of interest or increasing travel speeds. The latter has been the main focus of transport planners since the profession was invented in the 1920s and 30s (Popkema, 2014). Cresswell and Merriman (2011) as cited by Jensen (2015, p. 480) note that transport geography and transport modelling was mostly a quantitative, positivist, and law-seeking activity in the context of conceptualizing travellers and travel time. Conceptions of travel time as disutility and travellers as rational free agents minimizing their travel time still work through as assumptions in transport planning instruments such as computer traffic models and cost-benefit analysis (CBA). Values such as causality, rationality and clarity underly these assumptions. In current traffic and transport models, costs are used to calculate how so-called trips are assigned to car, public transport and cycling networks.

One of the most important (current) planning instruments is a CBA of potential infrastructure projects. Such an analysis always includes an estimated reduction of travel time. This reduction of travel time is consequently translated into a monetary value given a value of time of travellers. Ex-ante standardized approaches such as CBA are used to evaluate infrastructures funded by the national government, so that the quality and objectivity of decision-making can be improved (Annema et al., 2007). A project is profitable if the beneficiaries (often consisting of around 80% or more of travel time reduction) outweigh the costs. Main components of a CBA are accessibility benefits (e.g. travel time savings and travel time reliability), traffic safety effects, environmental effects and costs. Since 2007, not only national infrastructure projects need to go through a CBA, also local and regional projects funded by national government have to be evaluated according to a CBA (Beukers, Bertolini & Te Brömmelstroet, 2012). A social CBA (or sCBA) also includes social impacts of infrastructures, although often in a very limited way (Geurs, Boon & Van Wee, 2009) because social effects are often hard to estimate and quantify in ex-ante appraisals.

2.2 Accessibility-based paradigm

Based on critiques I will elaborate on later, scholars have proposed to move from the mobility-based paradigm based on travel time reduction to a more holistic view on mobility, namely accessibility (Banister, 2011; Cervero, 1997; Ferreira, Beukers & Te Brömmelstroet, 2012; Geurs, Zondag, de Jong & de Bok, 2010; Litman, 2013). Accessibility can be defined as an indicator for individuals to have the opportunity to participate at activities at different locations (Geurs & van Wee, 2004). The idea is that transport planning should move from being a technocratic practice, where predict-and-provide principles are the main focus. Not the focus on trips and its costs is the main focus, but reaching certain destinations which are valuable for an individual. This means that focusing on infrastructure development to tackle congestion (i.e. travel time reduction) is not the main priority anymore. Travel time itself is not per se a disutility, as train traveling for example shows when people work or read a book. Transport planning through the lens of accessibility means that the experience of access for individuals in space and time are the most important. Planners should thus be focusing on accessibility of different locations for different people at different times of the day as main indicator, rather than travel time reduction only. An important part of accessibility planning is acknowledging the integral character of transport planning. A difference in land-use can lead to a difference in activities which consequently leads to different traffic flows (Wegener & Fürst, 1999). Therefore, transport planning cannot be dealt with in a separate municipal department, and not in isolation from the spatial planning department. Lack of institutional and professional cooperation can in fact lead to policies which are working against goals of other departments. Another very important aspect of the accessibility-based paradigm is the acknowledgement that transport policies are clearly related to both engineering and social practices, and have both social and technical impacts. This conceptual addition to understanding transport systems has been highly inspired and influenced by Urry (2000, 2007) and is called the new mobilities paradigm (Sheller & Urry, 2006). This research field aims to approach mobility from a multidisciplinary and human-centred perspective, in order to analyse the meanings travellers attach to traveling (practices), spaces and themselves in an interconnected society. All in all, this means that social (equity) problems are just as much a problem for traffic engineers as flow problems of transport systems. The conceptual use of the paradigm concept is just one part though of understanding policies and practices in a planning context.

2.3 Planning paradigms in a transport context

It is often unclear what the term paradigm entails in a practical planning context because of its lack of proper definition by researchers. In literature, many transport and geography researchers advocate to move from one paradigm to another. For example, Cervero (1997) advocates to move from a mobility-based planning paradigm to an accessibility-based paradigm. Banister (2008) suggest to move towards a sustainable mobility paradigm without defining what a paradigm exactly is. More recently, Lyons (2018) aims to align ‘the smart’ and ‘the’ sustainable planning paradigm with each other. The definition of a paradigm refers with all authors to the adjective that is placed before the word, which makes the paradigm concept fuzzy in a planning context. Jones (2014) has actually tried to define a transport planning paradigm, but directly applies the Kuhnian (scientific) definition of a paradigm into a planning context. Another issue is that Jones’ (2012) idea of a paradigm is only dealt with in term of ideas and not in terms of planning activities. This approach to paradigms is also present with the earlier-mentioned authors. Such argumentation underestimates what a paradigm entails, and that a paradigm has to be supported by planners, scientists and technological instruments in a practical context. I therefore suggest to operationalize the term ‘paradigm’ in a planning context, which enables to understand transport planning practices more properly. What would such an operationalization need? Most importantly, a paradigm should be approached from an activity-based perspective through its practices. A paradigm not only consists of ideas,

perspectives or beliefs held by policy makers. Rather, policy making is an activity in which the planner works forth-and-back with technology and other planners in a specific organizational context. Knowledge about technologies, best practices and state-of-the-art research is shared through both formal and informal networks of rules and norms of the regime (Geels, 2012; Van Der Brugge et al., 2005). A regime is the dominant pattern of actors, artefacts and structures in a social system. Moreover, policy makers rely on (political) values such as a (dis)belief in freedom, rationality or logic. All these institutional and organizational aspects play an important role in de adoption of alternative concepts in municipal organizations.

The term paradigm has been introduced in the philosophy of science field by Thomas Kuhn (1962). The original and most common explanation of a paradigm is described as a set of beliefs to which a certain scientific community subscribes. A paradigm describes and prescribes the set of problems that are acknowledged as a problem and the solutions that are appropriate for these problems, based on certain shared rules and standards. One of the most-cited papers which came up with the term policy paradigms is written by political economist Hall (1993). He defines policy paradigms as interpretive frameworks of ideas and standards 'that specif[y] not only the goals of policy and instruments that can be used to attain them, but also the very nature of the problems they are meant to be addressing' (Hall, 1993, p. 279). This framework is according to Hall embedded in the terminology policy makers use and influential precisely because policy makers are not aware of it.

The role of technology and practices are not enough incorporated in both Kuhn's framework of a disciplinary matrix and Hall's framework of a policy paradigm. Transport planning is typically an activity performed by the use of planning instruments such as traffic models and GIS-based maps. Kuhn talks a lot about ideas, and not about the pragmatic part of a paradigm such as instruments and standards which embody the paradigm, such as (traffic) models. Therefore, I will use a more practical interpretation of Kuhn's work by the philosopher of science Rouse (2003) since he approaches science not only as an epistemological endeavour, but from a practical perspective. This approach to philosophy of science is derived from the idea that science is an activity, and not only knowledge derived from that activity. This enables to open the black-box that science (or any other knowledge-based activity) sometimes can be. Rouse sees paradigms not as beliefs or epistemic values only, but as 'exemplary ways of conceptualizing and intervening in particular situations' (Rouse, 2003, p. 107), like acquiring and using a set of skills. According to Rousse, scientists *use* paradigms, instead of believing them. This interpretation of a paradigm implies that paradigms are not mere Platonic ideas. Rather, a paradigm can be embodied through instruments which reinforces a certain scientific system, or in a policy context institutional and professional practices. Just as Boon (2017), Rousse thinks that science should be also approached from a pragmatic perspective, through criteria of usefulness via technological constraints in the form of instruments for example. These instruments do not have to be limited to physical ones such as a computer, programs or books but can also be methodological (e.g. standardized approaches and procedures) or conceptual heuristics. Criteria of evaluation of a system are thus important, as such criteria embody the overall paradigm.

What is missing still in this review of a paradigm is a institutional and organizational perspective in a policy context. The institutional embedding of a planning paradigm through groups of actors, rules and practices is essential for sustaining the planning culture in an organizational context, as Geels (2012) and Van Der Brugge et al. (2005) have shown through a multi-level perspective analysis on paradigms in the cases of decarbonizing society and Dutch water management respectively. They showed that policy makers rely on (political) values such as a (dis)belief in freedom, rationality or logic, originating in different educational backgrounds and personal preferences. For example, in the

Dutch water management case, bringing biologists into engineering teams led to more ecologically oriented water management.

To sum up, transport planning paradigms are not only ideas, perspectives or beliefs held by policy makers. Rather, as policy making is an activity in which the planner works forth-and-back with technology and other planners, the paradigm should be more than idea-based only. All in all, I define a transport planning paradigm as a social and cognitive way of conceptualizing and intervening in the transport system by transport policy makers. This is exemplified by philosophical assumptions (1), policy goals (2), policy instruments (3) and evaluative criteria of the transport system (4). Finally, it needs institutional embedding of policy practices through organization and values. An overview of the two transport planning paradigms has been displayed in Figure 2. A paradigm consist of two parts: the green part symbolizes the conceptual basis for a paradigm, consisting of assumptions, goals, policy instruments and evaluative criteria. The blue part symbolizes its institutional embedding of different values, organization and logic on a practical level. Consequently, the green arrow symbolizes the classic policy cycle through which change based on content-learning can be characterized. In other words, it displays paradigmatic change on an epistemic level. The blue arrows symbolizes the change based on institutional reorganization. The hypothesis of this thesis is that the blue-arrow process is of more importance for paradigmatic change in Dutch municipal policy making than the green-arrow process. After working out the empirical part of this thesis, this hypothesis can be tested. Also, a more concrete conceptualization of both arrows can then be defined.

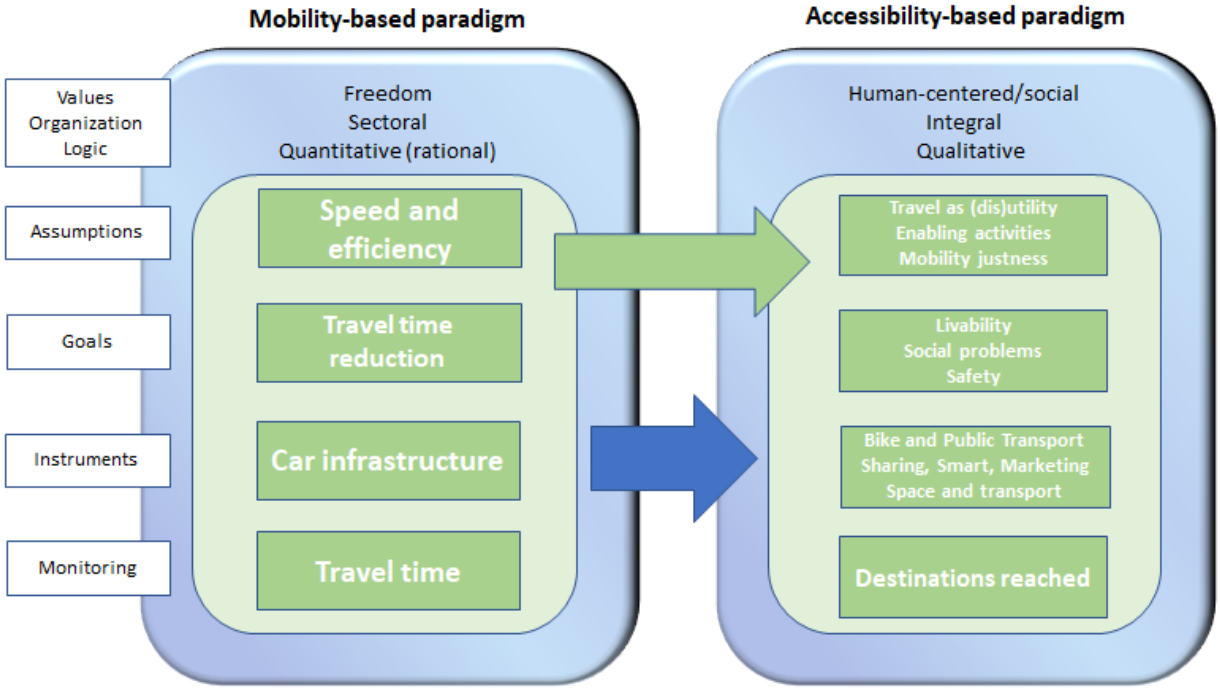

Figure 2: Schematic overview of transport planning paradigms, where the green arrow symbolizes change based on epistemic learning and the blue arrow symbolizes change based on institutional reorganization.

2.4 Critiques on the mobility-based paradigm

Throughout the development of the urban transport planning field, one paradigm has been dominant: the mobility-based paradigm which views travelling as a disutility. However, based on statistical empirical research, sociological empirical research and philosophical research I will argue that traveling does not have to be a disutility per se on a conceptual level. Economically, I think there exists a scale for conceptualizing traveling which ranges from 100% disutility (e.g. a leisure trip) on the one hand till 100% utility (e.g. a hospital trip) on the other hand. All trips consist though of a

diverse mix of social aspects with specific meanings and practices, even the 100% utility trips: speed, comfort, pleasure, (physical) access, individual preferences, habitual behaviour and cultural norms can all be rationales for choosing a certain mode at a certain time. The mobility-based paradigm mostly focuses on speed, i.e. time reduction, thus ignoring the other motives and characteristics of traveling. The alternative planning paradigm based on accessibility instead incorporates assumptions on traveling as a social valuable practice. As a result, accessibility analyses reaching destinations at different times and places.

Travelling as a disutility, or mobility as a derived demand from other activities has been criticized by several scholars (Banister, 2008; Lyons & Urry, 2005; Metz, 2008; Mokhtarian & Salomon, 2001; Watts & Urry, 2008). This criticism comes from different academic fields and empirical experiences, especially from transport economics (1), equity analysis of transport systems (2) and humanities and social science research on travelling and travel time (3). In the following paragraphs, I will briefly deal with these three type of criticisms (2.4.1 – 2.4.3 respectively).

2.4.1 Transport economics

Transport economics uses the idea of stable travel time budgets. Empirical research has already found in the 80s that there exist travel time budgets on an aggregated level of around 60-70 minutes per day, irrespective of time, place and culture (Hupkes, 1982; Zahavi, 1974). This means that faster modes of transport will lead to more distance travelled, given that the overall travel time remains the same. One would expect if travellers tend to minimize their travel time, that less travel time is not 'invested' in covering more distance. At least on an aggregated level this idea seems not to be the case. On an individual or household level, the idea of travel time budgets do not apply. Hupkes (1982) described his theory as a 'law' from which all kinds of rules can be deduced for local situations. This law does not right however to individual preferences, constraints and situational contexts which eventually determine where and how a person goes. Schwanen (2008, p. 711) puts it in a comment to Metz (2008) in this way: 'Implicitly, there is an average traveller moving through his text who has much discretion over where, when and how to travel, and it is this average person who is conserving—almost cherishing— travel time by choice. Yet, this traveller is a nobody, a statistical artefact who bears little resemblance to actual road users'. According to Schwanen, the concept of travel time budget does no right to the complex and open-ended process which influences people's way of travelling. Some people are in fact forced to travel a short distance, because they don't have a car or cannot cycle. They would like to go further however. A more individualized hypothesis of travel time budget has been proposed by Mokhtarian and Salomon (2001, p. 712), which does right to this contextualized notion of travel time budgets: 'Rather than uniformly trying to minimize travel, people seek to decrease their travel if it exceeds the desired optimum, but seek to increase travel if it falls short of their ideal amount'. What does become clear is that the idea of travel time minimization for all travellers does not apply, but still remains powerful on an aggregated level. Question is then, if extra distance is covered by providing extra infrastructure, how should this extra distance be socially distributed to citizens? Van Wee and Rietveld (2008) comment on Metz (2008) that valuing the benefits of travel time savings is in fact useful. My response is then, for whom is it useful? For the people who have already enough accessibility or those who are lacking accessibility because of individual disabilities or public transport dependencies? This relates to problems of equity and just transport systems.

2.4.2 Equity analysis

A second critical perspective on the focus of decreasing travel time in transport planning comes from studies about social equity and social exclusion. Accessibility to locations is unequally distributed over people in society: some people have more access to locations or not. Thomopoulos, Grant-

Muller, and Tight (2009) provide an overview of equity categories in planning on different scales: individual, on a group level and regional. Unequal access to locations can also occur either voluntarily or involuntarily. If individuals desire to go to a certain location but cannot access it, one can speak of social exclusion. van Wee and Geurs (2011, pp. 358-359) define social exclusion in this way: 'the fact that some people or population groups are excluded from a certain minimum level of participation in location based activities, in which they wish to participate'. Although research does not provide direct causal links between social exclusion and underlying factors, it is generally acknowledged that income and car possession are the main explanatory factors for a lack of travel possibilities within certain social groups (Lucas, 2012; van Wee & Geurs, 2011). Such a lack of possibilities is defined as mobility poverty. Note here that car travel is seen as the benchmark of high potential accessibility. Other influencing factors for mobility poverty include age, ethnicity and physical wellbeing (Beyazit, 2013). Public transport is considered to be a solution for issues around equity and mobility poverty. In a Dutch context, the social-spatial differences between different people are limited to certain extent due to the high bicycle use (Jorritsma, Berveling, De Haas, Bakker & Harms, 2018), although not every social group has the possibility to cycle and the potential action radius is relatively small in comparison with car and public transport. In this same Dutch research, larger cities and rural regions with a declining population are defined as areas in which people live who are more likely to be socially excluded by mobility poverty. Such groups are most-often people with a low income, unemployed, elderly, people without a driver's license and people with a migration background. Although urban regions have a high potential accessibility rate through public transport (Pritchard, Stępniak & Geurs, 2019), it very much matters which locations at what times can be reached by public transport from low-income neighbourhoods. For example, factories might not be reached at 7 AM by public transport whereas inner city centres are accessible from all parts of the city. There are also large differences in between cities in terms of potential accessibility by car and public transport.

In a planning context, traditional transport planning has been mainly focusing on providing more accessibility to those who already have a high level of potential accessibility by car travel, for example by solving congestion bottle necks through adding more road capacity (Martens, 2017). Future travel demand predictions which are input for infrastructure investments are based on models that seek to predict behaviour of persons who have a relatively high potential accessibility, i.e. those who own and use a car. This means road investments often increase equity problems. A planning paradigm based on travel time reduction can thus lead to a status-quo bias of car travel. This bias does not help socially excluded groups who do not have access to such transport systems, in which car mobility is the benchmark.

This kind of mobility planning criticism can be interpreted as a consequence of the idea that travelling (mobility) is just as much part of the social realm, as it is part of the economic realm. This evaluation is the starting point of critical reflection and analysis from social sciences and the humanities, especially philosophy.

2.4.3 Social sciences and philosophy

Social scientists and philosophers dealing with mobility, emphasize that there is an (non-economic) social utility to travelling, which is undervalued in the dominant conception of travelling in the field of for example modelling and planning. The economic conception views traveling as meaningless. This does not mean that it is socially meaningless. Going from A to B through means of infrastructure is more than an efficient or technocratic practice. The alternative approach to mobility has been initiated by Urry (2000, 2007) and is often called the mobilities turn. This sub field of mobility studies aims to approach mobility from a multidisciplinary perspective, in order to analyse the meanings travellers attach to traveling (practices), spaces and themselves in an interconnected society. What is

new here is the rejection of the classic binary between social studies and transport research, which means that transport is now connected with complicated social patterns (Sheller & Urry, 2006, p. 208). The turn has inspired many research and additional frameworks which enables to understand mobility from a holistic perspective[2]. Lyons and Urry (2005) mention for example that travel time has increasingly become activity time, in which people sleep, read, work, discuss, eat, and call. New technologies have made many of these activities possible, such as mobile phones and apps like Skype. Especially in public transport, travelling does not have to be an economic disutility if the traveller can work on his laptop (Gustafson, 2012). Travelling can also have a leisure motive, so-called undirected travel (Mokhtarian & Salomon, 2001). Moving yourself can be a way to relax by enjoying the speed in a car or the landscape outside. A person can also make a trip by bike to exercise. Moreover, such motives can also play a role in traveling with highly directed motives such as going to work. A trade-off can be made here by a person to travel slower by bike if that is healthier. Redmond and Mokhtarian (2001, p. 202) conclude that based on empirical findings, 'results support the contention that commute time is not unequivocally a disutility to be minimized, but rather that there is an optimum to be achieved which can be violated in either direction'. This optimum depends on the individual context in which the traveller is situated. Mobility can in fact be described as an entanglement of movement, representation and practice (Cresswell, 2010). The meaning or representation of mobility can be diverse: it can figured 'as adventure, as tedium, as education, as freedom, as modern, as threatening' (Cresswell, 2010, p. 19). Cresswell calls such meanings narratives, which tells a story about who the traveller is or how a particular transport society is constituted with trains, cars, bikes and boats. For example, the sensory experience of traveling by train, car, walk or bike can be completely different. The practical part of traveling shows how it can be a way to relate to the world. While traveling is defined as economically useless by the mobility-based paradigm, it is definitely not philosophically useless as shown through literature: a traveller perceives the world differently and is differently shaped as a person through modes, speeds and corresponding arrangements of infrastructures.

2.5 Organizational history and the need for speed

If there are so much conceptual arguments to move from a mobility-based paradigm to an accessibility-based paradigm, why has the change not taken place yet? Analysing the mobility-based paradigm through an institutional lens enables to understand why it has become so dominant.

The profession of transport planning in the form of traffic engineering has been mainly developed in the United States in the 1950s and 60s. The basis for transport sciences and planning lies more interestingly in the 1920s and 30s however (Popkema, 2014, pp. 25-39). Different actors have had a prominent role in this process. In the USA, the Bureau of Public Roads (BPR) manifested itself as a technical expert office, pushing towards the development of a national highway system. The bureau did research to promote efficiency of the road network which resulted in the introduction of terms like 'design speed', 'curve radius' and 'vertical alignment'. The road had to be designed according to the wishes of the car and the car user. One should note that already in 1925 the USA car system was at the same level the Netherlands would have in the 1960s and 70s. In Europe, Germany is the initiator of institutionalizing expert knowledge on transport and traffic, by setting up different courses on these topics at different universities in the 1920s. These courses were part of economic curriculums. At the same time, policy makers, traffic engineers and urban planners worked together to define fast and slow traffic, cars and non-cars respectively (Oldenziel, 2018). For example, the

[2] In my view, the new mobility movement could be called accessibility movement as well. Such a definition would be in line with other literature on holistic and integral planning. For the sake of consistency with literature though, I will keep referring to the mobilities turn by mobility and not accessibility.

Permanent International Association of Road Congresses (PIARC) introduced standards for speedy travel and at the Congrès Internationaux d'Architecture Moderne (CIAM) it was decided that the future belonged to fast cars (Oldenziel & Albert de la Bruhèze, 2011). In the 1930s, the integration of economic courses and traffic engineering was even more stimulated by the Fascist and the Nazi regimes, in order to mobilize the Italian and the German population as fast as possible.

In the USA, transport modelling (i.e. calculating traffic volumes rather than making educated guesses) became dominant from the 1950s on. In 1956, the Interstate Highway Act was established by congress, which ensured 25 billion dollars of funding for highway construction. Moreover, this Highway Act 'determined that the development of the highway system remained in the hands of federal and state highway-engineers, which resulted in a technical orientation' (Popkema, 2014, p. 29). The successor of the Bureau of Public Roads (BPR), the Federal Highway Administration (FHA), developed its own methodologies and models to answer the call for more highways. This lead to an acceleration of highway construction. According to Stopher (2016), the problem to be solved was a weekday peak period transport problem. This meant that data collection in the form of car counts and modelling only focused on this problem. The BPR formula linked travel times on a link with volumes and capacity. Numbers produced by such formulas and computers were not questioned, as it was assumed that computers told the truth. Since all people were assumed to want a car, providing efficient car mobility was the main focus of the profession. No other modes were considered. If they were considered, it was used with the objective to 'simply estimate what fraction of household trips would be made by each of car and public transport, so that the latter trips could be removed from the process and trip distribution and highway assignment be performed using only car trips' (Stopher, 2016, p. 43). Car possession was estimated using socio-economic characteristics, as (poor) people were assumed not to have a car.

The methodology developed in the early days of traffic engineering to calculate traffic volumes still exists: it is in fact the main modelling approach in transport modelling and is therefore also referred to as the classical approach (Ortúzar & Willumsen, 2011). Why the four-step model with its (hidden) assumptions is still the main methodology in transport planning is a very complex question to answer. One answer could be that the model itself became so sophisticated and developed that no alternative model was developed (Koglin & Rye, 2014; Oldenziel, Albert de la Bruhèze & Veraart, 2016). In Kuhnian language, other ways of seeing and defining the problem was blocked in the community and its institutes as the planning paradigm was in its normal phase and fixed as a planning culture (Schwanen et al., 2011). Restated, the socio-technical regime of earlier-described actors, institutions, rules, and practices only accepted incremental innovation.

Moreover, transport planning with its focus on numbers was highly regarded as an objective science. Institutional rules and norms such as the highly interwovenness of economic programs and planning programs shows this aim of objectivity. Objectivity of data can be questioned though. Public transport, walking and cycling have been ignored in the transport models, which also means that research data and literature about these modes is (still) very limited in comparison with car research. More recently, such modes are included more and more in models although usually only for bicycle and public transport in a narrow way (Ziemke, Metzler & Nagel, 2017). Practically speaking, car modelling thus had a huge head start of knowledge, data collection and research and policy experience over public transport modelling and bicycle modelling. This development is also enhanced through the institutionalization of the four-step model in educational programs, like civil engineering. The four-step model is relatively easy to interpret with simple basic premises which describe human behaviour. If there are enough basic socio-economic criteria, the model will easily produce some outcomes through ticking the boxes and pressing the button.

Apart from the stabilizing role of actors, institutions and modelling practices in the car-base regime, norms have also played an important role. The classical modelling approach should be regarded in a context of different cultural meanings that are assigned to car, bike and public transport traveling (Oldenziel et al., 2016). The car mode is mostly referred to as fast, modern, sexy, luxurious, and middle-class, whereas cycling and public transport are seen as old-fashioned, slow, unsafe, and only used by the poor and the needy. Transport planning has taken over these conceptualizations, actively supported by industrial car and road lobbies (Geels, 2012; Norton, 2015; Oldenziel, 2018). Building an efficient transport system based on the above-described norm fits a compelling and dominant narrative of a society which inevitably goes and should go forward, and which is built on rationality and efficiency. This guiding narrative has been broadly coined by historians and social scientists as 'modernization', in which human made civilization and progress became intertwined with concepts like 'speed' and (unhindered) traffic flow, requiring a focus on decreasing travel times through infrastructural projects, mostly set up by governmental organizations and institutions. This process is not only relevant for car infrastructure. The narrative of speed is also relevant for rail travel (e.g. high speed rail) and more recently cycling (e-bikes, speed pedelecs and so-called bicycle highways).

Travellers who are fastest have been prioritized in policies, as they embody a speedy and efficient rationale for traveling, which is easy to objectify in transport planning. This so-called transport rationalization makes transport planning a relative neat business, with large consequences however for the way how a city is ordered. If speed is to be guaranteed for cars, a separation of traffic flows is necessary for safety reasons. This has led to building highways, city ring roads and separated lanes for cars. Norton (2015) refers to this engineering strategy as the safety control paradigm, in which three E's are central: (highway) engineering, education and enforcement. To protect slower travellers from fast cars, measures like crosswalks, traffic lights and separate paths have been installed in the city. Highway engineers thought that they could reconcile safety with speed through design. Apart from exception countries like the Netherlands and Denmark, in Europe a long-term infantilization has taken place since the 1930s, by framing the cyclist as 'a vulnerable' or 'soft' road user' (Bonham & Cox, 2010, p. 50; Oldenziel et al., 2016). In such cases, the cyclist is depicted as strange and interrupting the 'norm' (Lee, 2014). The institutionalization of such norms was established by powerful societal actors like urban authorities, engineering experts and schools. Norton (2015, p. 327) describes for example how the American Automobile Association (AAA) taught children at schools in the 1930s that 'the street is for autos' and that they had to 'accept responsibility for their own safety'. Also, 'urban authorities and traffic engineering experts designed new traffic rules that favoured cars' (Oldenziel, 2018, p. 283), like forbidding to cross the street diagonally as a pedestrian or riding too close to cars as a cyclist. All in all, protecting vulnerable road users and improving car flow can both be traced back as consequences of speed as ordering principle in traffic design.

It may be the case that none of the described paradigms will be actually adopted. Rather, some new hybrid form might appear which uses both elements from the old paradigm, as well as elements of a new paradigm. I will illustrate this matter by a reflection on speedy cycling, in the form of bicycle highways, e-bikes and speed pedelecs. Given the main assumption of transport modelers and planners to increase efficiency and speed in a network, it might not be a surprise that also cycling infrastructure is speeding up. In recent years, the number of e-bikes and speed-pedelecs has hugely increased. Along this development, infrastructure such as so-called bicycle highways has also been developed. E-bikes and bicycle highways are especially presented to cover longer (commute) distances in a healthy and sustainable way. Building new commute infrastructure for cyclists is clearly a sign that car commuting is not the only norm anymore in transport planning. The application of speed in a new context raises many interesting issues though. The infrastructure itself is called a highway, suggesting a focus on fast and efficient transport only. Through empirical research it has

been analysed what the transport planner's perspective is on this matter (Liu, te Brömmelstroet, Krishnamurthy & van Wesemael, 2019). By eleven interviews with bicycle highway expert planners from five European countries, they found that these practitioners define a bicycle highway through engineering-based criteria, such as design and funding. When asked about the design of a highway, interviewees mention that 'they struggle with how the uniform, predictable and regulated engineering of highway environments can be balanced with the diverse, vibrant, and human-scale design of pedestrian environments' (Liu et al., 2019, p. 7). All practitioners think that a car highway has a different meaning than a bicycle highway, but what exactly the balance is between the two is unclear according to them.

The responses of the interviewees show that planning professionals are still grappling with the application of high-speed for cycling. The old paradigm works through in the new paradigm, but also new elements are added to it. This means that paradigmatic change cannot be understood as simple substitution. The interviews also show that planners are searching to find a new discourse to attach to for building useful bicycle highways, as there are no clear standards yet for cycle highways. On the one hand, this creates uncertainty but on the other hand this give opportunities for academia and policy makers to *form* standards based on new criteria like user narratives, sustainability or a just space distribution. This chapter has provided some criteria for applying speed in a cycling context. For example, designing for cycling speed should not mean to design for traveling as fast as possible from A to B, with a uniform commute cyclist in mind. Rather, it should be about the smooth and gentle implementation of a cycle highway in an already existing cycle network, while at the same time acknowledging that everyone can use the highway: from skateboarder to pedestrian to an elderly person who wants to drive slowly. All in all, such new standards might prevent unjust and unsustainable effects of bicycle highways in the tradition of the classical planning engineering paradigm, promoting liveable cities for all citizens. Instead of traffic separation, sharing of road space should be encouraged.

2.6 Barriers, experiences and policies from an empirical perspective

From a more pragmatic and empirical level, there is a growing amount of literature about the reasons why policy makers do not pick up another transport policy paradigm. I will firstly go into the usage or non-usage of accessibility instruments by policy makers in general. Then, I will focus on other barriers in an international context.

Boisjoly and El-Geneidy (2017) have set up a survey which they distributed to 343 accessibility planner practitioners in the world, mainly North-America and Europe. Most respondents worked in the public sectors for a governmental organization, and the majority were transport planners. They were asked questions about their familiarity with accessibility concepts and use of them. The research focuses on location-based measures, as this measure is most-used in planning practice. As a result, most practitioners use accessibility-based concepts in their work. When the practitioners were asked about the reasons for which they did or did not use concepts, the main reasons for using accessibility concepts were 'Own initiative' (36%), 'document requirement' (30%) and 'already in place' (22%). As barriers, respondents mentioned 'lack of knowledge (52%), 'lack of data' (34%) and 'lack of time' (26%). The least-commonly stated barriers were 'lack of interest' (7%) and 'lack of support' (10%). This indicates that planners are interested in using other accessibility concepts, but not have the knowledge or institutional resources to do so.

Te Brömmelstroet, Silva, and Bertolini (2014) conclude after workshop sessions with 80 planning practitioners in Europe and Australia that in general they have very positive views on the instruments presented in the workshop. However, they saw two main barriers towards using such instruments in practice. The first is the technical and resources barrier: practitioners felt that they did not have the

technical skills and (computational) resources to work with other planning instruments. The second barrier is political: there was no support by local politicians to apply other instruments. In general, the respondents felt that their organizations were too unfamiliar with the instruments to use them in practice. As for content (i.e. usefulness and usability), Te Brömmelstroet, Curtis, Larsson, and Milakis (2016) conclude based on the same workshop sessions that there is a trade-off between explainability and accuracy. Simple measures lead to a more inclusive debate to non-experts, whereas more extensive multi-modal instruments are causing lower interaction.

Another smaller study (Geurs & Levine, 2015) which surveyed 38 practitioners from 14 different European countries shows that the most important barriers towards the use of accessibility instruments are related to institutional reasons: transport policy goals which include accessibility have not placed central, political commitment is lacking and transport and land-use departments are separated. Moreover, there are not standards which can guarantee the usage of accessibility instruments in policy making. Knowledge barriers are in this study less seen as a barrier, in contrast with the study of Boisjoly and El-Geneidy (2017) but in accordance with Te Brömmelstroet et al. (2014).

From an English perspective, Curl, Nelson, and Anable (2011) conducted semi-structured interviews with officers from local transport authorities on their experience with using accessibility measures in practice. The practitioners state that in general they have a positive attitude towards accessibility instruments, but that it is sometimes unclear how accessibility is exactly measured and quantified. The authors see a mismatch between strategic policy making on a higher level and local policy making using accessibility instruments. In the absence of easily quantifiable alternatives, 'there is often heavy reliance on time based threshold measures' (Curl et al., 2011, p. 10). This notion is in accordance with conclusions by Geurs and Halden (2015, p. 472), who state that 'cross-sector accessibility planning is very difficult to achieve, even among highly supportive organizations'.

From a developer perspective, Papa, Silva, Te Brömmelstroet, and Hull (2015) asked 21 developers from Europe and Australia about their perspective on barriers blocking the use of their accessibility instrument. As a reason mostly mentioned were 'data availability' (26%), 'a separation of urban and transport institution' (20%) and 'formal processes' (15%). Again, this seems to indicate that institutional barriers are very influential as a barrier for using accessibility instruments by urban and transport planners. Based on an additional survey about the user-friendliness and usefulness of accessibility instruments, Silva, Bertolini, te Brömmelstroet, Milakis, and Papa (2017) also underline that organizational and institutional barriers are the main reason for the so-called implementation gap of instruments. To improve this gap, the researchers recommend that developers of instruments should be more engaged with planners and organizations so that accessibility planning becomes more institutionalized.

In a Dutch context, Te Brömmelstroet (2010) conducted a survey with 124 respondents, who were transport planners and land use planners. They survey focused more on the quality of accessibility instruments as a barrier for using them. Most respondents were working for the government, whereas a smaller part was working as a consultant. The following main barriers were perceived: 'not transparent' (65%), 'low communication value' (64%) and 'not user friendly' (52%). When asked about possible barriers for successful land use and transport planning integration, respondents answered mostly 'conflicting interests', 'lack of common language' and 'lack of political commitment'.

More generally, there is also research which connects sustainable transport policies with the local organization of planning. Most research on sustainable transport policies focuses on case studies

from cities. One paper compares the transport policy instruments deployed in three American cities: Seattle, Montreal, and Curitiba (Mercier, Carrier, Duarte & Tremblay-Racicot, 2016). As an hypothesis, the authors thought that there would be a clear distinction between two kinds of policy planning, namely policy planning based on proactive governing (i.e. top down policy making) and interacting governing (bottom-up policy making using consensus). After conducting interviews with policy makers from the three cities, this has not been found to be the case however. Rather, both policy making strategies were tied together. The deployment of sustainable transport policies was in fact dependent on the local institutional and political context. Lead stakeholders and actors who are de-facto in charge in Seattle, Montreal and Curitiba are respectively a diverse group of actors, the provincial government and the major of Curitiba with the IPUCC.

A Scandinavian research has analysed how the use or non-use of expert knowledge affects the achievement of transport policies (Tennøy, Hansson, Lissandrello & Næss, 2016). In this article, the authors do acknowledge that there are different forms of knowledge involved in policy making. They chose to only focus on expert knowledge though as the authors assume that 'knowledge is the main basis for many planners' knowing and acting' (Tennøy et al., 2016, p. 1). Applying expert knowledge is according to the authors a prerequisite for producing plans with a high achievement potential. Based on process reconstruction by interviews and document analysis of the making of transport policies in Aarhus (Denmark), it has been concluded that indeed the use of expert knowledge makes a different in policy making. This knowledge can come from either the scientific world, consultancy or other sources of new knowledge like magazines. Expert knowledge affects the planners framing of problems, as well as the measures they would consider. Plans with low achievement potential are constructed because of the 'subconscious ways planners use knowledge when making plans, together with a culture in which they are not required to clearly state the cause–effect relations on which they build their analyses and plans, or to present references for their knowledge claims' (Tennøy et al., 2016, p. 29). Moreover, structural power relations can play a role in the sharing of expert knowledge among transport planners. As a recommendation, the authors argue that planners should be more aware of the tacit knowledge and assumptions they have.

A comparison of transport policies in Stockholm and Copenhagen by Koglin (2015a, 2015b) also shows that differences in planning cultures and organization matters very much. In Copenhagen, transport and urban planners work together frequently, whereas in Stockholm transport and urban planners work separately. The integral approach in Copenhagen has led to more cycling policies, whereas the sectoral approach in Stockholm focuses more on motorized vehicles and public transport. Although this has also to do with a difference in economic, cultural and historical aspects, interviews with planners in both cities have shown that an active discussion of views between people with a different background leads to another planning paradigm.

Zhao, Carstensen, Nielsen, and Olafsson (2018) come to similar conclusions on integral decision making. Through an analysis of sustainable bicycle policies in Copenhagen and Beijing, it is concluded that 'the efficiency of bicycle infrastructure planning corresponds to the level of planning knowledge and experience gained, shared and embedded in the local planning culture' (Zhao et al., 2018, p. 158). The authors were introduced with the term 'planning culture' through Othengrafen and Reimer (2013), who have defined a conceptual framework to understand planning practices. This framework consists of three parts: the societal environment (i.e. underlying and unconscious taken-for-granted beliefs, thoughts, perceptions and feelings), the planning environment (i.e. shared assumptions, values and cognitive frames used by members of the planning profession) and the planning artefacts (i.e. visible planning products, structures and processes). The authors promote research that looks into 'the diversity of local and regional planning cultures below the national scale' (Othengrafen &

Reimer, 2013, p. 1281), so that more insight is gained into the complexities and interdependencies between the three parts of a certain planning culture. Especially empirical research is recommended, else the planning culture concept will remain fuzzy according to the authors.

2.7 Summary

Based on literature study, two different types of conceptual paradigms have been distinguished in relation with urban transport planning: a dominant mobility-based paradigm which views traveling as a disutility, and an alternative newer accessibility-based paradigm that builds on reaching destinations and the social dimension of transport. Ideas are not enough though to explain how paradigms are used in practice. A definition of a planning paradigm has therefore been proposed, consisting of *conceptual* elements on the one hand, and of an *institutional* embedding of these conceptual elements through groups of actors, rules, norms and practices on the other hand. This second part of a planning paradigm is based on the regime concept of the Multi-Level Perspective theory. The theoretical framework in Figure 2 can be used in order to build a research methodology and test hypotheses that have come up in this chapter.

Through historical analysis, it has been shown that a broad change of urban transport planning has not taken place because of the strong institutional embedding of the mobility-based paradigm. Transport planners have implemented minimization of (car) travel time since the 1920s, through standardization of knowledge and building on the belief that the fast car will win. Speed as a norm has worked through in urban design, by separating traffic flows and distribution of space. Transport modelling with its focus on numbers supported this norm, as it was regarded as a quantitative and objective science. Models proposed highly verifiable results with ‘clear’ correlating relations.

New (groups of) innovative actors are able to form different models, norms, rules and standards in an renewed organizational culture. As an hypothesis, paradigmatic policy change happens through fulfilling the necessary condition of such institutional reorganization. This is not a simple substitution process though, where an old paradigm is replaced by a new one. Every planning activity has a web of cognitive, social and institutional elements, which makes change difficult. Empirical research on barriers and experiences of policy makers confirms this idea. Lack of knowledge and data, lack of political support and conflicting interests because of sectoral planning are mentioned as barriers by practitioners for adopting different transport policies.

3. Research methodology

In order to research policy change, municipal transport policy documents will be assessed for its transport policy paradigm, based on the theoretical framework of Chapter 2. Consequently, a descriptive statistical analysis will show which factors correlate with the presence of a policy paradigm. The hypothesis is that only a few municipalities exist that adopt an accessibility-based paradigm in their document. Four of such cases will be further analysed through interviews, to find more organizational conditions that have supported the creation of the policy document.

3.1 Analysis of transport policy documents

The first part of empirical analysis will answer sub question one: What kind of transport policy paradigms are present in Dutch urban municipal transport policy plans? This question will be answered by analysis of Dutch municipal transport policy documents. These transport policy documents have been assessed for its transport policy paradigm. In Chapter 2, two types of planning paradigms are defined from a theoretical perspective, summarized in Figure 2. A planning paradigm consist of conceptual elements (philosophical assumptions, goals, instruments and monitoring criteria), and institutional embedding (values, organization and logic). Philosophical assumptions have already been described. Secondly, there are different rationales (i.e. policy goals) to provide transport policies: improving economic growth, decreasing negative externalities such as air pollution, greenhouse gas emissions, noise, tackling social equity issues and increasing road safety (Santos, Behrendt, Maconi, Shirvani & Teytelboym, 2010; Stopher & Stanley, 2014; van Wee, Annema & Banister, 2009). Thirdly, there are different policy instruments available for municipalities: May et al. (2003) define six types of policy instruments: land use measures, infrastructure provision, infrastructure management, information provision, attitudinal measures and pricing. These measures are in accordance with van Wee, Banister, Annema, and Geurs (2013). On a more strategic level, Santos, Behrendt, and Teytelboym (2010) define physical policies (e.g. road construction, providing public transport, land-use policies such as parking), soft policies (e.g. car sharing, attitudinal changes, 'smart' technological solutions, marketing) and knowledge policies (e.g. research and development, policy packaging and policy integration). Finally, there are different operational monitoring measures possible (Geurs & van Wee, 2004). All goals, instruments and measures have been categorized into the two planning paradigms I define in this thesis. Both planning paradigms are defined as extreme points of the spectrum. Empirical analysis has to show whether such a conceptualization is suitable in practice. I will come back to this point in the discussion.

A mobility-based paradigm stands for a single-objective economic paradigm. It approaches transport as an economic derivative, ignoring other aspects of traveling including its destination. Its focus is to promote speed, as traveling is considered to be a disutility. Consequently, a mobility-based paradigm of 'predict-and-provide' places car infrastructures and mobility for users central as a policy instrument, including the facilitation of all parking demand since this is the most efficient solution in terms of speed. This means that simple time thresholds or I/C ratio's are used as the main evaluator and operational monitoring measure of a transport system.

An accessibility-based paradigm connects the travelling realm (i.e. a trip) with the spatial realm. Not traveling as fast as possible is important, but rather the possibility to reach valuable destinations. Along with this difference, this means that policy goals such as promoting liveability, social equity and decreasing poverty issues and safety problems are also related to the transport system. The range of policy instruments increases in this paradigm: not car infrastructure is the point of departure, but rather a set of soft instruments, knowledge instruments and attention for lower incomes and promoting liveability is important. Public transport and cycling is explicitly taken into account with, as such modes provide sustainable and accessible transport options for all citizens. Not

the aim to travel as fast as possible is standard, rather the possibility to reach a certain number of valuable destinations is the main measure. To monitor accessibility policies, location-based accessibility measures are used, which focus on the number of activities an individual can reach by different modes.

Through reading, points have been assigned according to elements of each of the planning paradigms. If none of the criteria were mentioned in the policy document, zero points have been assigned. The methodology taken in this study is not labelled as a discourse analysis, since this study is not so much focused on context as on content. All specified criteria for the mobility-based paradigm displayed in Table 1. All specified criteria for the accessibility-based paradigm are displayed in Table 2. Apart from the document content, secondary information has been gathered by looking at the context in which a document was created. This includes the year of publication, guiding consultancy, and type of document (e.g. vision or classic traffic plan).

Table 1: Evaluation criteria for presence of mobility-based paradigm

Type of aspect	Specific criterium	Points if mentioned
Philosophical	Travel as disutility or derived demand	1
	Facilitating (car) mobility growth	1
	Efficiency and speed	1
Policy goals	Improving economic growth	1
	General travel time reduction (throughput)	1
	Travel time reliability	1
Policy instruments	Increasing existing road capacity for cars	1
	Change of local road lay-out ('Wegcategorisering')	1
	Adoption of junctions (roundabouts/traffic lights)	1
	Development of bypasses and highway connections	1
	Demand-driven parking policies	1
Operational monitoring measure	Infrastructure-based (e.g. time thresholds/IC ratios)	1

Table 2: Evaluation criteria for presence of accessibility-based paradigm

Type of aspect	Specific criterium	Points if mentioned
Philosophical	Travel as social practice: positive utility and opportunities	1
	Political meaning of traveling: employ activities	1
	Justness of transport system	1
Policy goals	Promoting liveability	1
	Social (equity) issues	1
	Traffic safety	1
Policy instruments	Providing physical infrastructure for bicycles and public transport	1
	Soft instruments (Attitudinal measures , marketing, information provision)	1
	Knowledge instruments (Integration of departments, research and development)	1
	Attention for lower incomes (in specific areas)	1
	Specific measures for promoting liveability (e.g. environmental zone or electric charging poles)	1
Operational monitoring measure	Location-based (e.g. integral/accessibility-focused)	1

Based on the total scores or each of the paradigms, a balanced score has been calculated expressed by the score of the accessibility-based paradigm minus the mobility-based paradigm. In total, 12 point can be assigned for each paradigm. This means that the total range of balanced scores lies between -12 and +12. The balanced score shows which type of paradigm is dominant in a municipality. Hypothetically, it could be the case that there exists a perfect negative correlation between the mobility-based paradigm score and the accessibility-based paradigm score. However, it might also be possible that municipalities which have a high mobility-based score also have a high accessibility-based score. It is expected though that a negative correlation seems more plausible. It might also be possible that on a partial level a paradigm has a large amount of points, whereas the overall number of points is low. Therefore, it has also been analysed if there are differences between the averages of the four parts of the paradigm and the overall transport planning paradigm score.

3.2 Data description

The policy document analysis has been carried out by reading and scoring 172 Dutch municipal transport policy plans. In total, there are 355 municipalities in the Netherlands. As stipulated earlier, each Dutch municipality has to show a coherent framework for its transport policies by national law. The diversity of municipalities in terms of political colour, socio-demographic characteristics and size enable to analyse all kinds of relations between the present paradigm and mentioned characteristics. Moreover, municipalities have quite some authority to determine local street plans, public transport and parking policies. This means that a broad scoring spectrum can be expected when scoring all plans. Policy plans have been found either by searching on municipal websites or through contacting a local clerk. The first selection includes all municipalities which have both a population larger than 30.000 and a population density higher than 250 inhabitants per km^2. Consequently, municipalities who have either a population higher than 30.000 or a considerable high population density (>1000 inhabitants/km^2) have been added. Finally, some smaller municipalities have been added based on the presence of a train station which is important in the national railway network. This study focuses only on (highly) urban municipalities, because they are the busiest in terms of traffic and transit flows. Moreover, highly rural municipalities have to deal with different problems like de-population and high costs of maintaining local transit services which are not in the scope of this research. The complete list of municipalities of which the policy document has been analysed can be found in Appendix A: Overview of municipal documents that have been scored.

3.3 Descriptive analysis of characteristics

To analyse what characteristics stand out of municipalities that either have a high mobility-based paradigm score or an accessibility-based paradigm score, a descriptive statistical analysis has been carried out through conducting a principal component analysis for significantly different variables. This analysis will answer sub question two: Which transport-related, demographic, spatial and institutional characteristics relate with the policy paradigm of municipal documents? Since older values of variables are missing or differently composed, only the most recent variable values are used in the descriptive analysis. This might mean that a 2004 document score has been related with 2019 values of pollution. It is not expected though that such errors will influence the overall analysis, since most variable values do not fluctuate significantly. The aim of this thesis is also to find general relations and trends, beyond local characteristics. I will now go into the background of each of the three characteristic categories that have come up through literature study.

Firstly, general transport-related characteristics in a municipality could correlate with the presence of a certain paradigm. General numbers on car ownership per household are available on average

municipal level. The average modal split per municipality is defined in twofold based on OVIN[3] data. Firstly, it is calculated based on the amount of trips per mode per person divided by the total amount of trips made per person per day. Secondly, it is calculated based on the amount of kilometres travelled per mode a day divided by the total amount of kilometres per day. The level of negative externalities could theoretically be a reason to adopt certain sustainable transport policies or adjust road configurations. Many research has been carried out which focuses on environmental objectives as rationale for transport policies and visions (May, 2012; Stopher & Stanley, 2014; van Wee et al., 2013). Environmental objectives range from reducing greenhouse gases, energy use in general, air pollutants, noise and soil and water pollution. In this research, PM10 exposed concentration numbers per municipality as measured and modelled by the National Institute for Health and Environment (RIVM) are used as a variable, as well as NO_x exposed concentration levels. CO_2 traffic emissions without highways have been calculated based on national traffic models. These models are partly based on theoretical insights and local measurements. Another very important negative externality is traffic safety (Wegman, 2013). In 2018, the number of traffic fatalities was 678 in the Netherlands (SWOV, 2019). This might be a reason to introduce specific types of transport policies. Two variables are therefore included in the list related to traffic safety. To include the aspect of transport justice and transport poverty, the number of households with a low income has been added. Social problems related to transport such as social exclusion lead to unjust transport systems (Martens, 2017), which consequently could be an imperative for transport policy intervention.

Secondly, general demographical and spatial characteristics might correlate with the presence of a certain paradigm. I characterize these variables as 'background'. Sociodemographic characteristics such as age and educational level might be of influence on travel behaviour (Dijst, Rietveld & Steg, 2013). Percentages of citizens per age group as defined by CBS have been used as a variable, as well as shares of highest educational level of citizens between 15 and 75 years old. Spatial characteristics such as the urbanity level and recently published numbers on density and functional mix use (Harbers, Spoon, van Amsterdam & van der Schult, 2019) could explain the rationale for more or less car infrastructure or public transport. Furthermore, the presence of public transport in the form of train station types might be an explanatory factor for adopting a certain transport policy paradigm. Through the percentage of people working and living in the same municipality, a characterization of a municipality can be established regarding daily commute patterns. Finally, the share of students living in a municipality is added since this group has a distinct travel pattern, using bike and (free) public transport.

Thirdly and finally, institutional and organization indicators could explain why a certain paradigm is adopted. The concept of policy transfer describes how knowledge about policies, arrangements and institutions flows from one institution to another in time (Marsden & Stead, 2011). According to the authors, policy lessons are dispersed when there is a high level of trust and a similar context between the two organizations. Informal networks are essential in the sharing of policy knowledge (Marsden, Frick, May & Deakin, 2011). Therefore, the organizational learning culture and network of civil servants with external actors such as consultants might be very important here. The presence of an external consultant as constitutor of the transport policy document can thus be critical. The local political government context also matters. An empirical study shows that essential for transport policy reform is 'civic action groups, politicians and planners who are willing to participate in robust political contention over many years' (Stone, 2013, p. 402). This thesis uses the following

[3] OVIN is a national mobility survey, distributed to around 40.000 people, representative for Dutch society. The survey includes questions about personal characteristics and, more importantly, 1-day travel diaries.

characterization of political parties in the Netherlands[4]: classic-right (VVD), progressive (D66, GL, PvdD), Confessional (CDA, CU, SGP), protest parties (PVV, FvD, 50PLUS, DENK) and classic-left (PvdA, SP). Local governmental and political will in the form of for example sustainable ambitions has been measured through questionnaires. The municipal solvability ratio has also been added, since financial constraints might prevent or stimulate the adoption of another planning paradigm. Finally, throughout reading all documents, it has been recorded whether the document has been written in a style of a 'municipal transport plan' (or GVVP in Dutch), or in more modern mobility vision style. All variables per category are displayed in Table 3.

Table 3: Variables for descriptive statistical analysis

	Variable	Source
Variable category 1: Transport-related characteristics	Car ownership per household	CBS
	Modal split (% of trips)	OVIN
	Modal split (% of kilometres)	OVIN
	Average kilometres travelled per day	OVIN
	PM10 concentration	RIVM
	NO_x concentration	RIVM
	CO_2 emissions/1000 inhabitants (without highways)	RWS/RIVM
	Traffic injuries/1000 inhabitants (10 year average)	SWOV/CROW
	Traffic death/100.000 inhabitants (5 year cumulative)	SWOV/CROW
	Low-income households (%)	CBS
Variable category 2: Background variables	Population size	CBS
	Density	CBS
	Floor-space index	CBS
	Mixed-used index	CBS
	Urbanity level	CBS
	Train station type	Prorail/Own analysis
	Age groups (%)	CBS
	Educational levels (%)	CBS
	Inhabitants living and working in same municipality (%)	CBS
	Function-mixture index (0 only dwellings, 100 only working) per municipality	PBL
	Number of students living in municipality (%, HBO and WO)	CBS
Variable category 3: Institutional and organizational characteristics	Share of political parties	Own analysis based on national elections 2017 (Kiesraad)
	Sustainability ambitions	VNG questionnaire
	Solvability ratio	CBS
	External consultancy in development process	Own analysis
	Year of publication	Own analysis
	Vision-based/GVVP based	Own analysis

[4] This characterization is loosely based on Van Wijk (2019), researcher at the Netherlands Interdisciplinary Demographic Institute (NIDI). Generally, the classic right party is in favour of facilitating car-mobility growth, whereas more progressive parties tend to inhibit car mobility growth, see for example Smaal (2012, pp. 799-800). However, clichés about right-wing voters who take the car and left-wing voters who take the bicycle do not tell the whole story: relations between voting behaviour and mobility is in fact multi-layered and contextual (Slofstra, 2019).

There are some variables missing that would have been very interesting to analyse, especially for the institutional and organizational characteristics. For example, more detailed information on financial funding for car infrastructure and bicycle infrastructure for example would have been interesting to have. More information about the local policy maker context could give more body to the organizational characteristics, such as team size, average age and the integral character of the planning department. The amount of policy makers working at different departments could give evidence about larger teams can benefitting from social network effects. Average age might be interesting to include since younger policy makers are more focused on the accessibility-based paradigm through their recent educational learnings. As a dummy, a variable describing the integral character of a department (zero for traffic and public space separated, one for an integral department) might correlate with the overall score on both planning paradigms. In addition to the largest political party, it would have been interesting to have the political colour of the local municipal council member responsible for mobility as well.

3.4 Interviews

Policy making cannot be measured fully through looking at the outcome of a policy process only, as a transport document can be characterized. Therefore, additional interviews have been carried out to retrieve under which conditions paradigmatic change has taken place. This analysis will answer sub question three: Which factors of a planning paradigm are promotors and barriers for a paradigm shift? Political, organizational or external conditions could all be relevant for this change. The hypothesis that has come up in the theoretical framework is that institutional reorganization and learning is just as important for paradigmatic change as concrete problems like pollution or congestion can be. An important part of policy and decision making happens in an informal sphere, through social networks of policy makers for example. This includes the transfer of (tacit) knowledge from one social group to another in the form of social learning. The term 'tacit knowledge' was first coined by Polanyi (1966) and further worked out in well-cited papers of for example Gertler (2003) and Lam (2016) in a context of organizational learning and knowledge sharing. Generally, the term can be defined as non-codified knowledge, acquired through routine and practice. Such non-codified knowledge transfer might be of large relevance for establishing a broader transport policy paradigm. Moreover, policy transfer is more likely to happen in an informal environment where people trust each other and contexts are relatively the same (Marsden & Stead, 2011). Leadership might thus be of relevance for local policy making, by giving trust to employees and room to experiment.

Four interviews have been conducted with municipal policy makers who were involved with the development of the local policy plan. These four municipalities have been selected based on their high balanced score. An overview of interviewees is displayed in Table 4. A semi-structured interview format has been followed, consisting of four sections: team organization and background (1), rationale to switch to new paradigm (2), development of current policy document (3) and the broader context of municipal policy making (4). Each interview lasted around one hour, and the conversation was recorded through a telephone. Consequently, each conversation was transcribed and general themes of all interviews were retrieved. All interviews were conducted in Dutch. The interview script can be found in Appendix B: Interview script.

Table 4: Interview participants, document and role

Interviewee	Document	Role
Eindhoven (EI)	Eindhoven op Weg (2013)	Transport planner (Verkeersplanoloog)
Zwolle (ZW)	Mobiliteit brengt Zwolle verder (2019)	Policy advisor, strategist
Venlo (VE)	Trendsportal (2017)	Policy advisor, coordinator
Rotterdam (RO)	Stedelijk verkeersplan Rotterdam 2016-2030+ (2016)	Strategist mobility

4. Results

In this chapter the following sub questions will be answered in each section:

1. What kind of transport policy paradigms are present in Dutch urban municipal transport policy plans? (Sections 4.1 – 4.2)
2. Which transport-related, demographic, spatial and institutional characteristics relate with the policy paradigm of municipal documents? (Section 4.3)
3. Which factors of a planning paradigm are promotors and barriers for a paradigm shift? (Sections 4.4 – 4.5)

4.1 Policy document characteristics

Initially, 210 municipalities were selected for analysing the transport policy document. After searching and asking local clerks, 172 policy documents have actually been retrieved. Although this number accounts for almost half of the municipalities, almost 75% of Dutch citizens (around 12,5 million) live in these municipalities because of the urban character of the chosen municipalities. A considerable part of the municipalities that did not have an up-to-date policy plan or were busy with renewing it. Interestingly, some municipalities mentioned that they were renewing because of the new Environmental and Planning Act. Other municipalities mentioned that they did not have a policy document either because politicians could not agree upon a common plan or the municipality did not deem it necessary to have one.

The policy documents that have been found have the following characteristics. Most documents have a classic structure in the form of a so-called 'municipal transport plan' (or GVVP in Dutch), as indicated by national law. A smaller part however has written their document in the form of a mobility vision, structural vision or ambition document. A minority of all documents were written in cooperation or supervision with an external consultant. Larger municipalities however like Amsterdam and Den Haag have their own municipal consultant office, which practically acts as an external consultant. The presence of this type of consultants has not been included in the analysis, as it was not possible to retrieve which municipalities have their own consultant firm. In terms of time, most of the documents were written from 2009 till now. 10 years is namely a common-held threshold to construct a new document. An overview of the document characteristics can be found in Table 5, and a histogram of the document age can be found in Figure 3.

Table 5: Policy document characteristics

Total number of documents analysed: N=172	
Classic GVVP document: 59,9% (103/172)	Vision-based document: 40,1% (69/172)
Consultant involved: 45,3% (78/172)	Consultant not involved: 54,7% (94/172)
Years old of plan (mean): 5,8	
Years old of plan (median): 5	
Standard error of mean: 0,32	

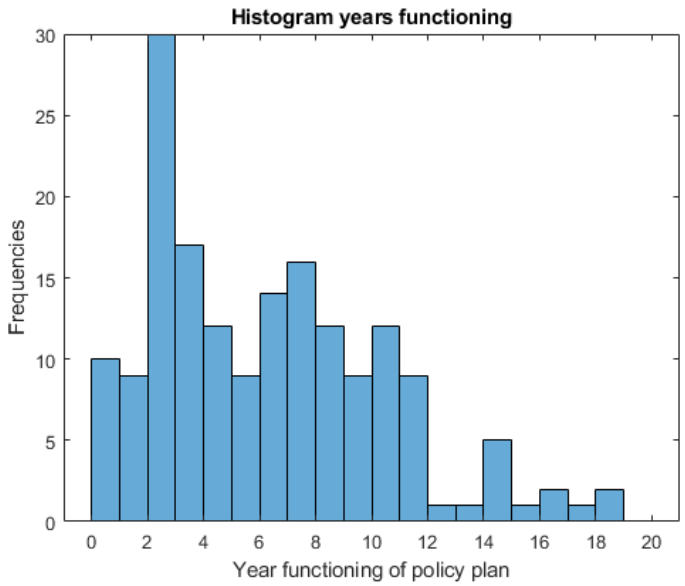

Figure 3: Histogram years functioning

4.2 First exploration of scores

An overview of scores for each of the two paradigms is displayed in Figure 4. All scores are displayed in Appendix C: Document Scores. The balanced score is calculated by subtracting the mobility-based score from the accessibility-based score. The mobility-based mean lies substantially higher than the accessibility-based mean. Furthermore, only a small portion of municipal documents scores high, whereas the larger part scores below six points. This effect is even more stipulated through the balanced score figure, in which most municipalities score negative and a minority of policy documents score above zero. The range of balanced score lies between -9 and 7, with a median of -3. The potential range lies between -12 and 12, which means that most urban municipalities in the Netherlands still adopt a mobility-based paradigm in their policies.

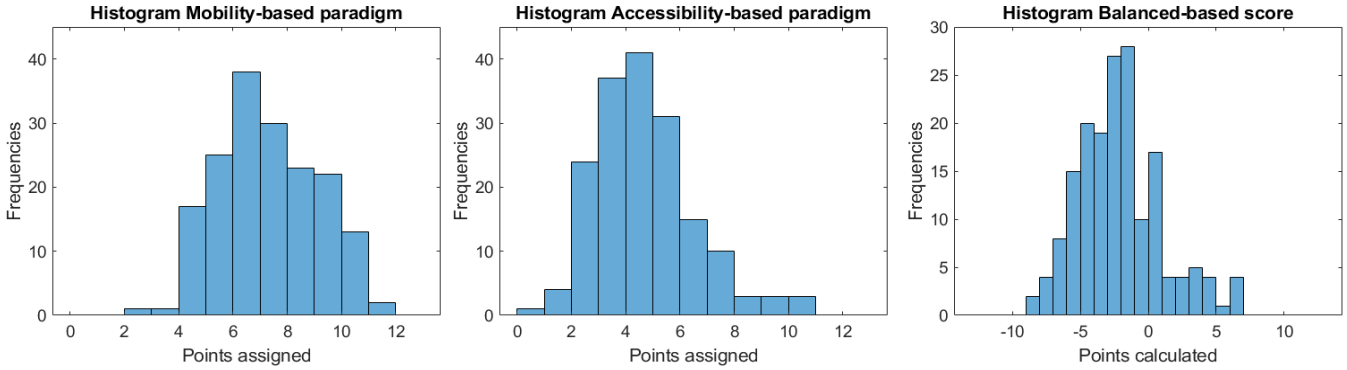

Figure 4: Histogram of scores

Table 6: Statistical overview scores

	Mobility-based score	Accessibility-based score	Balanced score
Mean	6,8	4,2	-2,6
Median	7	4	-3
Standard error of mean	0,14	0,14	0,24

If the scores of the mobility-based paradigm and accessibility-based paradigm are plotted against each other, it becomes clear that there is a moderate negative correlation of -0,41 between the two using Pearson's correlation coefficient. This relation can be seen in Figure 5, displayed in a way either

based on number of municipalities or population size of municipalities. A residual plot shows a random pattern and the histogram plot of residuals is normally distributed. This indicates that the linear trendline is in fact an appropriate measure to relate both scores with each other. Boxing the mobility-based scores also indicates a negative relationship between the two variables. The difference between both figures also shows that frontrunner municipalities (i.e. scoring high on the accessibility-based paradigm and low on the mobility-based paradigm) have large populations, but are not large in number. Also some laggards (i.e. scoring low on the accessibility-based paradigm and high on the mobility-based paradigm) increase in population size. The same pattern can be detected in Figure 6, where scores are displayed geographically both according to actual municipal size and according to population size[5].

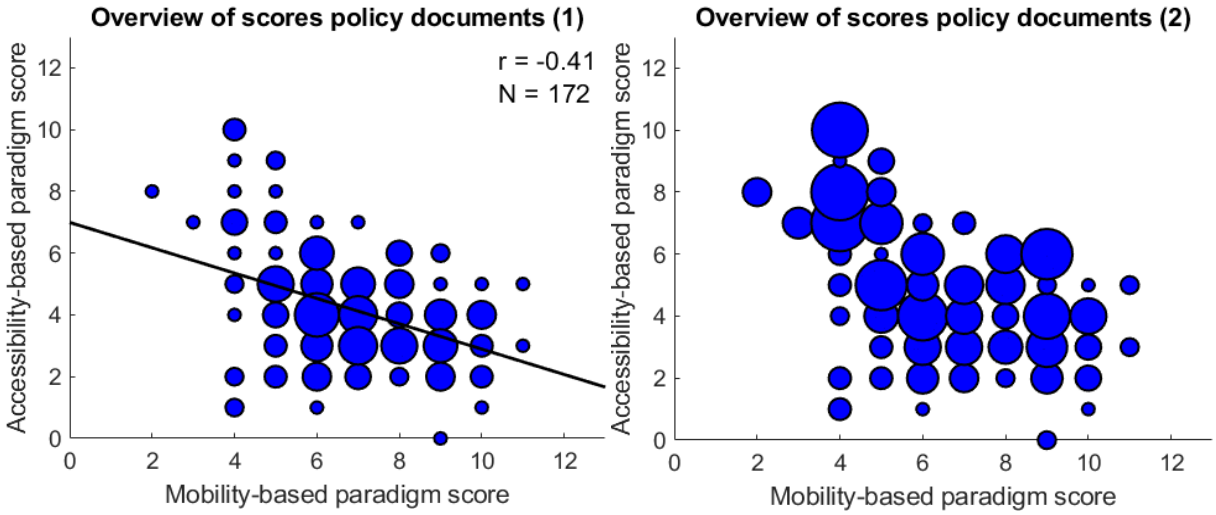

Figure 5: Scores policy documents with negative linear relationship (r = -0,41, p < 0,001). Point size according to cumulative number of municipalities having that point combination (left), and point size according to cumulative population (right).

Based on a first inspection of characteristics of municipalities and scores, some first frontrunners and laggards can be listed, as well as municipalities that sore both low on the mobility-based paradigm and the accessibility-based paradigm. Frontrunner municipalities are typically (progressive) student cities and high in population like Groningen, Utrecht, Eindhoven, Amsterdam and Maastricht. Perhaps surprisingly, Rotterdam also belongs to this list despite its car-city image. Laggards also have an urban character, but not the same centre role as frontrunner municipalities. Such suburban municipalities are for example Almere, Lelystad, Haarlemmermeer, Beverwijk, Den Helder and Barneveld. Finally, municipalities that have low scores on both the accessibility-based paradigm and the mobility-based paradigm are smaller in population size and more rural such as Lochem, De Fryske Marren, Oegstgeest, Oude IJsselstreek, Berkelland and Noordoostpolder. There are of course exceptions to this first characterization of municipalities. For example, there are some frontrunner municipalities in the northern part of the Province of Limburg which are actually quite rural. Also, municipalities like Zutphen and Deventer have a low balanced score but are generally considered to be progressive cities. This characterization of municipalities is based on a first impression of municipalities which has been formed throughout reading and scoring all policy documents. Systematic descriptive analysis in the next chapter can confirm or adjust this impression.

[5] Figure 7 shows for the four clusters the difference between municipal shares and population shares per cluster as defined in the descriptive statistical analysis.

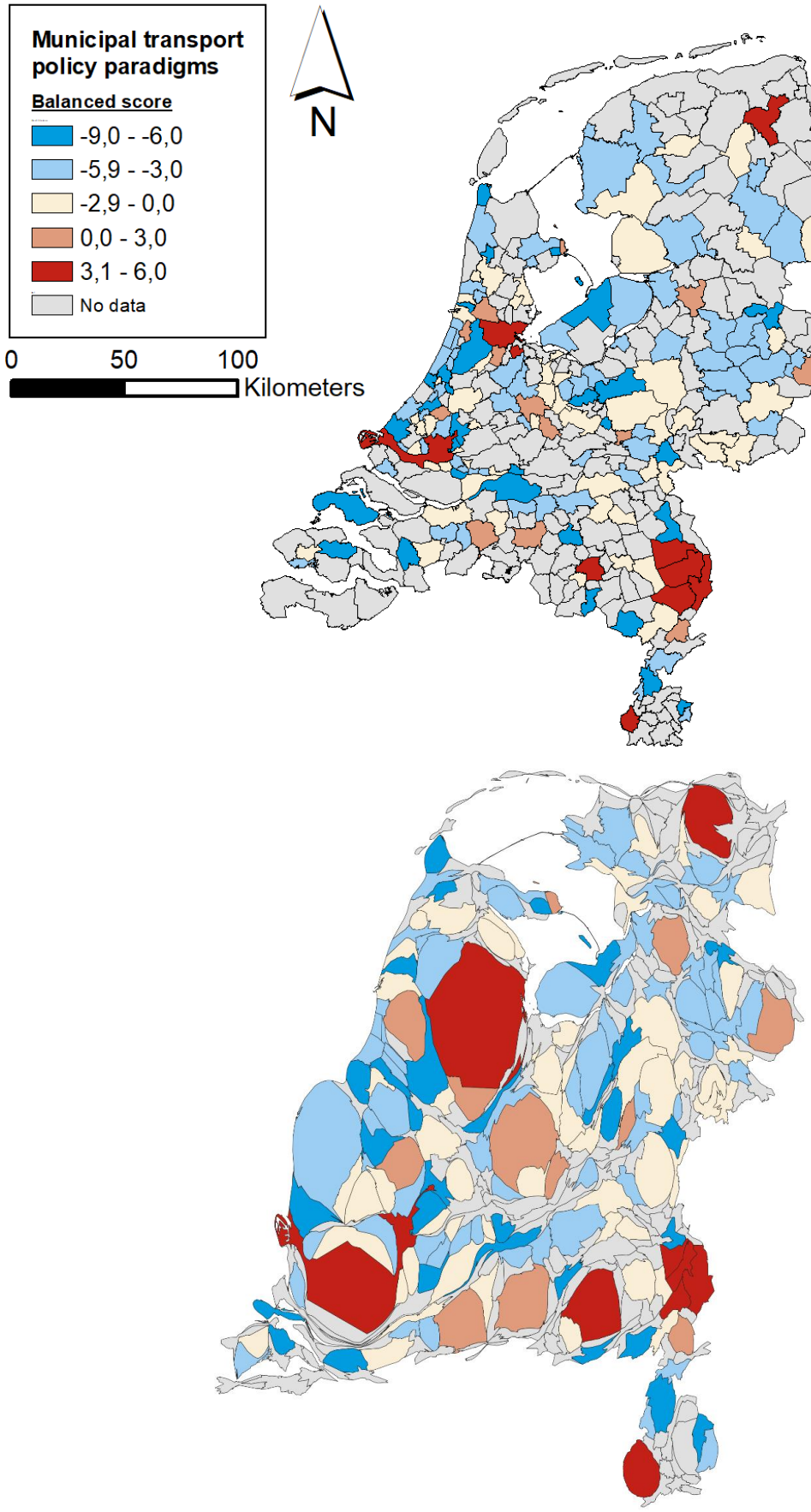

Figure 6: Balanced score displayed according to actual municipal size (above, ArcMap) and as a cartogram which disperses municipal surface areas according to relative population size (below, QGIS). Red (+) is accessibility-focused, blue (-) is mobility-focused.

4.3 Descriptive statistical analysis

In order to analyse characteristics of the municipalities, a descriptive statistical analysis has been carried out to see which variables differ significantly. Each municipality has been put into a cluster, based on the score of each paradigm. Four clusters are defined for interpretability reasons, based on the median values of the mobility-based paradigm score and the accessibility-based paradigm score. Practically, this means that each cluster has score limits according to Table 7. Table 8 shows which variables differ[6] significantly for the four clusters, using an Anova1 test or Chi-square test, dependent on the type of variable.

Table 7: Cluster division based on median paradigm scores

	Accessibility-based score	Mobility-based score	Characterization
Cluster 1	> 4	< 7	Frontrunners
Cluster 2	> 4	≥ 7	Inbetweeners
Cluster 3	≤ 4	< 7	Inbetweeners
Cluster 4	≤ 4	≥ 7	Laggards

Table 8: Tests for significant differences between four clusters

	Variable	Type	Test	Significance (p-value)
Variable category 1: Transport-related characteristics	Car possession per household	Ratio	Anova1	0,000***
	Modal split (% of trips)			
	Car (driver)	Ratio	Anova1	0,000***
	Train	Ratio	Anova1	0,000***
	Bus, Tram	Ratio	Anova1	0,000***
	Bicycle	Ratio	Anova1	0,987
	Walk	Ratio	Anova1	0,000***
	Modal split (% of kilometres)			
	Car (driver)	Ratio	Anova1	0,000***
	Train	Ratio	Anova1	0,000***
	Bus, Tram	Ratio	Anova1	0,099
	Bicycle	Ratio	Anova1	0,748
	Walk	Ratio	Anova1	0,415
	Average kilometres travelled per day	Ratio	Anova1	0,359
	PM10 concentration	Ratio	Anova1	0,075
	NO_x concentration	Ratio	Anova1	0,009**
	CO_2 emissions/1000 inhabitants (without highways)	Ratio	Anova1	0,549
	Traffic injuries/1000 inhabitants (10 year average)	Ratio	Anova1	0,801
	Traffic death/100.000 inhabitants (5 year cumulative)	Ratio	Anova1	0,451
	Low-income households (%)	Ratio	Anova1	0,000***
Variable category 2: Background characteristics	Population size	Ratio	Anova1	0,000***
	Density (inhabitants/km^2)	Ratio	Anova1	0,007**
	Floor-space index (FSI)	Ratio	Anova1	0,003**
	Mixed-used index (MXI)	Ratio	Anova1	0,482
	Urbanity level	Ordinal	Anova1	0,000***
	Train station type	Ordinal	Anova1	0,023*
	Age groups (%)			
	0-5 years	Ratio	Anova1	0,122
	5-10 years	Ratio	Anova1	0,388
	10-15 years	Ratio	Anova1	0,004**
	15-20 years	Ratio	Anova1	0,380

[6] This test indicates whether there is any difference between the clusters. Further analysis by Tukey's HSD test has shown that for most variables only the first and the fourth cluster have a significantly difference of mean. Therefore, municipalities will be only characterized as frontrunners and laggards respectively.

	20-25 years	Ratio	Anova1	0,000***
	25-45 years	Ratio	Anova1	0,000***
	45-65 years	Ratio	Anova1	0,000***
	65-80 years	Ratio	Anova1	0,000***
	80+ years	Ratio	Anova1	0,048*
	Educational levels (%)			
	Low-educational level	Ratio	Anova1	0,027*
	High-educational level	Ratio	Anova1	0,002**
	Inhabitants living and working in same municipality (%)	Ratio	Anova1	0,004**
	Function-mixture index (0 only dwellings, 100 only working)	Interval	Anova1	0,455
	Number of students living in municipality (%, HBO and WO)	Ratio	Anova1	0,000***
Variable category 3: Institutional and organizational characteristics	Share of political parties	Nominal	Chi square	0,009**
	Sustainability ambitions	Ordinal	Anova1	0,163
	Solvability ratio	Interval	Anova1	0,795
	External consultancy in development process	Nominal	Chi square	0,295
	Year of publication	Interval	Anova1	0,000***
	Vision-based/GVVP based	Nominal	Chi square	0,000***
	* Significant at 95% confidence level (p<0,05) ** Significant at 99% confidence level (p<0,01) *** Significant at 99,9% confidence level (p<0,001)			

Most modal trip shares differ significantly for the four clusters, apart from cycling. This might be explained by the fact that cycling is so common in the Netherlands for all municipalities, that not much differences exist between the municipalities. CO_2 and PM10 emissions due to traffic do not differ significantly, but NO_2 emissions do. Statistics related to traffic safety do not differ significantly for each of the four clusters. The share of low-income households does differ for each of the four clusters. Almost all background variables differ for the four clusters, including population size as expected in the first analysis of frontrunners and laggards. This is confirmed by Figure 7, in which the share of municipalities and population is compared per cluster. For the organizational variables, it stands out that the presence of an external consultant does not differ significantly for each of the four clusters. I will do deeper into this matter later on. Furthermore, the sustainability ambitions as stated by the municipality through a questionnaire do not differ significantly as well as the financial state of the municipality, quantified through a simple solvability ratio. The political colour of a municipality does differ significantly though.

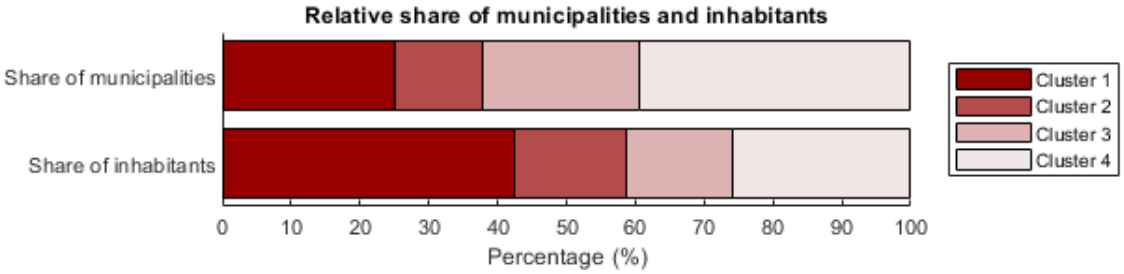

Figure 7: Relative share of municipalities and inhabitants per cluster

Since many of the variables correlate with each other, an exploratory factor analysis has been carried out to reduce the number of variables and to improve interpretability. As the organizational variable category includes nominal variables, this section has not been selected for factor analysis. 24 variables from the transport-related and background characteristics that significantly differ for the four clusters have been used as input for factor analysis. The factor analysis has been done with the statistical software program SPSS. Principal components has been chosen as extraction methodology. The rotation methodology is varimax, so that independent non-correlating factor scores are

calculated as output. Based on the Eigenvalues > 1 and scree plot, six components were included in the final solution. Eventually, the 6-component solution can explain 79,7% of the variance of the original solution. Each component has been given a name, based on the characteristics of the individual variables. All factor loadings larger than 0,4 are displayed in Table 9. The components are:

- Component 1: Physical urbanity (42,9% explaining the variance)
- Component 2: Number of students (9,8% explaining the variance)
- Component 3: Social urbanity (8,9% explaining the variance)
- Component 4: Car/public transport orientation (8,0% explaining the variance)
- Component 5: Elderly citizens (5,5% explaining the variance)
- Component 6: Educational level citizens (4,6% explaining the variance)

Table 9: Rotated component matrix PCA procedure (Varimax Rotation), only correlations > 0,4 plotted

Components → / Variables ↓	1: Physical urbanity	2: Number of students	3: Social urbanity	4: Car/PT orientation	5: Elderly citizens	6: Educational level
Density	0,845					
FSI	0,830					
NO_2 concentration	0,782					
Bus_tram_trips	0,696					
Urbanity level	0,668			0,410		
Population_20_25 (%)		0,871				
Number of students (%)		0,840				
Population_45_65		-0,640			-0,405	
Car possession	-0,455	-0,540		-0,415		
Low_income (%)			0,794			
Population size			0,734			
Living and working in same municipality (%)			0,728			
Type_train_station			0,599	0,539		
Walk_trips	0,477		0,495			
Population_10_15 (%)		-0,444	-0,482		0,469	
Train_trips (%)				0,857		
Train_km (%)				0,843		
Car_driver_km (%)				-0,544		
Car_driver_trips (%)		-0,464		-0,472		
Population_80 (%)					-0,859	
Population_65_80 (%)					-0,814	
Population_25_45 (%)	0,434		0,407		0,585	
Education_low (%)						-0,882
Education_high (%)						0,851

The first component consists mainly of physical characteristics of cities, like high densities of citizens and a corresponding high urbanity level, high level of NO_2 concentrations due to car traffic and a high use of urban transport modes as bus and tram can be characterized. The second component consist of a high number of students, which correlates negatively with car possession and population aging from 45 till 65. The third component consists of social-demographic characteristics of cities, like the percentage of households with a low income, population size and percentage of people who are working in the same municipality as they live. Car possession is not part of this component, since it has a correlation under 0,4. The number of teenagers correlates negatively with the earlier-mentioned variables. The third component is called car/public transport orientation, as the use of train (both trips and kilometres) correlates highly negative with car use (both trips and kilometres).

The fifth component consists of the elderly population, and the final sixth component combines the percentage of low and high educational level of citizens.

4.3.1 Transport-related and background characteristics

Using the six components, factor scores have been added as a third dimension to the municipal policy document scores. All six components combined with the document scores are displayed in Figure 8. To improve interpretability, the factors score are displayed using a moving average of the value of the scatter point and its direct neighbours in the plot. The moving average displays the

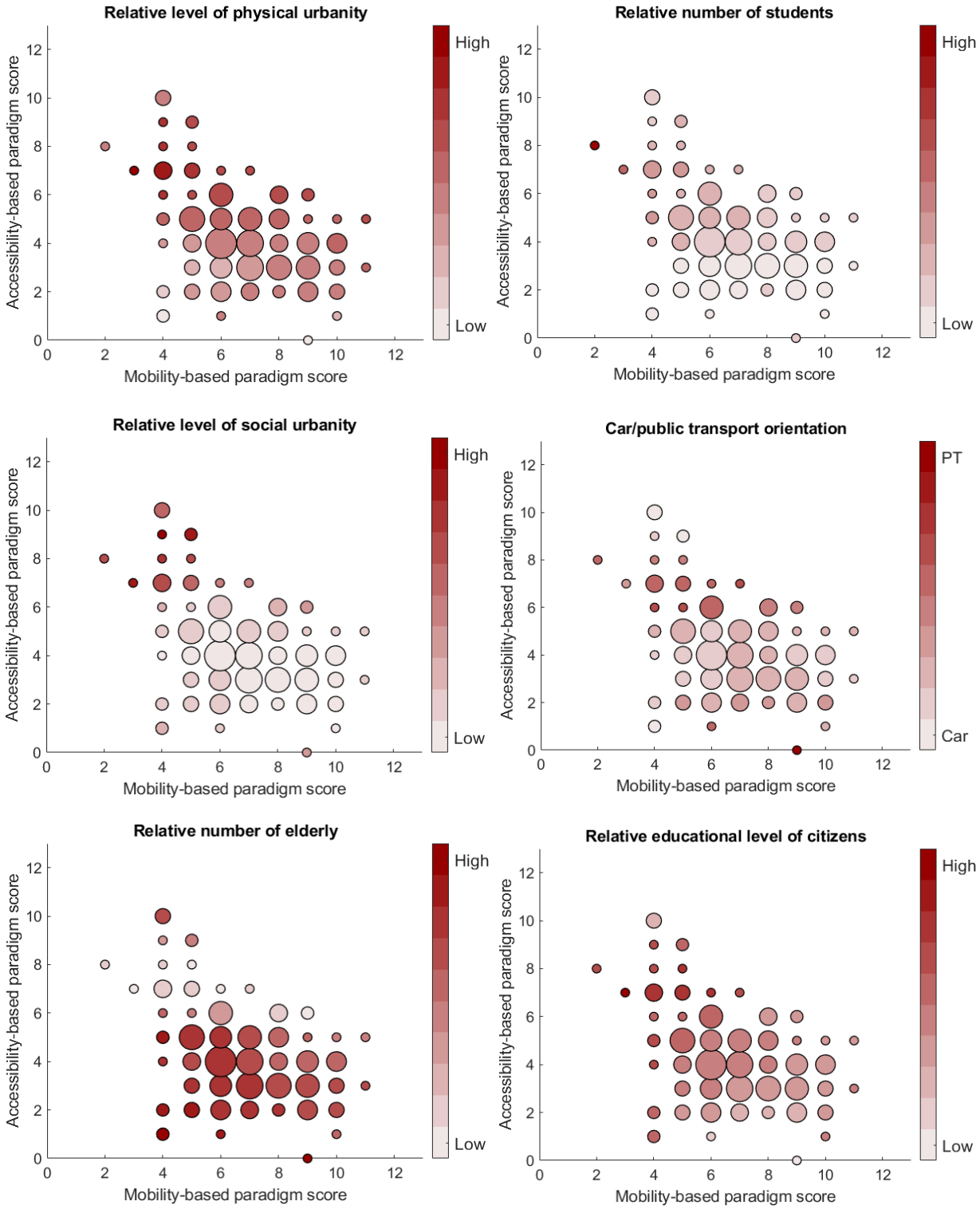

Figure 8: Factor scores of components plotted as third dimension of policy document scores

general trend of the factor scores better, at the expense of reading individual outliers. For Figure 8, only relative labels (mostly high/low) have been used to improve interpretability. Absolute values can be found in Appendix D: Absolute differences transport and background variables.

Generally, it can be detected that so-called frontrunners (i.e. municipalities scoring high on the accessibility-based paradigm and low on the mobility-based paradigm) are highly urban. There is a difference though between physical urban levels of municipalities and social urban levels of municipalities: Frontrunner municipalities are highly-urban in both a physical way and a social way. Practically, this means that the population in such municipalities is larger on average, as well as the share of low income households. Moreover, frontrunner municipalities have higher shares of students, have lower shares of elderly and a relative highly-educated population. Such municipalities are typically student cities like Amsterdam, Rotterdam, Utrecht, Eindhoven, Enschede, Groningen and Nijmegen.

There are also some municipalities in the frontrunner quadrant which are not in line with the general trend of the six components. These municipalities are located in the province of Limburg. Municipalities like Venlo, Horst aan de Maas or Venray are not highly urban in a physical and social way, have a relative high share of elderly, low number of students and are more oriented towards car than public transport. It is therefore extra interesting to analyse why these municipalities have come up with progressive transport plans, through holding additional interviews.

Regarding physical urbanity, there are many municipalities which can physically be characterized as urban with high densities of people and space, but socially relative less urban. In general, these municipalities are not part of the frontrunner municipalities group as described earlier. Such municipalities consist of for example (suburban) cities like Alphen aan den Rijn, Haarlemmermeer, Assen, Beverwijk, Almere, Zutphen and Woerden. Such cities have higher physical urban densities but a lower qualification of social urbanity, as the share of population with a low income is lower for example. Also, more citizens are commuting from these municipalities to other places as the share of people working and living in the same municipality is on average lower. In order to show how all six components correlate with a higher balanced score, a weighted multi-linear regression model has been set up which is displayed in Table 10. The factor scores displayed in Figure 8 have been used as input for the regression analysis, which means that the independent variables are not standardized anymore as they have been translated through a moving average. The balanced scores have been used as dependent variable in the regression model, along with weights based on the amount of municipalities having that score combination. Models with the mobility-based score (R^2 = 0,709) and the accessibility-based score (R^2 = 0,771) as dependent variable show similar results in terms of significance and coefficients.

Table 10: Multiple weighted linear regression model (R^2 = 0,745)

Dependent variable: Balanced score			
Variables	Coefficient	Beta	Significance (t-value)
Constant	-3,642	-	0,000***
Physical urbanity	1,026	0,089	0,521
Number of students	2,375	0,323	0,014*
Social urbanity	3,761	0,525	0,000***
Car/PT orientation	-0,741	-0,045	0,649
Elderly citizens	2,983	0,285	0,049*
Educational level citizens	3,236	0,297	0,017*
	*Significant at 95% confidence level (p<0,05) ** Significant at 99% confidence level (p<0,01) *** Significant at 99,9% confidence level (p<0,001)		

The results of this model indeed confirm that physical urbanity alone is not a good predictor for a high balanced score, as this variable is not significant in the model. Also the Car/PT orientation variable is not significant in the regression model. The social urbanity level has the largest effect on the balanced score, followed by the number of students, educational level of citizens and the number of elderly citizens. All in all, this means that the component explaining the most variance of municipal characteristics (42,9%) does not affect the balanced score in a uniform way. Frontrunner municipalities are highly urban in both a physical way and social way, but other municipalities having a low balanced score are also physically urban. Therefore, institutional and organizational characteristics of municipalities should be analysed which can explain why physical urbanity does not correlate positively with a high balanced score in a uniform way.

4.3.2 Institutional and organizational characteristics

For the organizational characteristics, only the year of publication, political colour of the municipality and type of policy document (vision-based or GVVP-based) significantly differ for the four different clusters. Therefore, these three variables have been plotted in the same way as the factor scores. Also here, only relative labels (mostly high/low) have been used to improve interpretability. Absolute values can be found in Appendix E: Absolute differences organizational variables.

Firstly, the type of document and the relative number of years functioning of the document are plotted in Figure 9. The plot shows that the frontrunner documents are the youngest in comparison with other municipal documents. Furthermore, frontrunner documents are written in a style of a mobility vision instead of a classic GVVP document. Combining these two plots implicates that younger documents are written more often in the form of a mobility vision. The fact that younger documents have a higher balanced score, also indicates that there exists a learning curve from a mobility-based paradigm to an accessibility-based paradigm. Apparently, the form of a vision instead of a GVVP connects more with achieving this paradigmatic change. When reading all documents, it appeared indeed that vision-based documents have defined clearer policy goals and propose better integration of transport planning and spatial planning.

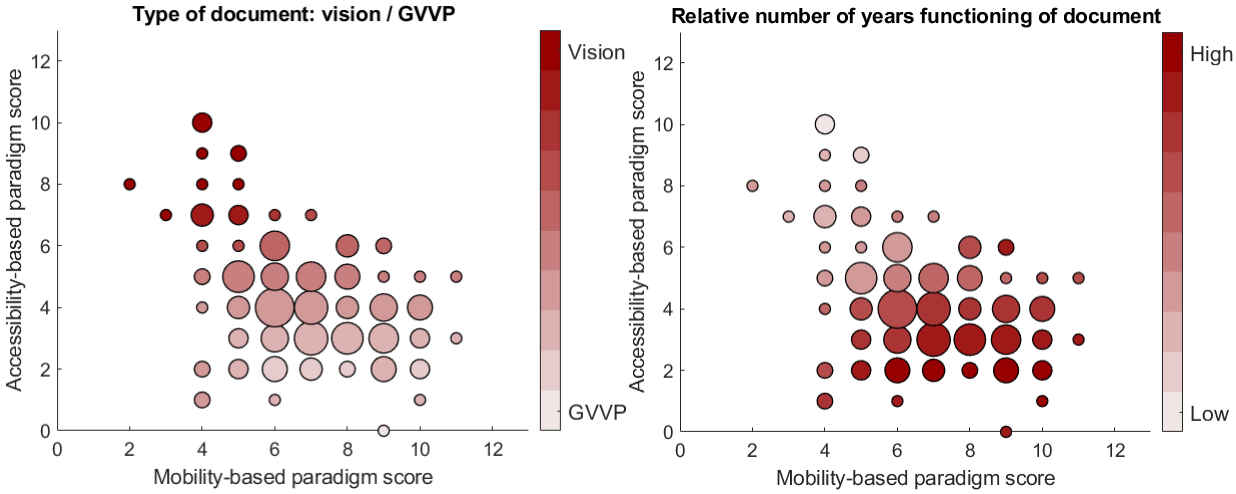

Figure 9: Organizational variables plotted as third dimension of policy document scores

Based on literature, it was expected that external consultancy presence would also be significantly different for the four clusters as such a party could provide state-of-the-art knowledge with regard to mobility policies and planning. Municipal scores with and without external consultant have been displayed in Figure 10. The figure clearly shows that both groups are visually not different from each other. A t-test confirms this: both groups are not significantly different in terms of mobility-based and accessibility-based paradigm scores. It should be noted though that larger municipalities have

internal consultancy firms, which is not included in this analysis. The fact that an external consultant does not correlate with higher or lower paradigm scores might have to do with the commercial aspect of consulting. If a municipality does not wish a different type of policy document, then the commercial consultant will not propose radical different policy goals and measures. On the other hand, municipalities which have already a broader view on mobility also choose a consultant which can help building such a different mobility vision. This hypothesis can be tested during the interviews.

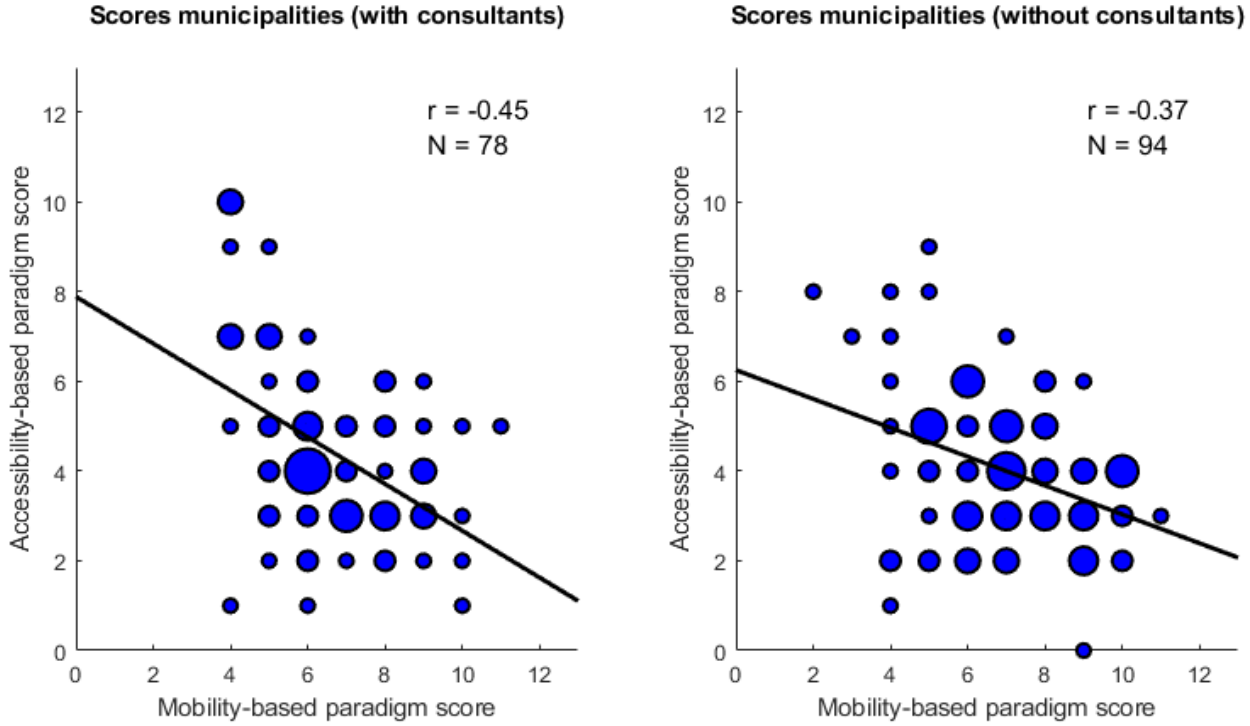

Figure 10: Municipal scores with and without external consultant

An analysis of the relative shares of political blocks in comparison with the policy document scores (as displayed in Figure 11) shows that the share of progressive parties correlates positively with the group of frontrunner municipalities. The classic-right party VVD, block of confessional parties and block of protest parties correlates higher with the rest of the municipalities. All these correlations together indicate that the political colour of a municipality does influence the outcome of a policy document writing process.

Moreover, when reading through all policy documents it was noticed that there was a subtle political difference of language regarding modal choice preference, as displayed in Figure 12. One part of the documents explicitly chose for a policy prioritization of modes: active modes such as walking and cycling were considered as most important, then public transport, and least important the car. Practically, this meant that active modes were promoted in terms of room, travel times and financial budget. Car traveling was made less attractive through for example lower parking norms, less space for roads and so-called cuts in the network. Another considerable share of documents chose a very different approach however with regard to modal split. Their basis of thinking was choice of freedom: if all modes are at the same quality level, then travellers will automatically shift towards more sustainable modes. Quality levels are often defined in a poor way in such documents, but sometimes referred to as travel times, comfort or frequency. Many municipalities noticed that public transport and cycling networks are not at the same quality level as the car network is. Therefore, such policy documents state that they aim to invest in sustainable modes. At the same time though, car travel is not really discouraged because the traveller should be possible to make its own modal choice. In order words, choice of freedom underlies this policy document as an important value.

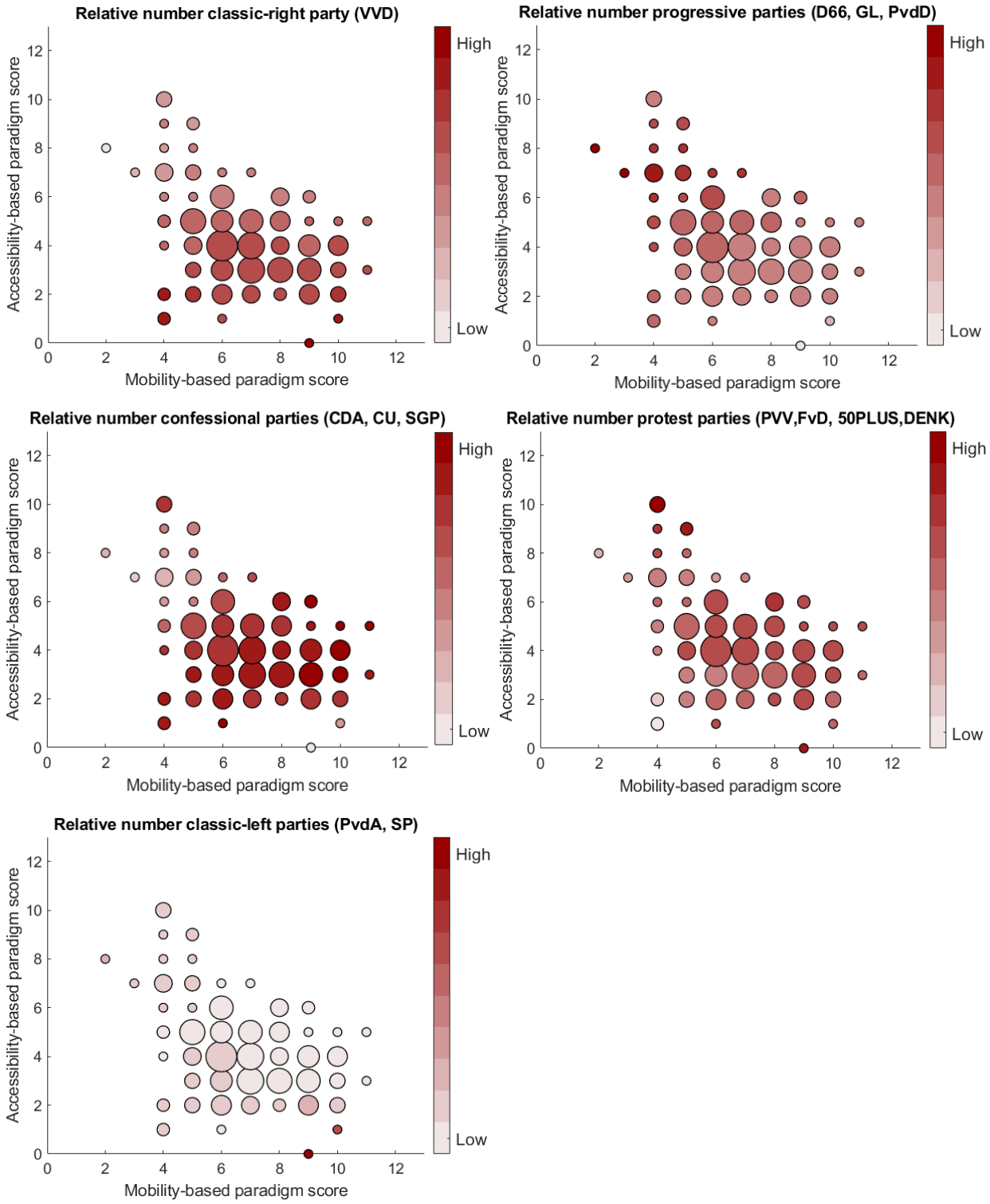

Figure 11: Relative share of political votes per block, plotted as third dimension of policy document scores

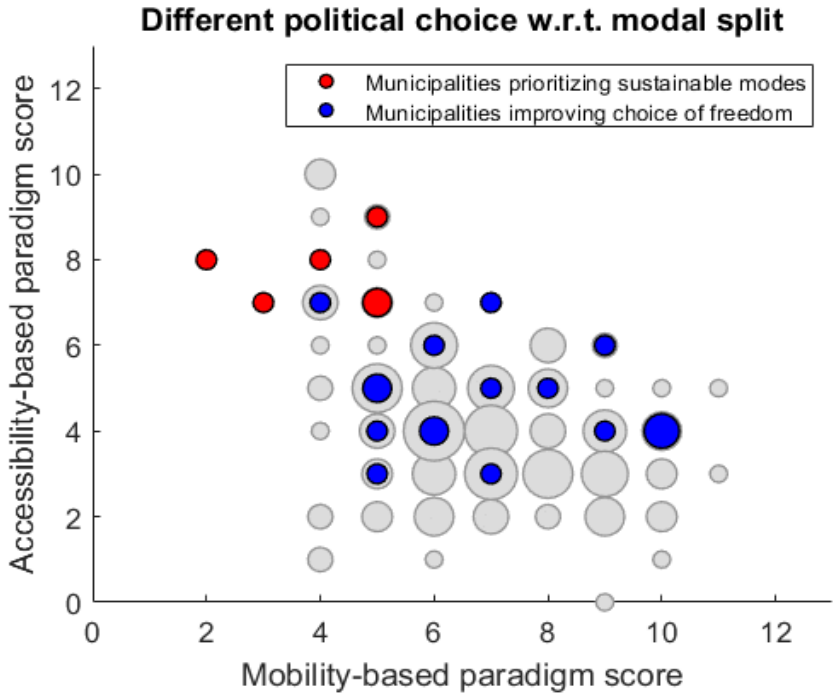

Figure 12: Two different types of political choices with regard to desired modal split

Throughout analysis of all policy documents, a list was created independently of the scores with municipalities that adopt either modal prioritization or choice of freedom in their policies. The result of this list is plotted in Figure 12. Connecting this with Figure 11, it shows that choice of freedom is adopted in mostly (liberal) right-wing and confessional municipalities. This makes sense, as these parties tend to be more in favour of having a free choice of traveling by car. Municipalities that have explicitly chosen to prioritize active modes and deprioritize the car have a higher electoral share of progressive parties. These additional findings based on document analysis confirm the idea that political values and choices indeed play a role in the policy process and eventually the establishment of a certain transport policy paradigm.

4.4 Elements of policy cycle in documents

As part of the policy document analysis, four different categories have been distinguished in the policy document: philosophical assumptions, goals, instruments and monitoring measures. The relation between the mobility-based score and the accessibility-based score for each category is displayed in Figure 13. The figures show that there is a no correlation between the scores for the categories philosophical, goals and monitoring. For the category instruments however, the correlation is even larger than for the total score (see Figure 5). This means that the categorization of a document (i.e. either mobility-based paradigm or accessibility-based paradigm) highly depends on the chosen policy instruments, rather than a difference in philosophical assumptions or policy goals, even taking into consideration that more points could be scored through policy instruments. Especially for policy goals, many documents scored both high on mobility-based criteria as accessibility-based criteria. This becomes even clearer when the average score per category are shown in Figure 14, relative to the total amount of possible points per category. The category ‘goals’ has relatively the most amount of points for both type of paradigms. This can be explained by the fact that most municipalities have policy aims that aim both at reducing travel time (mobility-based paradigm goals), and general aims of improving liveability and safety (accessibility-based paradigm goals). Frontrunner municipalities have consequently adopted policy instruments that indeed improve liveability and sustainability, whereas another part of the municipalities only adopt policies that stay within the regime of car mobility. In terms of consistency, the mobility-based paradigm has

on average similar scores for each of the categories of the policy cycle. The accessibility-based paradigm has especially low scores for the philosophical and monitoring category. This shows that the accessibility-based paradigm is still in a early phase of development, as broader visions through new philosophical assumptions and concrete evaluators in the form of new monitoring measures are still missing in many municipal documents. More work is thus necessary for policy makers and academics to create criteria that are useful and easily applicable in an accessibility-based framework. Furthermore, political will and vision is necessary to adopt new and broader philosophical views in policy documents.

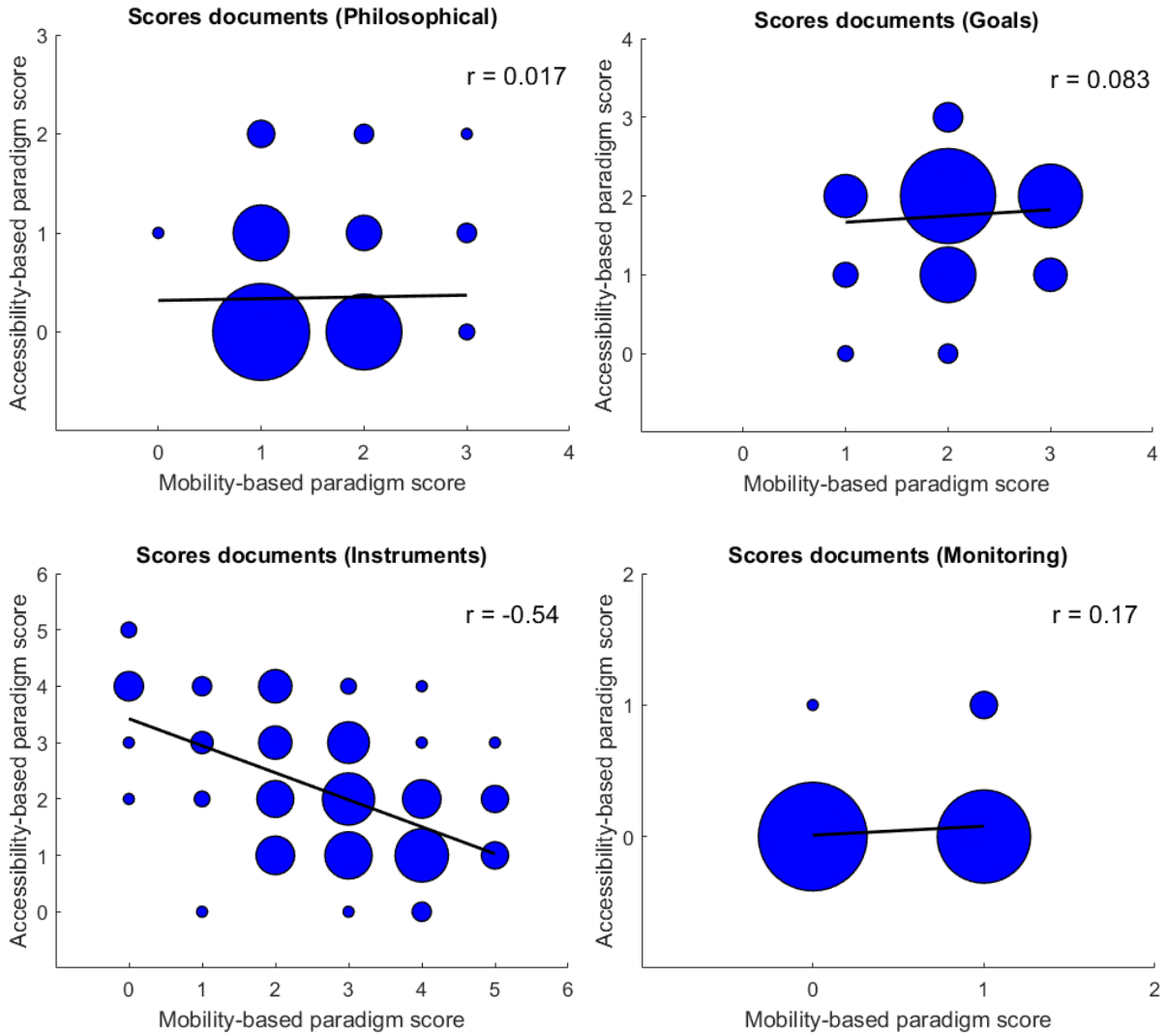

Figure 13: Document scores per paradigm and policy cycle category. Only Instruments and Monitoring have a significant p-value < 0,05.

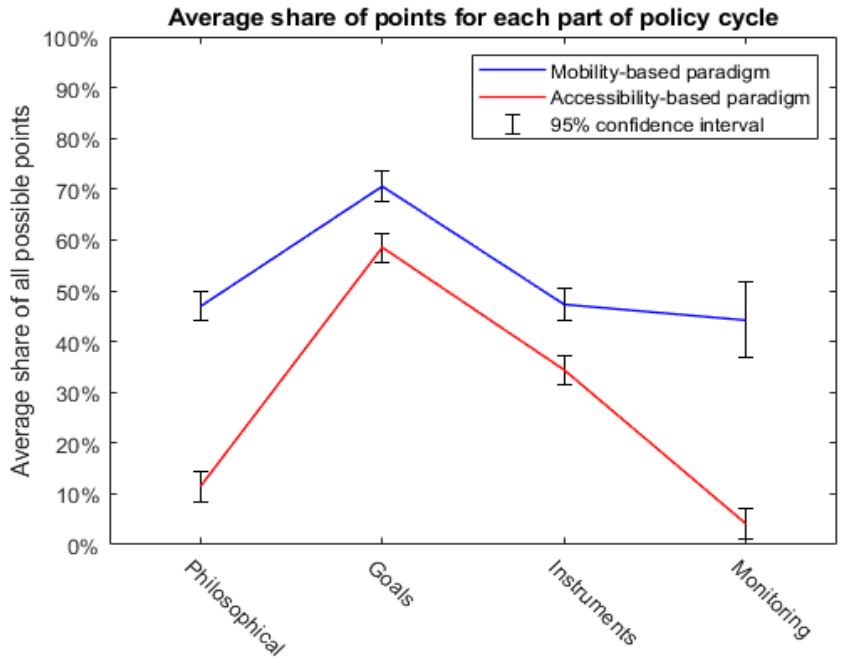

Figure 14: Share of points per policy cycle category

4.5 Interview findings

The aim of the interviews was to find local conditions which triggered paradigmatic change, in addition to characteristics that have been described in sections 4.2 - 4.3. Interviews have been carried out with policy makers of the municipalities of Eindhoven (EI), Zwolle (ZW), Venlo (VE) and Rotterdam (RO).

Firstly, questions have been asked about the organization of the department responsible for writing local policy document. It appears that each municipality has worked in an integral way, where employees from different backgrounds (e.g. traffic engineering, design, spatial planning, sports and health) provided input for the plan. EI states: 'The plan has been set up by a core team of a traffic engineer, an urban planner and a public administration expert'. Also VE mentions that 'the vision has been created by a team called 'Labour and Accessibility', but employees from the social domain, sport and health have also worked on this vision'. This does not mean though that all these departments are integrated as one department. With all municipalities, there is a division of mobility, spatial planning and other urban planning departments, as well as a division of so-called planning departments and execution ('uitvoering') departments. For writing the documents, multidisciplinary teams were set up that aimed at including a variety of urban developments into the plan.

Then, questions were asked about whether the current plan was a so-called breach with earlier plans, to find out if the planning aims and instruments have radically changed. These findings are summarized in Table 11.

Table 11: Paradigmatic change as a breach with earlier plans

Municipality	Breach?	Which elements?
Eindhoven	Yes	Changing position of car in city, attention for quality of living, pedestrians and area development
Zwolle	Semi	Position of bicycle has been reconfirmed, new is relation with spatial planning, climate adaption and energy transition
Venlo	Yes	Plan is no plan, but a vision with a direction of development. No description of specific parts but broad view on society through lens of mobility and accessibility
Rotterdam	Yes	Changing position of car in city, more attention for quality of living, pedestrians and environment, mobility poverty

In three of the four municipalities, policy makers define their policy document as a breach in comparison with earlier documents. Only the municipality of Zwolle sees this document as an extension of earlier planning: 'This city is characterized by incremental change, not radical at all' (ZW). Eindhoven and Rotterdam specifically have chosen to change the modernist car-centred boulevards, which have been developed after both cities were bombed during the second world war. Moreover, both cities frame the new plan not as bullying cars, but as promoting the quality of public space by adding green and reducing the number of car parking possibilities. In Venlo, the breach is particularly defined through the internal status of the plan: 'The fact that we go from an asphalt-minded plan to a plan based on sustainability and vitality is not unique, that happens everywhere' (VE).

Most importantly, it was then asked which local conditions have helped creating the policy document, focusing on organizational and political aspects. By transcribing the interview results, six conditions have been found that came up during all four interviews. These conditions are listed in Table 12 in order of importance. I will now go deeper into each of the mentioned conditions.

Table 12: Local conditions for paradigmatic change

Condition	Mentioned by			
	Eindhoven	Zwolle	Venlo	Rotterdam
Knowledge and attitude of employees	X	X	X	X
Political trigger and support	X		X	X
Cooperation with external (knowledge) parties	X		X	X
Positive leadership		X	X	X
Coupling with provincial/national developments	X	X		X
Local air quality problems	X			X

Firstly, knowledge and attitude of employees have come up as a the most important condition for paradigmatic change since all interviewees mentioned this. Two interviewees (EI, RO) mentioned that policy makers already wanted to write a more ambitious plan before other triggers made this possible. In Rotterdam, positive experiences with the development of the Central Station stimulated this tendency to change policies: 'Our department had enough people who were willing to think about this change' (RO). In Zwolle, all employees have an extensive knowledge network of external connections. Furthermore, employees are generalists and specialists at the same time. For this focus, 'one needs to develop him or her self: visiting study days, keeping up with the latest developments and trends' (ZW). In Venlo, three policy makers including the interviewee convinced the organization to develop a different policy plan, based on their knowledge on transition development and the European program called SUMP (Sustainable Urban Mobility Plan). Some policy makers are still not convinced: 'Willingness to change is dependent on your own personality, what you want with it and what you feel for it' (VE). On the organization level, the transition in Venlo has been successful though.

Political change and support have consequently activated the potential forces in the planning departments. For example, a just-elected city council member in Rotterdam wanted to focus more on cycling policies. The local department agreed with this aim, but also wanted approach such a policy from a coherent system perspective. This meant that other policies, including car-inhibiting measures and policies on the promotion of quality of public space, were also included in the new program. In Eindhoven, a motion to discourage through-traffic in the city centre stimulated the development of change, as well as ambitions to develop high-quality urban transport. Moreover, the city council member of a right-wing party convinced his own party and other council members that

the proposed policy plan would be beneficiary for the town. Also in Venlo, the council member's support for the plan helped the political process of accepting it.

For three municipalities, cooperation with external (knowledge) parties was essential in the overall development process. In fact, without the participation of local influential persons, experts and citizens, it would probably not have been possible to produce the current document. In Venlo and Rotterdam, the concept of mobility poverty was mentioned through participatory workshops with all kinds of (non-) experts. The interviewee in Rotterdam mentioned that external pressure of influential figures were key for convincing politicians to opt for a different kind of policy plan: 'I have a trustworthy reputation, but if I go to the city council and tell them that everything should be different, they will not accept that. You have to support your story with prominent people, who also think in a renewed way'. It is particularly interesting that knowledge experts on transition management, just transport and sustainable transport were mentioned as forces of paradigmatic change. Although consultancy firms have helped with producing numbers on environmental pollution (EI) and pedestrian and cycling data (RO), such parties were not decisive from a process perspective. This is in accordance with policy document scores that do not indicate a significant effect of external consultants.

With three of the four municipalities, support of managers and team leaders was mentioned as condition to experiment and search for new knowledge. ZW mentions about this: 'it is a type of culture, I am able to fail. I will not be fired right away if an experiment goes wrong' (ZW). This room to experiment is also stipulated by VE: 'Apart from my own ambition and itch to innovate, the most important thing was my team manager. He gave me the trust to do something with my ambitions' (VE). In Rotterdam as well, a new team leader stimulated to search for new types of policy instruments, in order to innovate.

Especially in Eindhoven, the fifth condition was mentioned as influential: coupling with national and provincial developments. On a national level, the region of Eindhoven has been framed as 'Brainport', a region in which multinationals, schools and government work together on new technologies. For Eindhoven, this also meant that the city had to become attractive for internationals to live in: 'There has to be an attractive living environment. There have to be good cultural facilities. This renewed mobility plan promotes attractiveness, the city used to be ugly' (EI). Apart from Eindhoven, Rotterdam and Zwolle were also helped by so-called MIRT projects (National long term investment programs for space and transport). Topics that triggered change were coupling of public space with mobility and experiments to change mobility behaviour.

Finally, local air quality problems in Eindhoven and Rotterdam were mentioned as rationales to come up with a different plan. Measurements at specific locations showed that pollution levels were higher than legal criteria. Therefore, measures had to be taken, which fitted a more progressive policy plan.

All in all, the six conditions listed in Table 12 do not provide clear-cut answers why a municipal organization has chosen for a different policy paradigm in their document. Often, a combination of (coincidental) conditions made it possible to flow into a process of policy change. What stands out though, is that the local knowledge basis of planners and team managers is of the most importance. Without having this basis, there is no foundation to let positive effects of other conditions land in the organization.

5. Discussion

This chapter contains a reflection on the methodology and the interpretation of results of this research. I will firstly reflect on the policy document scores and its limits in terms of methodology, also based on interview findings. Then, I will go into the findings and relate these to the theoretical framework.

In this thesis, two different planning paradigms have been distinguished, based on literature analysis. This choice has been made for analytic reasons, in order to make descriptions and criteria more straightforward. The mobility-based paradigm can be characterized through a quantitative network approach, focusing on car mobility and modelling. The accessibility-based paradigm on the other hand uses integral approaches that combine spatial and mobility elements, mostly focusing on transit and cycling. It is of course possible that one could model transit flows and cycling in a quantitative way, or apply a spatial analysis for car traveling. Also, some elements like traffic safety have been put in the accessibility-based paradigm, whereas it might also have been placed in the mobility-based paradigm as historical analysis has shown. Planning paradigms can thus consist of multiple overlapping layers and are not as dichotomous as originally defined. This is in fact confirmed through empirical analysis. Scores indicate that many municipalities cannot be put under one label in terms of planning paradigms. There exists a large grey are between the two extremes, as shown in Figure 15.

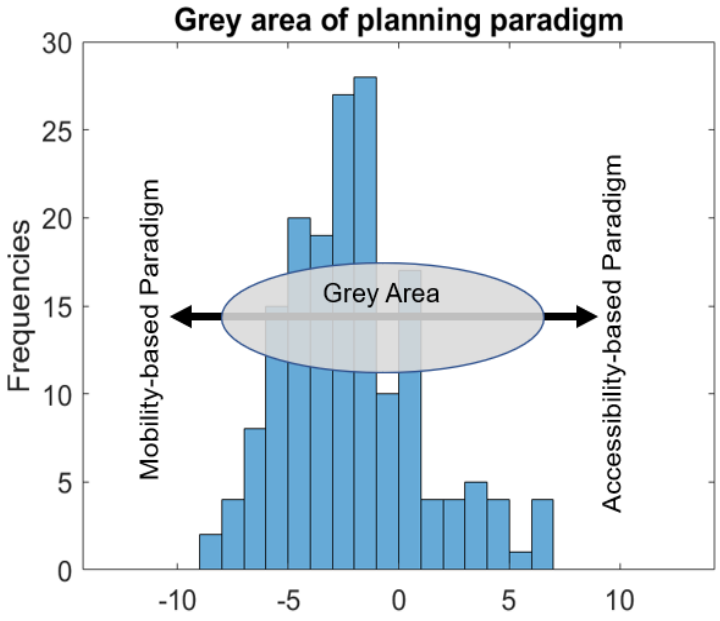

Figure 15: Grey area of policy practices between mobility-based and accessibility-based end

The existence of this grey area means that most municipalities adopt elements of both the mobility-based paradigm and the accessibility-based paradigm in their policies and organization. The planning paradigm concept as applied in practice is in this sense more fluid and contextual, rather than pointing towards the extremes. Based on a comparison of years of publication and scores though, there does seem to be a slow shift on the spectrum from the mobility-based end to the accessibility-based end. In Chapter 4.4, it has been described that this shift is mostly made up of different policy instruments a municipality adopts. A comparison of the accessibility-based instrument sub scores with the balanced scores has therefore been displayed in Table 13. Which elements of a accessibility-based planning paradigm are leading in the paradigm shift?

Table 13: Analysis of accessibility-based policy instruments scores and balanced score

Accessibility-based policy instrument	Pearson correlation with balanced score
Providing physical infrastructure for bicycles and public transport	0,22
Soft instruments (Attitudinal measures, marketing, information provision)	0,57
Knowledge instruments (Integration of departments, research and development)	0,61
Attention for lower incomes (in specific areas)	0,33
Specific measures for promoting liveability (e.g. environmental zone or electric charging poles)	0,53

The correlations of the balanced score with soft instruments, knowledge instruments and specific environmental measures are significantly higher than the ones of physical infrastructure and attention for lower incomes respectively. This can be explained by the fact that almost all municipalities have some kind of policy in relation with cycling or public transport and the very small amount of municipalities that have policies in relation with transport poverty. There are of course different levels of for example cycling policies possible, a fact that has not been covered in this thesis. Further research could look into the possibility of defining different levels of cycling policies, both in terms of stated goals, the extent to which funding is available and integral network effects. Overall though, it can be concluded that a transport policy paradigm shift is more constituted through an integral view of spatial and transport planning than a significant difference in focus on cycling and public transport policies.

Methodology-wise, there are several limits related to policy document analysis. Firstly, reading and scoring documents remains subjective, which means that the results could have a structural bias. A second opinion on scores has not been executed. The general trend of highly urban municipalities having higher scores does not seem to be far-fetched though. Furthermore, it is unknown what the actual operational status of the document in the local policy making process is. Is the plan truth written down on paper or in fact leading for local planning? Interview results suggest that the influence of visions on the planning process should not be underestimated. Visions are a necessary step to go forward, although the real test for paradigmatic change comes when implementation programs ('Uitvoeringsprogramma's) are written which describe funding allocation and design choices. In the case of Eindhoven, an implementation program was actually not created along with the vision as this would make it easier to get the plan through the municipal board. A cut in the local road network as proposed in the vision was in fact cancelled after elections. Also in Rotterdam and Venlo, interviewees mention that the real test lies in the execution of the stated aims and instruments: 'Achieving your targets is not just creating good visions, but also doing things differently in the execution. This translation is one large grey gap, which has grown in size since we have become more progressive in our stated policies' (VE). All in all, the relation between stated policies and actual change of urban planning is not as straightforward. It might also be the other way around, that municipalities with no vision actually plan their city in an innovative way.

It is very difficult to establish clear causal relations between current status of infrastructure, travel behaviour and municipal planning paradigm scores, apart from the methodological limit that variables do not match the publication year of documents. This limit has been described in Chapter 3. For example, is good cycling infrastructure a sign of progressive planning, or has a lack of cycling infrastructure led to more progressive planning? The municipalities of Houten and Almere have different scores: Houten has a balanced score of +1 whereas Almere has a score of -5. Both cities have been designed from scratch in a cycle friendly way from the 70s and 80s on. Furthermore, both

municipalities have been awarded with prices on sustainable mobility and cycling-friendliness[7]. It might be the case that for Almere, the good local cycling and PT infrastructure has led to a certain laid-back attitude, whereas the municipality of Houten wants to go further through adopting progressive policies. The political orientation of Houten and Almere (progressive and right-wing/protest respectively) also has to do with this difference in planning policies. Another example of municipalities having more or less the same characteristics are Enkhuizen and Boxmeer. Both municipalities have a similar number of inhabitants, vote structurally classic left-wing and have a train station with connections to larger cities. Boxmeer has the lowest balanced score of -9, whereas Enkhuizen has a score of +1. When looking at the actual policy documents, it becomes clear that Enkhuizen has incorporated new insights of behavioural instruments, integral planning and participatory help of citizens. The plan of Boxmeer is written in the style of a classic GVVP, mainly focusing on car transport. Since both municipalities are so similar, the only reason that can explain why the scores differ so much is the knowledge base and attitude of local policy makers.

Another point of discussion is the ambivalent status of the national and provincial government as promotor or barrier for innovative transport policies. Although interviewees have indicated that some national projects have been used to connect a local vision to, it is also felt that overall structural guidance is missing. For example, RO states: 'The national government do not know what urban accessibility is about. They are focusing on congestion and asphalt, although a change towards public transport and cycling is starting to grow' (RO). For Venlo, the provincial government did not want to go as fast with their mobility vision as Venlo wanted. Eventually, both government layers worked in a parallel trajectory of creating a vision. 'When the province gets at regional implementation, we will find each other again' (VE). For all interviewees, more collaboration on a regional scale (i.e. between municipality and province) is considered to be the future of municipal planning. National policies are neither a promotor, nor a real barrier of paradigmatic change according to the interviewees. The new environment and planning act does seem to have an effect though on municipal policy making. Initially, some municipalities could not hand over their policy document because they were working on a new version based on the new act. Furthermore, throughout reading all documents, it was found that a considerable part of municipalities anticipate the upcoming law, by proposing integral spatial visions.

As an hypothesis based on the theoretical framework, it was expected that paradigmatic policy change happens through fulfilling the necessary condition of institutional reorganization. Lack of knowledge and data, lack of political support and conflicting interests because of sectoral planning were mentioned as barriers in empirical research. A limited amount of interviews has confirmed the idea that the organizational aspects of a planning paradigm is of very high influence for paradigmatic change. Especially the knowledge basis of policy makers and political triggers enabled to move from a mobility-based paradigm to an accessibility-based paradigm. It is not the case though that such changes are always constructed in a deliberate way. Interviewees also mention that coincidence and accidental circumstances have helped writing a renewed policy document. Moreover, a distinction must be made between external help from so-called knowledge actors and other commercial consultancy firms. It has been shown through interviews that indeed knowledge institutes such as CROW and DRIFT help municipalities with creating better policies. Documents written in cooperation with commercial actors do not have significantly higher accessibility-based scores. Although consultants help with providing better traffic models and cycling data for example, they do not prove

[7] See https://www.crow.nl/over-crow/nieuws/2019/november/gemeente-almere-wint-prijs-voor-meest-duurzame-mob and https://www.fietsersbond.nl/nieuws/houten-verkozen-fietsstad-2018/ (Both accessed 5th of March 2020)

to have a significant effect on the overall policy process. All in all, interviews show that that epistemic learning and institutional reorganization as conceptualized in Figure 2 go hand in hand. Through meeting new actors and incorporating them in the policy process, policy makers indicate that their problem scope has broadened. In other words, they have learned new knowledge (i.e. epistemic learning) through the participatory process (i.e. institutional reorganization). Consequently, this has led to progressive policy plans which aim to tackle more than classic congestion problems alone. The amount of interviews in this thesis has been very limited because of time reasons. Therefore, conducting more interviews with municipal policy makers and other (political) actors is necessary in order to obtain a more solid basis for defining specific (organizational) conditions of paradigmatic policy change.

6. Conclusion

The aim of this research was to retrieve circumstances and conditions of paradigmatic change in municipal transport policy making. 172 Dutch municipal transport policy documents have been analysed and scored, in order to relate municipal characteristics with the overall planning paradigm. Consequently, additional interviews have been carried out to find organizational conditions for policy change. This thesis will conclude now by answering all three sub research questions and providing future research possibilities.

6.1 Sub research question 1

What kind of transport policy paradigms are present in Dutch urban municipal transport policy plans?

It has been found that most municipalities adopt policies based on the mobility-based paradigm instead of the accessibility-based paradigm. The majority of documents have a classic structure in the form of a so-called 'municipal transport plan' (or GVVP in Dutch), as indicated by national law. A smaller part however has written their document in the form of a mobility vision, structural vision or ambition document. There is a moderate negative correlation (-0,41) between both paradigm scores. Although only a smaller amount of municipalities adopt an accessibility-based paradigm, their population numbers are high. Some municipalities indicate that they do not have an up-to-date plan, because of the upcoming new environmental and planning act.

6.2 Sub research question 2

Which transport-related, demographic, spatial and institutional characteristics relate with the transport policy paradigm of municipal documents?

After factor and regression analysis, it has been found that urbanity is the most influential in relation with policy paradigm scores. So-called frontrunners (i.e. municipalities scoring high on the accessibility-based paradigm and low on the mobility-based paradigm) are highly urban in both a physical way and a social way. Physical urbanity relates to higher inhabitant densities and NO_x emissions. Social urbanity relates to higher shares of low-income households and lower shares of commuting citizens. Laggards (i.e. municipalities scoring low on the accessibility-based paradigm and high on the mobility-based paradigm) are also physically urban, but not socially urban.

Physical urbanity does thus not correlate uniformly with paradigm scores. Organizational and institutional characteristics of municipalities fill this explanatory gap. The year of publication, political colour of the municipality and type of policy document (vision-based or GVVP-based) significantly differ for the scores in an uniform way. The older the document is, the higher the balanced score. Based on this finding, it is that paradigmatic change is slowly starting to happen in Dutch municipalities, although not on a large scale. Furthermore, newer documents are more written in a vision-style instead of a GVVP-style. Vision-based documents have defined clearer policy goals and propose better integration of transport planning and spatial planning. Finally, the share of progressive political votes positively correlates with the balanced score. Political values and choices play a role in the policy process and eventually the establishment of a certain transport policy paradigm. Especially student-cities with progressive political agendas choose for adopting the accessibility-based paradigm.

6.3 Sub research question 3

Which factors of a transport policy paradigm are promotors and barriers for a paradigm shift?

There are some exceptions to the general trend that only highly urban municipalities have progressive policy plans. Municipalities in the relative rural province of Limburg show that local

organization is also essential for producing a integral vision. Through additional interviews with policy makers who have been involved in writing accessibility-based visions, six organizational conditions have been found that support paradigmatic change: Knowledge and attitude of employees (1), political triggers and support (2), cooperation with external (knowledge) parties (3), positive leadership (4), coupling with provincial/national developments (5) and local air quality problems (6). The most important condition is the knowledge base of local policy makers. If this condition is not met, all other positive triggers cannot land in the local organization. External parties with knowledge on organizing transitions have been very influential in the overall policy process. Cooperation with such actors is encouraged through positive leadership, as experimentation is stimulated. External developments such as national visions and local air quality problems are also influential, but not critical in developing progressive policy plans. In fact, (lack of) national policies are mentioned as a barrier for better urban policies on accessibility. Furthermore, problems with financial budgeting and issues of responsibility are common for integral planning. The real test though for progressive policy plans comes when actual planning choices have to be made in the future and budgets have to be allocated.

6.4 Main research question

How can changes, orientations, and practices of Dutch urban mobility policies be explained by using the paradigm concept?

All in all, this research question can be answered through the summarizing model as displayed in Figure 16. This figure is a renewed version of Figure 2, with the green and blue arrow specified according to empirical results of this research.

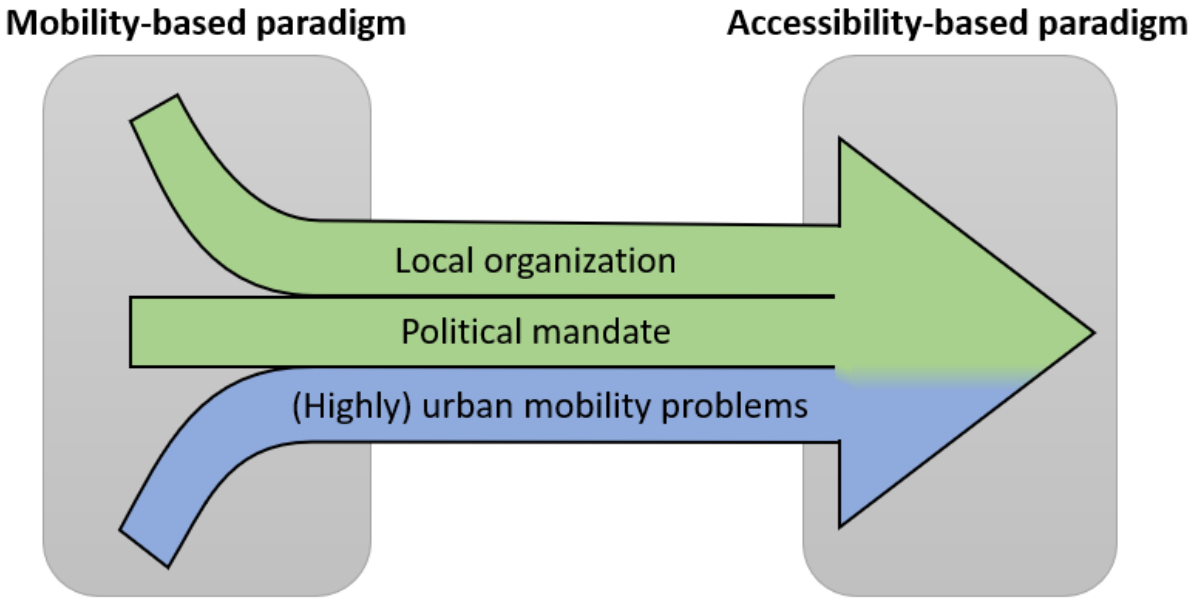

Figure 16: Summarizing model of paradigmatic change

In the theoretical framework it was hypothesized that paradigmatic change through institutional reorganization (green arrow) is more important than change through the classic policy cycle (blue arrow). Results have shown that this is indeed the case, but in a nuanced way. Firstly, problems related to mobility in highly urban areas indeed correlate with policy document scores. Through data and interviews, it was found that especially air quality problems and lack of space are rationales for municipalities to adopt a new planning paradigm. What is considered to be a problem is influenced and shaped by external knowledge actors though, who have an intermediary position between

academia and practice. This means that a reform of planning can only happen when there is a local municipal organization present that is capable and willing to implement new integral policy forms, possibly by the help of external parties as well. Secondly, this research has also shown that political values play a large role in the adoption of new planning paradigms. The specific geographic pattern of progressive political parties concentrating in highly urban areas reinforces the adoption of the accessibility-based paradigm in such areas. Interview results suggest however that it is possible for local policy makers to convince politicians from any party by good arguments and supportive data, and bringing in external parties. All in all, a specific combination of urban mobility problems, political mandate and local organization of a municipality can explain the presence of paradigmatic transport policy change in Dutch urban municipalities. These different elements can reinforce or inhibit each other, dependent on the local context. There does not exist one blueprint or combination of elements that provides the unique recipe for paradigmatic change. Local factors and coincidence along with the inherent uncertain outcome of policy processes play a role as well.

6.5 Further research possibilities

Throughout this research, some further research possibilities have come up. Firstly, more work and research is necessary to find methodologies and supporting programs to improve planning for all municipalities. Critical for paradigmatic change is the knowledge basis of local policy makers and external input by knowledge actors in for example a participatory process. Larger municipalities can rely on both a bigger social network and have more money to get external help. Furthermore, an interviewee mentioned that they are able to attract plenty of new employees, whereas smaller municipalities are having a more difficult job doing so. There is a division of winners and losers in the planning field, exemplified by knowledge, money and network capacities. How can (regional) networks be build that support also smaller municipalities in developing a progressive policy plan? The example of Venlo shows that also in a non-urban context with less political support, policy change is possible. Especially suburban municipalities that lie between the large urban centres and rural periphery can be critical in transforming Dutch geographical patterns, as De Voogd (2017, pp. 25-28) stipulates.

Related with the previous direction of research, more research is necessary to understand how the concept of a planning paradigm can be applied in a practical planning field. Scores have shown that many municipalities are in a grey area of the mobility-based and accessibility-based spectrum. More differentiation of criteria is sometimes useful to detect policy differences. For example, since almost all municipalities have some kind of stated cycling policy, the analysis of such scores becomes meaningless. More research is here necessary to discern between different levels of cycling policies. Other relevant research possibilities arise if different local contexts are considered for applying the planning paradigm concept. For example, which rationales, policy goals and instruments arise if the paradigm concept is applied in a rural context? Issues of depopulation, lower levels of service and mobility poverty might play a role here. Through literature study, different frameworks might come up which describe an old and new planning paradigm on how to deal with such issues. Secondly, planning paradigms could also be applied in a non-western context, in for example cities of the Global South. To what extent is it possible to extend an accessibility-based paradigm to such areas? Ethical issues arise here for creating a balance of economic growth and counteracting poverty on the one hand, and ecological sustainable goals on the other hand.

Methodology-wise, there are also several research possibilities. Firstly, it could be analysed whether it is possible to automatize the policy document analysis through for example machine learning technologies. Commercial parties could be interested in developing such a tool as a product, in cooperation with academia. Such a tool as a first scanning instrument would save a lot of time and

could enable large-scale data research in a policy context. The presence of concrete text elements like ‘integration of spatial and mobility planning’ or ‘mobility justness’ could be input for such an algorithm, along with clear learning cases from this thesis. Secondly, it is also recommended to build a database of policy plans which incorporates newly published documents. Through re-evaluation of documents, more conditions and municipal characteristics can be found that enable paradigmatic change. Thirdly, several missing variables that could correlate with the paradigm score have come up in this research:

- Information on financial funding for car infrastructure and bicycle infrastructure
- Team size, average age and the integral character of the planning department
- Political background of the local municipal council member responsible for mobility

Especially data on municipal organizations is not publicly available or hard to find. For example, municipal budget plans are difficult to interpret and to compare with other budgets. Finally, it is recommended to extend the number of interviews in one municipality with other policy makers involved, as well as the local council member. More interviews enable to reconstruct the whole policy process, which can be presented as a learning case to other municipalities.

One last recommendation for scientific research in general is improving the ties between different departments and fields. Integral cooperation is necessary between philosophers, engineers and other scientists to come up with better analysis of problems and better solutions. Approaches, methodologies and opinions of one field could function as a mirror for the other. In addition to cooperation between scientific fields, cooperation between academia and other societal institutions should be encouraged. This thesis has shown that policy makers are looking for new theoretical narratives and frameworks to build policies upon. Distribution of academic knowledge to policy makers by actors who have an intermediary position between the practical policy making world and the theoretical academic world is therefore essential for future progressive transport planning.

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Appendix A: Overview of municipal documents that have been scored

Municipality	Document title	Year	External consultant	GVVP (1) / Vision (2)
Aalsmeer	Aalsmeers Verkeers- en Vervoersplan (AVVP) 'Leefbaar en Bereikbaar'	2010	Yes	1
Alblasserdam	Gemeentelijk Verkeers- en Vervoersplan Alblasserdam Basisnota	2017	No	1
Albrandswaard	Ruimte voor duurzame mobiliteit – Gemeentelijk Verkeers- en Vervoerplan Albrandswaard	2012	Yes	1
Alkmaar	Visie Mobiliteit en Bereikbaarheid	2017	Yes	2
Almelo	Almelo op weg naar 2025	2015	No	2
Almere	Mobiliteitsplan Almere	2012	No	2
Alphen aan den Rijn	Structuurvisie Verkeer en Vervoer	2013	No	2
Amersfoort	Verkeer- en Vervoerplan Amersfoort	2013	Yes	2
Amstelveen	Ontwerp Mobiliteitsvisie Amstelveen	2019	No	2
Amsterdam	Uitvoeringsagenda Mobiliteit Amsterdam Aantrekkelijk Bereikbaar	2015 2013	No	2
Apeldoorn	Verkeersvisie 2010-2020	2010	No	2
Arnhem	Arnhem Aantrekkelijk bereikbaar	2009	Yes	1
Assen	Gemeentelijk Verkeers- en Vervoersplan Strategienota	2005	No	1
Baarn	Gemeentelijk Verkeers- en Vervoersplan Baarn	2012	Yes	1
Barendrecht	Barendrecht op weg	2017	No	2
Barneveld	Veilig op weg naar de toekomst	2017	No	1
Berg en Dal	Integrale Mobiliteitsvisie Gemeente Berg en Dal 2016-2026 – Kadernota en beleidsuitwerking	2016	Yes	2
Bergen op Zoom	Verkeersplan	2014	No	1
Berkelland	Gemeentelijk Verkeer- en Vervoerplan	2008	No	1
Bernheze	Duurzaam Mobiliteitsplan Bernheze (2016-2022)	2016	Yes	2
Beverwijk	Gemeentelijk Verkeer- en Vervoerplan Deel B	2011	Yes	1
Bloemendaal	Actualisatie Verkeerscirculatieplan Gemeente Bloemendaal	2018	Yes	1
Boxmeer	Gemeentelijk Verkeers- en Vervoersplan (GVVP) Boxmeer	2014	Yes	1
Boxtel	Gemeentelijk Verkeers- en Vervoersplan 2008-2020	2008	Yes	1
Breda	Structuurvisie Breda 2030	2013	No	2
Capelle aan den IJssel	Gemeentelijk Verkeers- en Vervoersplan, Visie 2020-2030 – Slim reizen	2009	No	1
Castricum	Integraal Verkeers- en Vervoersplan	2004	Yes	1
Coevorden	Op weg naar Duurzame Mobiliteit – Mobiliteitsplan 2012-2020	2012	No	2
De Bilt	Wat beweegt de Bilt? Gemeentelijk Verkeer- en Vervoerplan	2012	Yes	1
De Fryske Marren	Gemeentelijk Verkeers- en Vervoersplan De Fryske Marren	2015	No	1
De Ronde Venen	Beleidsplan Verkeer 2017-2021	2017	No	1
Delft	Delft Duurzaam Bereikbaar	2005	No	1
Den Haag	Haagse Nota Mobiliteit	2011	No	2
Den Helder	Visie Infrastructuur Den Helder 2025	2011	No	1
Deurne	Verkeer- en Vervoersplan Deurne, Deel B: Visie en Structuren	2010	Yes	2
Deventer	Beleidskader Verkeer en Vervoer	2013	No	1
Doetinchem	Mobiliteitsvisie 2016-2026	2016	Yes	2
Dordrecht	Koersnota Mobiliteit Dordrecht: een stad in beweging	2018	No	1
Dronten	Gemeentelijk verkeer- en vervoerplan	2017	No	1
Echt-Susteren	Gemeentelijk Verkeers- en Vervoersplan Echt-Susteren	2016	Yes	1
Edam-Volendam	Vervoersplan Edam-Volendam 2018-2023	2018	Yes	1
Ede	Gemeentelijk Verkeers- en Vervoerplan Ede – Verbinden en Bereiken, Deel A: Kadernota	2014	No	1
Eindhoven	Eindhoven op weg	2013	No	2
Emmen	Oog voor Mobiliteit – Gemeentelijk Verkeer- en Vervoerplan 2012-2020	2012	No	1
Enkhuizen	Actualisatie Verkeersplan Enkhuizen 2017-2025	2017	Yes	1
Enschede	Koers voor Mobiliteit, Mobiliteitsvisie Enschede	2019	Yes	2
Epe	Gemeentelijk Verkeer- en Vervoerplan Epe, Deel B: Beleidsnota	2009	Yes	1
Etten-Leur	Gemeentelijk Verkeers- en Vervoerplan	2013	Yes	1
Goes	GVVP Goes Verkeers en Vervoerplan	2013	No	1
Gorinchem	Beleidsplan Verkeer en Vervoer – Verkeersstructuurplan	2001	No	1
Gouda	Mobiliteitsplan Gouda 2017-2026	2017	Yes	2
Groningen	Omgevingsvisie 'The Next City'	2018	No	2

Haarlem	Structuurvisie Openbare Ruimte – Duurzaam Ontwikkelingsmodel Mobiliteit en Ruimte Haarlem 2040	2016	Yes	2
Haarlemmermeer	Mobiliteitsvisie Haarlemmermeer – Vrijheid van bewegen	2018	No	2
Halderberge	Mobiliteitsvisie 2019-2022	2019	No	1
Harderwijk	Mobiliteitsvisie 2030	2010	Yes	2
Hardinxveld-Giessendam	GVVP 2012-2022	2012	Yes	1
Harlingen	Gemeentelijk Verkeers- en Vervoerplan Gemeente Harlingen	2011	No	1
Heemskerk	Verkeer- en Vervoerplan Heemskerk 2017, Deel A: Beleidsplan	2017	No	1
Heerenveen	Gemeentelijk Verkeers- en Vervoerplan	2017	No	1
Heiloo	Verkeersbeleid Heiloo 2018-2030	2018	No	1
Hellendoorn	Hellendoorns Mobiliteitsplan	2009	Yes	1
Hellevoetsluis	Gemeentelijk Verkeer en Vervoerplan	2013	No	1
Helmond	Helmond Verbonden Mobiliteitsvisie 2016-2025	2016	Yes	2
Hendrik-Ido-Ambacht	GVVP Hendrik-Ido-Ambacht – Mobiliteitsvisie 2009-2020	2009	Yes	1
Hengelo	Gemeentelijk Verkeers- en Vervoersplan	2003	No	1
Heusden	GVVP Heusden – Duurzaam en veilig op (de) weg!	2012	Yes	1
Hillegom	Hillegoms Verkeers- en Vervoersplan	2009	No	1
Hilversum	Structuurvisie Verkeer en Vervoer 2030	2016	No	2
Hof van Twente	Gemeentelijk Mobiliteitsplan 2016-2020	2016	No	1
Hoogeveen	Mobiliteitsvisie 2016-2026	2017	Yes	2
Hoorn	Masterplan Hoofdinfrastructuur Hoorn	2005	Yes	1
Horst aan de Maas	www.trendsportal.nl	2017	Yes	2
Houten	Bereikbaarheidsvisie	2011	Yes	2
Huizen	Mobiliteitsplan Huizen	2019	Yes	2
IJsselstein	Mobiliteitsagenda 2016-2018	2016	No	2
Kampen	Gemeentelijk Verkeers- en Vervoersplan Kampen	2010	Yes	1
Katwijk	Integraal Verkeers- en Vervoersplan Katwijk	2008	Yes	1
Kerkrade	Gemeentelijk Verkeers- en Vervoersplan	2017	No	1
Krimpen aan den IJssel	Verkeer- en Vervoervisie Krimpen aan den IJssel	2013	Yes	1
Landgraaf	Gemeentelijk Verkeers- en Vervoerplan Landgraaf	2017	No	1
Langedijk	Verkeer- en Vervoerplan Langedijk	2015	No	1
Lansingerland	Lansingerland Beweegt Visiedocument Verkeer en Vervoer 2009-2020	2009	Yes	1
Leeuwarden	GVVP 2011-2025: De complete stad bereikbaar	2011	No	1
Leiden	Mobiliteitsnota Leiden 2015-2022	2015	No	2
Leiderdorp	Integraal Verkeers- en Vervoersplan	2009	Yes	1
Leidschendam-Voorburg	Verkeers- en Vervoerpan Herijking 2014	2014	No	1
Lelystad	Nota Mobiliteit Lelystad Mobiliteitsvisie	2009	No	2
Leudal	GVVP Leudal Modulair Verkeersbeleid	2015	Yes	2
Leusden	Beleidsplan Verkeer en Vervoer 2001-2010	2001	Yes	1
Lingewaard	Gemeentelijk Mobilliteitsplan 2017	2017	No	2
Lisse	Lisse gaat Vooruit	2018	Yes	2
Lochem	Actualisatie Nota Mobiliteit 2016	2016	Yes	2
Maassluis	Wegenstructuurvisie Maassluis 2010-2015	2010	Yes	1
Maastricht	Ontwerp Omgevingsvisie Maastricht 2040	2019	No	2
Medemblik	Verkeersplan Gemeente Medemblik	2011	Yes	1
Meppel	Gemeentelijk Verkeers- en Vervoersplan (GVVP)	2017	No	1
Middelburg	Gemeentelijk Verkeer- en Vervoerplan Middelburg 2030	2016	No	1
Midden-Drenthe	Gemeentelijk Verkeers- en Vervoersplan 2012-2020	2012	No	1
Moerdijk	Moerdijk maakt mensen mobiel: Lokaal Mobiliteitsplan 2007-2011/2015	2007	Yes	1
Montferland	Integraal Verkeers- en Vervoersplan Gemeente Montferland	2012	No	1
Nieuwegein	Gemeentelijk Mobiliteitsplan+, 2030	2014	No	1
Nijkerk	Gemeentelijk Verkeers- en Vervoersplan	2011	No	1
Nijmegen	Nijmegen Duurzaam Bereikbaar	2011	No	2
Noordenveld	Noordenveld zet fiets op 1: Gemeentelijk Verkeers en Vervoersplan 2015-2025	2015	No	1
Noordoostpolder	Noordoostpolder: verkeer in de goede richting GVVP	2012	Yes	1
Noordwijk	Gemeentelijk Verkeers- en Vervoersplan 2012-2022	2012	No	1
Oegstgeest	Mobiliteitsplan 2017-2027	2017	No	1
Oost Gelre	Integraal Verkeersprogramma Oost-Gelre 2014-2024	2014	No	1
Oosterhout	Oosterhout vooruit: Visie op Mobiliteit in Oosterhout	2019	Yes	2
Oss	Mobiliteitsvisie	2009	Yes	2
Oude IJsselstreek	GVVP Oude IJsselstreek 2010-2020	2010	No	1
Overbetuwe	Gemeentelijk Mobiliteitsplan Overbetuwe (GMO) 2003-2013	2003	Yes	1
Papendrecht	Gemeentelijk Verkeers- en Vervoerplan Papendrecht (GVVP) 2010-2020	2010	No	1

Peel en Maas	www.trendsportal.nl	2017	Yes	2
Pijnacker-Nootdorp	Ontwerpvisie op Duurzame Mobiliteit Pijnacker-Nootdorp 2040	2013	No	2
Purmerend	Visie op Mobiliteit Purmerend	2018	No	2
Raalte	GVVP Raalte Beleid en Achtergronden	2002	No	1
Renkum	Gemeentelijk Verkeer- en Vervoersplan Renkum	2010	Yes	1
Rheden	Verkeerscirculatieplan Rheden/Velp	2008	Yes	1
Ridderkerk	Mobiliteitsagenda Ridderkerk 2016-2018	2016	No	2
Rijssen-Holten	Lange Termijnsvisie Verkeer en Vervoer	2014	No	1
Rijswijk	Structuurvisie Mobiliteit Rijswijk 2020	2011	No	2
Roermond	Gemeentelijk Verkeer- en Vervoerplan Roermond	2017	Yes	1
Roosendaal	Gemeentelijk Verkeer- en Vervoersplan Roosendaal 2015-2025	2015	No	1
Rotterdam	Stedelijk Verkeersplan Rotterdam 2016-2030+	2016	Yes	2
Schagen	Verkeer in Schagen Onze Ambities	2017	No	2
Schiedam	Gemeentelijk Verkeer- en Vervoerplan 2011-2020	2011	No	2
Schouwen-Duiveland	Integraal Verkeer- en Vervoerplan Schouwen Duiveland	2017	No	1
's-Hertogenbosch	Actualisatie Koersnota 2017	2017	No	2
Sittard-Geleen	Mobiliteitsbeeld Sittard-Geleen	2012	No	2
Sliedrecht	Verkeer en Mobiliteit 2017-2040	2017	No	2
Smallingerland	Gemeentelijk Verkeers- en Vervoerplan	2013	Yes	1
Soest	Gemeentelijk Verkeers- en Vervoersplan Beleidsnota	2008	No	1
Stede Broec	Verkeersplan Stede Broec	2009	Yes	1
Steenwijkerland	Beleidsplan Verkeer Steenwijkerland	2017	No	1
Stein	GVVP Stein Beleidsnota 2013	2013	Yes	1
Stichtse Vecht	Gemeentelijk Verkeers- en Vervoersplan Stichtse Vecht	2013	No	1
Súdwest-Fryslân	Gemeentelijk Verkeer- en Vervoerplan	2012	No	1
Teylingen	Evaluatie GVVP Teylingen	2017	No	1
Tiel	Mobiliteitsvisie Tiel	2008	Yes	2
Tilburg	Mobiliteitsaanpak Tilburg – Samen op weg naar 2040	2016	Yes	2
Twenterand	Gemeentelijk Mobiliteitsplan 2015-2025	2015	Yes	2
Uden	Gemeentelijk Verkeer en Vervoerplan Uden 2015-2030	2015	Yes	1
Uitgeest	Verkeersplan Uitgeest	2016	Yes	1
Utrecht	Mobiliteitsplan Utrecht 2025	2016	Yes	2
Utrechtse Heuvelrug	Uitvoeringsprogramma GVVP 2017-2021	2017	No	1
Valkenswaard	Mobiliteitsplan Valkenswaard 2014 – Bereikbaarheid als kracht	2014	No	2
Veenendaal	Gemeentelijk Verkeers- en Vervoersplan 2012-2025	2012	No	1
Veldhoven	GVVP Veldhoven Mobiliteitsambitie	2019	Yes	2
Velsen	Mobiliteitsagenda Velsen	2019	No	2
Venlo	www.trendsportal.nl	2019	Yes	2
Venray	www.trendsportal.nl	2017	Yes	2
Vlaardingen	Actieplan Mobiliteit	2018	No	2
Vlissingen	Gemeentelijk Verkeer- en Vervoerplan Vlissingen 2012-2020	2012	No	1
Voorschoten	Verkeersplan 2017	2017	No	1
Waalwijk	Mobiliteitsplan Waalwijk	2015	Yes	2
Wageningen	Gemeentelijk Mobiliteitsplan Wageningen	2013	No	2
Weert	Gemeentelijk Verkeers- en Vervoersplan	2006	Yes	1
Westervoort	Verkeersplan Westervoort	2008	Yes	1
Westland	Westlands Verkeer en Vervoersplan 2005-2015	2005	No	1
Wierden	Mobiliteitsplan Gemeente Wierden	2011	Yes	2
Wijchen	Gemeentelijk Verkeer en Vervoersplan	2008	Yes	1
Woerden	Verkeersvisie 2030	2017	No	2
Zaanstad	ZVVP 2008: Verkeer in een goed milieu	2009	Yes	1
Zandvoort	Actualisatie GVVP Zandvoort	2005	Yes	1
Zeist	Gemeentelijk Verkeers- en Vervoerplan Zeist 2014-2023	2014	No	1
Zoetermeer	Mobiliteitsvisie Zoetermeer 2030	2017	Yes	2
Zuidplas	Mobiliteitsvisie Zuidplas	2015	Yes	2
Zutphen	Verkeerscirculatieplan Zutphen	2008	Yes	1
Zwijndrecht	Gemeentelijk Verkeer- en Vervoersplan 2016-2030	2016	No	1
Zwolle	Mobiliteitsvisie 2020-2030 – Mobiliteit brengt Zwolle verder	2019	No	2

Appendix B: Interview script

1. Team organization and background

- By which team has this policy document been written?
- How is this team organized (number of people, background employees)?
- How you define your basic assumptions and premises?
- How do you get up-to-date with new knowledge on for example mobility justness?

2. Rationale to switch to new paradigm

- When looking back at earlier policy documents, when has a switch been made in your paradigm, and why? (Social, organizational, political?)

3. Development of current policy document

- How do you have cooperated with external parties?
- Have you learned from external cooperation? How?
- How did political support play a role in drafting this document? (Political input as basis or only adjustments?)
- Has a certain type of leadership been influential for developing this document?
- How is the current policy document used as source for new policies?

4. Broader context of municipal policy making

- Has the national and provincial government been a obstacle or incentive for developing this new document?
- What is the future of the mobility vision? More regional cooperation or more national guidance?
- How you look back on the whole process of writing this policy document? What went well, what are learning points?

Appendix C: Document Scores

	Mobility-based Paradigm					Accessibility-based Paradigm				
Municipality	Philosophical	Goals	Instruments	Monitoring	Total	Philosophical	Goals	Instruments	Monitoring	Total
Aalsmeer	1	1	4	1	7	1	2	2	0	5
Alblasserdam	1	1	3	1	6	0	2	3	1	6
Albrandswaard	2	1	3	0	6	1	2	2	0	5
Alkmaar	1	2	2	1	6	0	2	2	0	4
Almelo	3	1	2	0	6	2	0	4	0	6
Almere	2	2	5	0	9	0	2	2	0	4
Alphen aan den Rijn	2	2	3	1	8	2	2	2	0	6
Amersfoort	3	2	3	1	9	1	2	3	0	6
Amstelveen	1	2	1	0	4	0	2	4	0	6
Amsterdam	1	2	0	1	4	1	2	4	1	8
Apeldoorn	1	2	2	0	5	1	2	2	0	5
Arnhem	3	2	3	0	8	1	2	2	1	6
Assen	1	1	2	0	4	0	0	1	0	1
Baarn	1	2	3	0	6	0	1	3	0	4
Barendrecht	3	2	2	0	7	0	2	3	0	5
Barneveld	2	3	5	0	10	0	2	2	0	4
Berg en Dal	1	2	3	0	6	0	1	3	0	4
Bergen op Zoom	2	3	4	1	10	0	2	2	0	4
Berkelland	1	1	2	0	4	0	1	1	0	2
Bernheze	2	1	2	1	6	1	2	2	0	5
Beverwijk	2	3	4	1	10	0	2	1	0	3
Bloemendaal	1	1	1	1	4	0	1	0	0	1
Boxmeer	2	3	4	1	10	0	1	0	0	1
Boxtel	2	2	4	1	9	0	2	1	0	3
Breda	2	2	1	0	5	2	3	3	0	8
Capelle aan den IJssel	2	2	4	1	9	0	2	0	0	2
Castricum	1	2	3	1	7	0	2	1	0	3
Coevorden	2	2	3	0	7	0	2	2	0	4
De Bilt	1	1	2	1	5	0	2	3	0	5
De Fryske Marren	1	2	1	0	4	0	0	2	0	2
De Ronde Venen	1	3	3	0	7	0	2	1	0	3
Delft	1	1	2	1	5	0	2	3	0	5
Den Haag	2	2	4	1	9	0	2	4	0	6
Den Helder	3	2	4	0	9	0	0	0	0	0
Deurne	1	1	2	1	5	1	1	1	0	3
Deventer	2	1	3	0	6	0	1	1	0	2
Doetinchem	2	1	2	1	6	1	2	1	0	4
Dordrecht	1	2	3	0	6	1	2	3	0	6
Dronten	3	3	2	0	8	1	2	2	0	5
Echt-Susteren	2	2	5	0	9	0	2	2	0	4
Edam-Volendam	1	1	3	1	6	0	2	3	0	5
Ede	1	2	3	1	7	2	2	3	0	7
Eindhoven	0	2	0	1	3	1	2	4	0	7
Emmen	1	2	2	0	5	0	1	3	0	4
Enkhuizen	1	1	2	1	5	0	2	4	0	6
Enschede	1	2	2	0	5	1	2	4	0	7
Epe	2	2	3	0	7	0	1	1	0	2
Etten-Leur	2	2	2	1	7	0	1	2	0	3
Goes	2	3	4	0	9	0	1	1	0	2
Gorinchem	2	3	4	0	9	0	2	1	0	3
Gouda	1	2	2	1	6	0	2	4	0	6
Groningen	1	1	0	0	2	1	2	5	0	8
Haarlem	1	1	3	0	5	1	2	4	0	7
Haarlemmermeer	2	3	4	1	10	0	2	2	0	4
Halderberge	1	2	2	1	6	0	2	1	0	3
Harderwijk	2	2	4	0	8	0	2	1	0	3
Hardinxveld-Giessendam	1	1	3	0	5	0	2	2	0	4
Harlingen	1	1	4	0	6	0	1	1	0	2
Heemskerk	1	2	2	0	5	0	2	3	0	5
Heerenveen	1	2	4	0	7	0	1	1	0	2

Heiloo	1	1	2	1	5	0	2	3	0	5
Hellendoorn	2	2	5	1	10	1	2	2	0	5
Hellevoetsluis	2	2	2	0	6	0	1	2	0	3
Helmond	1	2	3	0	6	0	2	2	0	4
Hendrik-Ido-Ambacht	1	3	4	1	9	0	2	2	0	4
Hengelo	2	2	2	0	6	0	2	1	0	3
Heusden	1	2	3	1	7	1	2	1	0	4
Hillegom	2	3	3	0	8	0	2	1	0	3
Hilversum	1	2	2	1	6	0	2	2	0	4
Hof van Twente	2	2	3	0	7	0	2	2	0	4
Hoogeveen	1	2	2	1	6	1	2	2	0	5
Hoorn	1	2	2	1	6	0	2	1	0	3
Horst aan de Maas	1	2	0	1	4	2	3	3	1	9
Houten	2	2	2	0	6	1	2	4	0	7
Huizen	1	2	3	0	6	1	1	2	0	4
IJsselstein	1	2	4	0	7	0	1	1	0	2
Kampen	2	2	3	1	8	1	2	2	0	5
Katwijk	2	3	5	1	11	0	2	3	0	5
Kerkrade	1	2	4	0	7	0	2	1	0	3
Krimpen aan den IJssel	1	2	3	0	6	0	2	2	0	4
Landgraaf	1	3	4	1	9	0	1	1	0	2
Langedijk	2	3	5	0	10	0	1	1	0	2
Lansingerland	1	3	4	1	9	0	2	2	0	4
Leeuwarden	1	3	3	1	8	0	2	3	0	5
Leiden	2	3	3	0	8	0	2	3	0	5
Leiderdorp	1	2	4	1	8	0	1	1	0	2
Leidschendam-Voorburg	2	3	5	1	11	0	2	1	0	3
Lelystad	2	3	5	0	10	0	1	1	0	2
Leudal	1	1	3	0	5	0	2	3	0	5
Leusden	2	2	5	1	10	0	1	1	0	2
Lingewaard	2	3	4	0	9	0	1	1	0	2
Lisse	2	2	3	0	7	0	2	1	0	3
Lochem	1	2	2	0	5	0	1	1	0	2
Maassluis	1	2	3	0	6	0	1	0	0	1
Maastricht	1	2	2	0	5	2	3	4	0	9
Medemblik	1	2	4	0	7	0	2	1	0	3
Meppel	1	2	3	0	6	0	2	1	0	3
Middelburg	1	2	2	1	6	0	2	4	0	6
Midden-Drenthe	1	2	3	1	7	0	2	1	0	3
Moerdijk	1	2	3	0	6	0	2	2	0	4
Montferland	1	2	4	0	7	1	2	2	0	5
Nieuwegein	1	2	3	1	7	0	2	3	0	5
Nijkerk	2	2	4	0	8	0	2	1	0	3
Nijmegen	1	2	1	1	5	0	2	3	0	5
Noordenveld	1	2	2	1	6	0	2	3	0	5
Noordoostpolder	1	2	3	0	6	0	2	2	0	4
Noordwijk	1	2	4	0	7	0	2	2	0	4
Oegstgeest	1	2	2	0	5	0	2	1	0	3
Oost Gelre	1	2	4	0	7	0	2	2	0	4
Oosterhout	1	3	3	1	8	0	2	4	0	6
Oss	1	2	2	0	5	0	2	2	0	4
Oude IJsselstreek	1	1	4	0	6	0	2	2	0	4
Overbetuwe	1	2	3	0	6	0	1	1	0	2
Papendrecht	1	3	3	0	7	0	2	2	0	4
Peel en Maas	1	2	1	1	5	2	3	3	1	9
Pijnacker-Nootdorp	1	2	2	0	5	0	2	2	0	4
Purmerend	1	2	2	0	5	1	0	4	0	5
Raalte	1	2	3	1	7	1	2	1	0	4
Renkum	1	2	3	1	7	0	2	2	0	4
Rheden	1	2	3	0	6	0	2	2	0	4
Ridderkerk	1	3	3	0	7	0	2	2	0	4
Rijssen-Holten	1	2	3	0	6	0	1	1	0	2
Rijswijk	1	3	3	1	8	1	2	3	0	6

Roermond	1	2	1	0	4	1	1	3	0	5
Roosendaal	1	3	3	0	7	0	2	3	0	5
Rotterdam	2	2	0	0	4	2	3	5	0	10
Schagen	1	2	2	0	5	0	1	1	0	2
Schiedam	2	3	4	0	9	0	2	2	0	4
Schouwen-Duiveland	2	3	4	1	10	0	2	1	0	3
's-Hertogenbosch	2	3	4	0	9	0	2	2	0	4
Sittard-Geleen	1	3	5	0	9	0	2	1	0	3
Sliedrecht	1	3	4	0	8	0	2	2	0	4
Smallingerland	1	2	3	1	7	1	2	2	0	5
Soest	2	2	3	1	8	1	2	1	0	4
Stede Broec	2	2	4	0	8	0	1	1	0	2
Steenwijkerland	1	2	2	0	5	0	1	1	0	2
Stein	1	2	3	1	7	0	1	2	0	3
Stichtse Vecht	2	3	3	0	8	0	2	2	0	4
Súdwest-Fryslân	2	2	3	0	7	0	1	1	0	2
Teylingen	2	2	5	1	10	0	2	2	0	4
Tiel	1	2	4	1	8	0	2	3	0	5
Tilburg	1	2	0	1	4	1	2	4	0	7
Twenterand	2	2	4	1	9	0	1	1	0	2
Uden	1	2	2	0	5	0	1	2	0	3
Uitgeest	2	3	3	0	8	0	1	2	0	3
Utrecht	1	2	0	1	4	1	2	4	0	7
Utrechtse Heuvelrug	1	2	1	0	4	1	1	2	0	4
Valkenswaard	2	3	4	1	10	1	2	1	0	4
Veenendaal	2	3	4	1	10	0	2	1	0	3
Veldhoven	1	2	2	1	6	0	2	4	0	6
Velsen	1	2	2	1	6	0	2	3	0	5
Venlo	1	2	0	1	4	2	3	4	1	10
Venray	1	2	0	1	4	2	3	4	1	10
Vlaardingen	1	2	3	1	7	0	2	3	0	5
Vlissingen	1	2	5	0	8	0	1	2	0	3
Voorschoten	2	2	3	0	7	0	2	1	0	3
Waalwijk	2	3	3	1	9	1	2	2	0	5
Wageningen	1	2	0	1	4	1	2	2	0	5
Weert	2	2	5	0	9	0	2	1	0	3
Westervoort	2	2	4	0	8	0	2	1	0	3
Westland	2	3	4	0	9	0	2	1	0	3
Wierden	1	3	3	1	8	0	2	2	0	4
Wijchen	1	3	3	1	8	0	2	1	0	3
Woerden	2	3	3	0	8	0	2	1	0	3
Zaanstad	1	2	1	0	4	1	2	4	0	7
Zandvoort	1	3	2	0	6	0	1	1	0	2
Zeist	1	2	2	1	6	1	2	3	0	6
Zoetermeer	1	2	1	1	5	1	2	4	0	7
Zuidplas	2	3	4	0	9	1	1	1	0	3
Zutphen	1	2	3	0	6	0	2	1	0	3
Zwijndrecht	2	3	4	0	9	0	2	1	0	3
Zwolle	1	2	0	1	4	1	2	4	0	7

Appendix D: Absolute differences transport and background variables

	Low	High
Physical urbanity	-1.5	2.6
Number of students	-1.2	5.8
Social urbanity	-1.8	5.3
Car/PT orientation	-1.5	2.0
Number of elderly	-2.1	1.4
Educational levels	-2.4	2.7

These numbers are the average standardized (mean = 0, standard deviation = 1, methodology: regression) results of the factor analysis, meaning that all individual municipalities related to the calculated components are averaged for each point score combination.

Appendix E: Absolute differences organizational variables

	Low	High
Right-wing share of votes	13%	34%
Progressive share of votes	5%	47%
Confessional share of votes	4%	40%
Protest share of votes	10%	29%
Classic-left share of votes	4%	51%
Years functioning	0	11
Vision/GVVP based (dummy)	1 (GVVP)	2 (Vision)

These numbers are average shares of political votes per block for each point score combination. The amount of years functioning relates to the actual numbers. The vision/GVVP based variable is a dummy.