

No Need for Speed

Analysing the Readiness of Different Scale Dutch Municipalities for the Speed Limit

Transition

Rob Smit

r.c.j.smit@students.uu.nl

ID: 6960596

Supervisor: Peter Pelzer

MSc Spatial Planning

Department of Geosciences

University of Utrecht

23-07-2021



Utrecht University



**Vervoerregio
Amsterdam**

Abstract

On the 27th of October 2020, the Netherlands became the first country in the world to introduce nation-wide legislation on the subject of speed limit reduction. In this legislation, the Netherlands agreed upon the motion to change the standard speed limit within city borders from 50 to 30 km/h. This change impacts numerous aspects of urban living, making this change a full-fledged transition for municipalities across the country. The goal with this transition is to increase the liveability, traffic safety and decrease carbon output within cities. As municipalities are the main authorities in charge of implementing these transitions in their regions, this thesis will look into the readiness of Dutch municipalities for this transition and the main uncertainties that are stopping them from implementing the reduced speed limit. The main research question this thesis will be focussed on is as follows: *How are identified uncertainties influencing the readiness of different-scale Dutch municipalities to reach the desired effects for the transition into a lowered inner-city speed limit?*

This research used qualitative analysis to gather the data needed to answer the research question. This qualitative analysis was divided into two parts: expert interviews to gather data on the effects of the transition and focus interviews with policy workers and councillors to investigate the readiness of municipalities and the uncertainties they are dealing with. The focus interviews looked at three municipalities of different scales, namely the municipality of Haarlemmermeer, Purmerend, and Edam-Volendam. This is done to investigate whether the readiness of all municipalities is the same, as they differ in governance structures.

The analysis showed that to achieve the desired effects, municipalities must comply with certain characteristics, such as good public informing, large-scale implementation, and implementation with the right measures. However, the municipalities in the case study are not ready for this due to uncertainties around enforceability, lack of guidelines, and capacity issues, while some also have barriers due to lack of political backing. These uncertainties are most influential on the readiness of these different-scale Dutch municipalities, as these case studies cannot implement the transition successfully as long as these uncertainties remain unsolved. The resolving of these uncertainties are essential for the mass-implementation of this transition, making it important the government looks into addressing the issue with the enforceability of the new GOW-30 road, gives Dutch municipalities clear guidelines on how to implement the transition, and offers extra funding or subsidies to municipalities trying to implement the transition with insufficient finances. This will offer municipalities the ability to implement this transition at the right level, achieve the desired effects, and change urban living for the better.

Key concepts: Speed Change, Municipal Governance, Transition Readiness, Mobility, Traffic Safety

Abstract (Dutch)

Op 27 oktober 2020 heeft Nederland als eerste land ter wereld landelijke wetgeving ingevoerd op het gebied van snelheidsbeperking. In deze wetgeving stemde Nederland in met het voorstel om de maximum snelheid binnen bebouwde kom te wijzigen van 50 naar 30 km/uur. Deze verandering heeft meerdere gevolgen voor het stadsleven, waardoor deze verandering een volwaardige transitie is voor gemeenten in het hele land. Het doel van deze transitie is om de leefbaarheid, verkeersveiligheid en CO₂-uitstoot binnen steden te verbeteren. Aangezien gemeenten de verantwoordelijke autoriteiten zijn voor het implementeren van deze transitie in hun regio's, zal deze scriptie onderzoeken of Nederlandse gemeenten klaar zijn voor deze overgang, en de belangrijkste onzekerheden die hen ervan weerhouden de verlaagde snelheidslimiet te implementeren. De hoofdvraag van dit proefschrift is als volgt: *Hoe zijn gedefinieerde onzekerheden van invloed op de bereidheid van Nederlandse gemeenten van verschillende schaal om de gewenste effecten te bereiken voor de transitie naar een verlaagde snelheid binnen bebouwde kom?*

In dit onderzoek is gebruik gemaakt van kwalitatieve analyse om de gegevens te verzamelen die nodig zijn om de onderzoeksvraag te beantwoorden. Deze kwalitatieve analyse is opgedeeld in twee delen: interviews met experts om gegevens te verzamelen over de effecten van de transitie, en focusinterviews met beleidsmedewerkers en wethouders om de bereidheid van gemeenten, en de onzekerheden waarmee ze te maken hebben te onderzoeken. In de focusinterviews is gekeken naar drie gemeenten van verschillende schaal, namelijk de gemeente Haarlemmermeer, Purmerend, en Edam-Volendam, om te onderzoeken of de bereidheid van alle gemeenten hetzelfde is, aangezien ze verschillen in bestuursstructuren.

Uit de analyse bleek dat om de gewenste effecten te bereiken gemeenten moeten voldoen aan bepaalde kenmerken, zoals goede voorlichting van burgers, grootschalige implementatie en implementatie met de juiste maatregelen. De gemeenten uit de case study zijn hier echter niet klaar voor vanwege onzekerheden rond handhaafbaarheid, gebrek aan richtlijnen en capaciteitsproblemen, terwijl sommigen ook barrières hebben door gebrek aan politieke steun. Deze onzekerheden zijn het meest van invloed op de gereedheid van deze verschillende Nederlandse gemeenten, aangezien deze casestudies de transitie niet succesvol kunnen implementeren zolang deze onzekerheden onopgelost blijven. Het wegnemen van deze onzekerheden is essentieel voor de massale implementatie van deze transitie, waardoor het belangrijk is dat de overheid onderzoek doet naar de problematiek met de handhaafbaarheid van de nieuwe GOW-30 weg, Nederlandse gemeenten duidelijke richtlijnen geeft over hoe de transitie moet worden uitgevoerd, en extra middelen biedt of subsidies aan gemeenten die de transitie met onvoldoende financiële middelen proberen uit te voeren. Dit biedt gemeenten de mogelijkheid om deze transitie op het juiste niveau door te voeren, de gewenste effecten te bereiken, en de stad ten goede te veranderen.

Kernbegrippen: Snelheidsverandering, Gemeentebestuur, Transitiebereidheid, Mobiliteit, Verkeersveiligheid

Preface

In front of you lays the thesis produced in the context of the research performed into the uncertainties and readiness of Dutch municipalities for the speed limit transition. This thesis describes the main findings of this research into the speed limit transition and draws conclusions based on these findings paired with recommendations that could help the future of this transition.

This thesis was written by Rob Smit, a student from the Master's programme of Spatial Planning at the University of Utrecht, in collaboration with the Vervoerregio Amsterdam (Amsterdam Transport Region), which helped facilitate certain aspects of this research. This research was carried out during the period of February to July 2021.

First of all, I would like to thank my supervisor from the University of Utrecht, Peter Pelzer, who helped me tremendously with the writing of this thesis by giving me constructive feedback. I also thank Gerben Willemse, whom I collaborated with in feedback sessions, who helped me reach this result. From the Vervoerregio Amsterdam I would like to thank Marieke van der Meer and Bart Schalkwijk for helping me with brainstorm sessions at the start of this thesis and helping me arrange interviews from the different case studies. Finally, I would like to thank all experts, policy officers, and councillors who helped me through interviews and surveys and showed enthusiasm for my project.

I hope you enjoy reading this Thesis,

Rob Smit

Volendam, July 23rd, 2021

Abstract.....	2
Abstract (Dutch).....	3
List of abbreviations	6
1. Introduction.....	7
1.1 Scientific Relevance	10
1.2 Social Relevance	10
1.3 Research Questions	11
1.4 Reading Guide.....	12
2. Theoretical framework.....	14
2.1 Literature review	14
2.2 Conceptual Framework	21
3. Methodology.....	23
3.1 Research Design.....	23
3.2 Case Study Design.....	32
4. The Effects of Speed Limit Change on the Mobility System	34
4.1 Introduction of effects	34
4.2 Analysis of Effects	36
5. Assessing Municipal Readiness in the Speed Limit Transition	44
5.1 Introduction Readiness Assessment	45
5.2: Case of Haarlemmermeer.....	49
5.3 Case Purmerend.....	58
5.4 Case Edam-Volendam	66
5.5 Conclusions of the analysis	75
6. Conclusions and Discussion.....	83
6.1: Conclusions	83
6.2: Discussion and Future Research.....	88
References.....	90
Appendix.....	99
Appendix 1: Uncertainties and Delphi Method.....	99

List of abbreviations

Abbreviation	Definition
CROW	Centrum voor Regelgeving en Onderzoek in de Grond-, Water- en Wegenbouw en de Verkeerstechniek (Center for Regulations and Research in Ground, Water, Road Construction, and Traffic Engineering)
ETW	Erftoegangsweg (Property Access Road)
GOW	Gebiedsontsluitingswegen (Distribution Road)
SW	Stroomweg (Highway)
SWOV	Stichting Wetenschappelijk Onderzoek Verkeersveiligheid (Road Safety Research Foundation)
VRA	Vervoerregio Amsterdam (Amsterdam Transport Region)

1. Introduction

On the 20th of February 2020, 140 countries agreed upon signing the 'Stockholm Declaration', a list of resolutions connecting road safety and sustainable development, with the aim of achieving a 50% decrease of the amount of traffic deaths by 2030 (Chini, 2020). One of these resolutions was the focus on speed management, with the goal of mandating a lowered speed limit of 30 km/h in areas where vulnerable road users and vehicles mix in a frequent and planned manner. The Netherlands were the first country to transform this declaration into legislation on the 27th of October 2020, when they agreed upon the motion to change the standard speed limit within city borders from 50 to 30km/h (Rijksoverheid, 2020). Starting this date, municipalities could only implement 50km/h speed limits on inner-city roads in situations where it does not jeopardize the safety of road users, making the Netherlands the first country to implement such legislation in the world.

The introduction of this legislation did not come as a surprise however, Dutch cities have been implementing anti-car measures since the early 1970s, as research started showing the negative effects cars have on liveability (e.g., pollution, traffic safety) within the city (Dijkstra & Weijermars, personal communication, February 19, 2021). The notion of 'speed kills' has also become more apparent in recent decades, as a growing amount of literature has shown that there is a high correlation between vehicle speed and traffic deaths in the case of collisions (Richards, 2010). The graph below is an example from the United Kingdom, which shows the chance of slight, serious and fatal injuries by pedestrian impact from cars rapidly growing with the increase of speed.

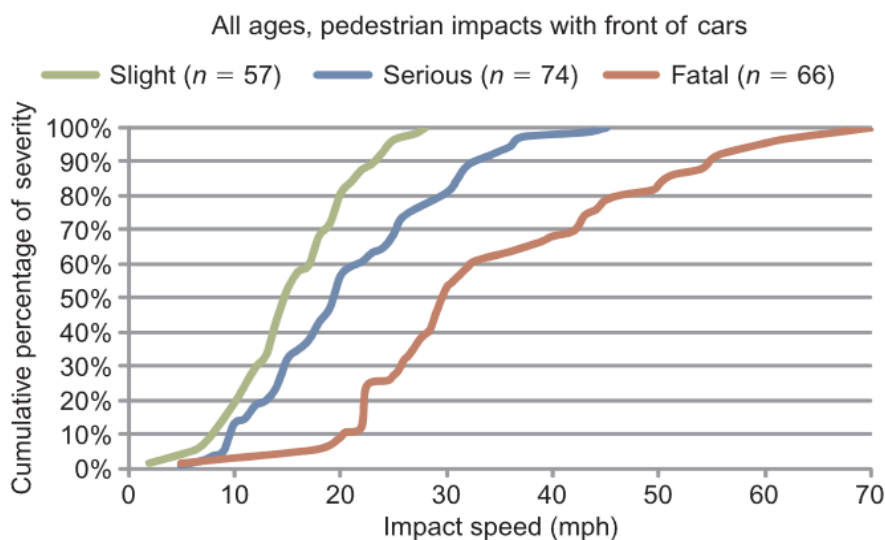


Figure 1: Traffic injury chances by pedestrians in collision with the front of cars by severity (Richards, 2010)

Looking at Figure 1 and applying it to the current situation, it is clear why the Netherlands has chosen to implement this measure. The difference in the percentage of severity between 30 mph (around 50km/h) and 20 mph (around 30 km/h) is very large, making the risk of (severe) injury upon collision within a situation with a 30km/h speed limit lower than in the current situation. By applying the lowered speed limit, the severity of collisions declines (Richards, 2010) combined with a decrease in the number of collisions, as the lower speed gives drivers a longer time to react (e.g., braking or manoeuvring) to dangerous situations (Dijkstra & van Petegem, 2019).

As the advantages to traffic safety are apparent, the question of why the Netherlands is the only country to pass such legislation is raised. The answer to that question could have something to do with the complexity of the implementation of this new speed limit. As Traffic Safety Researcher Dijkstra said it: "Putting up a 30 km/h sign instead of a 50 km/h sign is not enough to make this work" (Dijkstra & Weijermars, personal communication, February 19th, 2021). Because of the large influence this change could have on the future of cities and villages, it has become apparent that this speed change needs to be viewed and executed as a full-fledged transition.

Looking into the literature researching speed limit transitions has revealed that past studies concerning the change of inner-city speed limits are primarily focused on the direct effects it produces on the living environment. Research on the subject focuses on traffic safety (Mammen et al., 2019), environmental effects (Sugiyanto et al., 2019), and traffic flow (Islam et al., 2014). Research carried out by Dijkstra & van Petegem (2019) provides an overview of the effects of proposed speed change in Dutch cities, with the main focus on the effects of different speed limits on traffic flow, safety, and road design. This shows a gap in knowledge regarding the result of these effects on cities, as literature is primarily focused on direct effects and not on what these effects mean for a city/municipality. This thesis will look at this unclarity to see what this means for municipalities and whether this impacts the willingness to implement this transition.

This also translates to the challenge of responsibility, as there is a level of fuzziness regarding the possibility of a knowledge institute like the Dutch CROW developing an assessment framework for implementing road design characteristics for lower speed limits, and the municipalities are free to implement these however they see fit as the framework would likely have no legal foundation (CROW, 2021). This creates a level of uncertainty as to whether municipalities will obey the non-binding guidelines set for them or if they will choose their own path. This is one of the examples why a renewed focus on the governance behind this transition is necessary, as Dutch research documents on this transition rarely mention governance challenges, while it may be the most important factor for the success of the transition. By looking into the transitional governance structures while factoring in the effects and uncertainties of the transition for municipalities, it will offer a look into the

municipalities' readiness to implement this transition. It will also - as shown in the last example regarding the situation with the CROW - display the municipalities' willingness to implement this change.

As there are still many question marks surrounding this transition, this thesis aims to evaluate the readiness of municipalities in the current situation to implement the lowered speed changes. This is done by looking at the ideal characteristics needed for a successful implementation, and researching to what extent municipalities are currently complying to these characteristics. As each municipality is unique, it is interesting to review municipalities' stances and progress in this transition thus far to see where differences and similarities lay. An important aspect of successfully implementing this transition nationwide is determining which problems might prevent municipalities from implementing it. By looking at the uncertainties and barriers that this transition brings to municipalities, this thesis will offer an insight into the problems that stop municipalities from implementing the transition and what can be done by the Dutch government to minimize these problems.

This thesis will make a distinction between municipalities of different scales, evaluating the readiness of small, medium, and large municipalities to explore the differences in the approach to this transition. This thesis will only look at three case studies, namely the municipalities of Edam-Volendam, Purmerend, and Haarlemmermeer. This will provide insight into the different challenges these municipalities face in this transition and whether a distinction will need to be made in the assessment framework by CROW between different scale municipalities.

By taking the desired effects this transition brings to a city's mobility system as a starting point (e.g., improved traffic safety, less pollution), this thesis will be applying an Transition Governance Assessment Scheme which will assess a municipality's internal capacity, support base, and practicability to assess if the case-study municipalities have the right foundation to implement the speed limit transition in such a way that it produces the desired effects for its city. This thesis will focus on analysing the different uncertainties and barriers that prevent municipalities from implementing this transition, after which recommendations can be given that will help the nationwide implementation of this transition.

By interviewing the policy officers and politicians within the three case studies, this analysis will ultimately be made to answer this thesis' main research question:

How are identified uncertainties influencing the readiness of different-scale Dutch municipalities to reach the desired effects for the transition into a lowered inner-city speed limit?

1.1 Scientific Relevance

This thesis aims to contribute to the scientific knowledge surrounding the governance of inner-city speed limit reductions. It adds particularly to the literature that investigates the different effects of the speed-limit change (Dijkstra & van Petegem, 2019; Drolenga, 2021; Koster, L. & Faber, S. 2020), as this thesis looks at the governance strategies behind these effects to see how municipalities deal with the different challenges that arise. Looking at the subject from the bigger picture, this thesis will also add to the literature on mobility transition governance (Bertolini et al., 2019; Berger et al., 2014; Temenos et al., 2017), as this thesis addresses a mobility transition which doesn't fall under the most common fields of research (e.g., modal shift transition, sustainable transport transition).

The research revolves around the study of transition readiness and the uncertainties and barriers that are presented in these transitions. Based on the 'Theory of Change' by Noori et al., (2020) and the research on Transition Readiness by Dymnicki et al., (2012), this thesis will introduce a scheme that can be used to assess the governance structures of municipalities for mobility transitions. As the Netherlands is the first country in the world to make this transition and thus the main topic of this thesis, this research will also provide insight into Dutch transport, planning and governance structures. This could help other countries interested in making a similar transition to the different advantages and disadvantages of the Dutch situation in this transition.

1.2 Social Relevance

This thesis will, through engagement with the institutional practices and processes of transition management in the Netherlands on a municipal level, uncover the different (transition) governance processes, uncertainties and barriers, and different perspectives on the upcoming lowered speed limit transition. The 2020 Stockholm Declaration aims to improve road safety and sustainable development, and with the Netherlands aiming to be the first to fully employ one of its resolutions, namely the inner-city speed limit decrease, most countries will carefully watch the Dutch approach to this major transition (Chini, 2020). As the Netherlands is the first country to implement such legislation, there are many uncertainties and barriers without clear resolution (Rijksoverheid, 2020). This research will help identify these different uncertainties at municipal levels, as these are the most responsible for implementing the transition.

By identifying different uncertainties within municipalities, this thesis also hopes to spark debate about the approach to handling these uncertainties. As planning problems are inherently wicked, it is nearly impossible to find the 'perfect solution', making discussing these different uncertainties before implementing this transition therefore more important. This thesis will also provide advice for municipalities about the approach of these different challenges, based on its own literature review and expert interviews. Ultimately, this thesis will seek to show municipalities the different uncertainties at hand to ensure that organizations such as CROW, municipalities, and the government will take the identified uncertainties into account in the decision-making process to provide the most optimal outcome.

1.3 Research Questions

This Thesis will be determining the uncertainties for different scale municipalities for the transition by determining the effects of the speed-limit change on municipalities, and evaluating municipalities' capacity, support base and practicability. As a result of the literature review and the development of the conceptual framework, the research question for this thesis will be as follows:

How are identified uncertainties influencing the readiness of different-scale Dutch municipalities to reach the desired effects for the transition into a lowered inner-city speed limit?

1. Which effects does the lowering of the inner-city maximum speed limit have on a city's mobility system?
2. To which transition characteristics does a municipality need to comply to in order to be ready to reach the desired effects in implementation?
3. What uncertainties and barriers arise from the analysis of the internal capacity, support base, and practicability of municipalities?
4. In which aspects does the readiness for the transition differ in different scale municipalities?
5. How are uncertainties and barriers influencing the readiness of municipalities for this transition and what can be done?

1.4 Reading Guide

This thesis consists of five subsequent chapters which are: “Theoretical Framework”, “Methodology”, the first results chapter entitled “The Effects of Speed Limit Change on the Mobility System”, and the second results chapter is “Assessing Municipal Readiness in the Speed Limit Transition”, followed by the final chapter, “Conclusion and Discussion”.

The “**Theoretical Framework**” chapter consists of information collected from academic literature. This chapter will discuss various theoretical and conceptual theories related to the subject of the speed limit transition. Overall, the chapter will provide an overview of relevant concepts related to the subject of this thesis, discuss theory, and provide a comprehensive synthesis of the understanding throughout. The chapter is concluded with the conceptual framework and outline of the Transition Governance Assessment Scheme and Transition Characteristics, which will be applied in the analysis of this thesis.

The “**Methodology**” chapter will describe the different steps taken within this thesis to collect empirical data to answer the various research questions. This chapter will outline the choice of research methods, the validity and reliability of the research, and a description of how different steps are taken in this research. This chapter is concluded with the design of the case study, which will discuss the choice of case study and its relevance to the objectives of this thesis.

The first results chapter, namely “**The Effects of Speed Limit Change on the Mobility System**”, looks into the spatial effects of the transition. This chapter focuses on providing the reader with an overview of the different effects this transition has on a municipality’s mobility system, looking at the effects on topics such as traffic safety, traffic psychology, the environment, infrastructure and land use. This chapter concludes with an overview of the different effects of the transition, highlighting the ‘desired effects’ that the transition could bring to a municipality. The chapter is concluded with an overview of the most important characteristics a municipality must obtain to reach these ‘desired effects’.

The second results chapter, “**Assessing Municipal Readiness in the Speed Limit Transition**”, is focused around answering the main research question of this thesis. The chapter starts by describing the use of the Transition Governance Assessment Scheme, after which it is applied on the three case studies of this research. This analysis will outline the readiness of these three municipalities while providing information on the different uncertainties and barriers that municipalities face in this

transition. This chapter will then describe these different uncertainties and draw other conclusions from this analysis, followed by giving recommendations to solve these issues.

The final chapter “**Conclusion and Discussion**” is focused on answering the thesis research questions and sub questions, clarifying the answers found in the research. These conclusions are followed by a discussion, which will outline the different problems that were endured in the process of making this thesis and how they were resolved. Finally, this chapter looks at opportunities for future research around the subject of the speed limit transition.

2. Theoretical framework

2.1 Literature review

In this literature review, an overview will be provided of the different academic pieces of literature related to the subject of this speed-limit transition. This analysis provides an overview of the different viewpoints regarding the different topics within this thesis, identifies different points of conflict, and shows how this thesis will be able to fill a gap of missing knowledge within this topic. The two main academic subjects on which the literature in this thesis will be focused are as follows. Transport Policy in Planning and Transition Governance as these two topics both have an integral role in the proposed speed limit change in the Netherlands. As speed is an integral part of this discussion, this will also have a featured role within discussing the different paradigms.

2.1.1 Transport Policy in Planning

The Evolution of the Car in the City

Since the emergence of the first affordable automobile, transportation has increased its influence on daily life. People could travel faster and further than ever before, which caused changes to occur across the whole society, from spatial planning to demographics. This also came with a desire to continue to improve transportation, to make it faster, more accessible, and more affordable. As time went on, this also started putting constraints on the development of the city, as the push for speed and accessibility of primarily the car started having negative effects on the liveability within the city (Gössling, 2020). This trend has led to a push for change by academics (Bertolini et al., 2019) to address this issue by making radical changes in transportation policy to improve in areas like sustainability and safety. Politically, these demands for change are also gaining momentum, with an increasing number of cities opting for anti-car measures like car-free city centres and the lowering of car speed-limits. This latter option, also the main subject of this thesis, has been utilized in a unique way in the Netherlands, as it is the first country to pass legislation proposing to lower the inner-city speedlimits to improve traffic safety (Rijksoverheid, 2020).

This trend towards a more negative view of cars makes it relevant to look into the literature dedicated to anti-car measures. There is a wide range of literature dedicated to it and it can offer a perspective on how other cities have handled implementing measures that negatively affect car usage. The next paragraph will investigate the main academic discourses surrounding the subject of car-free city policies.

The Anti-Car City

In the year 2000, scholar JH Crawford was already writing about the idea of anti-car measures. A passage from his book 'Carfree Cities', says: "Transport is vital to cities: no city can function without its passenger and freight transport system. As large cities based on car and truck transport gridlock, it has become apparent that a better solution is needed" (Crawford, 2000, para. 2.1.). The 'better solution' referred to in this context discusses the discourse of 'taking the city back from the car', which is the main paradigm in most car-free city literature (Nieuwenhuijsen, 2016). The main goal for these drastic measures is to make the city liveable again by removing (part) of the private cars from the city noise and air pollution decline while also reducing the heat-island effect would make cities better places for living, work, and leisure.

In the article by Ortegon et al., (2016) the authors investigate the development of car-free cities, in which they categorize different car-free initiatives by rationale. These rationales are the underlying thought behind each initiative, for example, reducing emissions, making the use of cars less attractive, residential development, and the promotion of other modes of transport. In this article, there is no mention of speed limit reduction initiatives, which makes it relevant to investigate their place within these different rationales. By asking different stakeholders about the place of this measure within these rationales could tell a lot about its main goal and which sides could be opposed to that.

The Role of Speed and Travel Time

Speed has always been one of the most romanticized elements of motorized transport. The never-ending competition of being the fastest has led to car manufacturers striving to make the fastest cars and cities to accommodate these speedy vehicles to the best of their ability with the construction of highways and extensive city grids. Although the perception of the role of the car in the city is changing, it will be a difficult task to challenge this 'need for speed' by lowering speed limits within cities, as this likely will not go unopposed.

Research carried out by Tranter & Tolley. (2020) disagrees with this notion. They describe that the widespread acceptance by the general public of speed as a vital aspect of urban transport seems to be changing, as the renewed focus on liveability, accessibility, vitality, sustainability, and health is becoming increasingly important topics within urban planning. In this article, Tranter, P. & Tolley, R. (2020) describe the concept of the slow city; a city with lowered speed which focuses on vibrant communities and living a sustainable and healthy life. They argue that the best way to improve urban living can be achieved by lowering speed limits throughout the city and facilitating the healthiest modes of transport, bicycling and walking.

Tranter, P. & Tolley, R. (2020) argue that we need to rethink the widely held assumption that faster is better within urban transport and recognise that speed can destroy the liveability of places and does not always bring the desired benefits regarding accessibility and reduced travel time. An example of this, researched by Ausubel et al. (1998), is the theory of the Marchetti constant, which shows that over the last 50 years travel time has continued to be one hour on average, while travel options and vehicle speed have increased significantly in that time. Increasing speed and building additional infrastructure will lead people to live and work farther away, which will eventually lead travel time back to Marchetti's constant, bringing close to zero benefits to congestion reduction and better accessibility (Levkovich et al., 2019).

The transition of lowering inner-city speed limits within the Netherlands can be seen as a form of implementation of the 'slow city' concept. As the exact framework of how the Netherlands is planning to reach this goal has not yet been formed, it would make it relevant for this thesis to use literature surrounding the 'slow city' concept in the analysis of this research. This could also help to understand the changes in the status quo of urban transport speed and the effect this may have on stakeholders within the case studies.

Transport Policy and Governance

Transport Governance, similarly to the general governance debate, has received growing attention from scholars to address modern-day transport issues. The term used to describe Transport Governance is that of the legal and political mechanisms used for the coordination of transport systems, their interrelationships, and the allocation of resources (Zhang, S., & Witlox, F. 2019). Within the governance of transport policies, there are always various stakeholders with different interests at hand. This makes transport problems, like other planning problems, inherently wicked. Forming policies for transport issues thus also takes multiple cooperating layers of government, which makes Transport Governance a form of Multi-Level Governance (Zhang, S., & Witlox, F. 2019).

As the forming of transport policies occurs in a multilevel cross-sectoral way, it is important to research Transport Governance with an actor-oriented look, as the large number of parties involved can lead to complications resulting in compromises and changes in the policy (Fisher, 2012). This makes it relevant to ask policymakers from municipalities about their stakeholder cooperation, as it is an important factor in the composition of the policy and can also lead to difficulties, as Curry (2012) argues. In his article, he explains that there may be difficulties perceived by professional and lay stakeholders in participatory processes, as there can be a knowledge gap combined with differing interests. This can be an important factor in the success of the transition and should thus be taken into account in the analysis.

2.1.2. Governance of (Mobility) Transitions

Transitions are processes in which society endures a significant change over comparably short periods of time (Rotmans et al., 2001). As advancements are being made in technology and research this has led to a growing number of articles addressing the latest innovations and technologies, which makes research regarding the transition into these new realities relevant. Transition research is broadly applied in various fields such as sustainability (Loorbach, 2010), planning, economics, and politics (Kahler et al., 2004). Research on mobility transitions used to be scarce in the last century as Rotmans et al., (2001) described, however it has been on the rise in the last five years with major contributors being researchers like Anna Nikolaeva and Tim Schwanen with papers discussing new politics of mobility transitions (Nikolaeva et al., 2018) and the governing processes of mobility transitions (Hopkins, D. & Swanen, T. 2018). In the following paragraphs, a different perspective on transition governance will be highlighted, with a focus on research regarding mobility transitions.

Transition Governance

Based on the understanding of a transition by Loorbach (2010), four criteria of a transition approach are described; (i) the need for a long-term perspective to guide short-term development, (ii) the acknowledgment of uncertainties and surprise, (iii) the importance of networks and self-steering, and (ix) the necessity of creating space for innovation. Relating this to the topic of this thesis, the change of the speed limit applies to all these criteria with the need for a long-term perspective (CROW framework), uncertainties and surprise (challenges for municipalities), the importance of self-steering (the responsibility of municipalities), and the necessity of creating space for innovation (redevelopment of the road space for new car speed). On the surface, this would indicate that the change of inner-city speed limits should be a transition, yet the aforementioned examples fit to the criteria have not been fully researched and will thus be analysed further in the results.

Within the transition governance literature, the main paradigm discussed is that of the multilevel sociotechnical perspective by (Geels, 2012). This multi-level perspective views transitions as processes from the interaction of development at three analytical levels: the socio sociotechnical landscape that consists of exogenous factors, socio-technical regimes, where practices and associated rules for the existing systems are, and niches, where radical innovation takes place. Genus et al., (2008) argue, that this MLP perspective does not identify the networks and actors which could be facilitative or obstructive to transition. This makes this theory difficult to apply in the context of this thesis research.

Loorbach (2010) also introduced a transition management framework in his article, dubbed the 'transition management cycle'. This cycle consists of four different components which each describe a different phase within the transition. The first 'strategic' phase entails the structuring, envisioning, and establishment of the transition arena. The second 'tactical' phase includes the development of coalitions, images, and transition agendas. The third 'operational' phase describes the mobilization of actors and executing projects and experiments. The fourth and last 'reflexive' phase describes the evaluating, monitoring, and learning components of the transition. This framework could serve as an inspiration for the analysis as it approaches transitions in an operational sense.

Transition Readiness

A major factor in each transition is the governing body and stakeholders' willingness to implement the transition. This, coupled with the ability of the governing body to implement the transition, are the two most crucial steps to making a transition possible. An issue brief written by (Dymnicki et al., 2014) describes the combination of these two steps as the 'readiness' for policy change. Here, readiness is described as "the extent to which an organization is both willing and able to implement a particular practice". This article identifies three components that organizations must evaluate when implementing new policy interventions.

1. **Motivation of the people within the organization to implement the policy:** the beliefs of an intervention and support for a program to adopt a certain policy.
2. **General organizational capacities:** organizational functioning, referring to climate, staff capacity, culture, and leadership.
3. **Intervention-specific capacities:** human, fiscal, and technical conditions such as skill, knowledge, and intervention-related abilities that are important to a successful implementation.

By retrieving information from municipalities about these three components, the readiness of municipalities can be assessed. However, it is also important to consider the phase of implementation in which the organization is in before assessing this readiness. The National Implementation Research Network (n.d.) framework describes the following four phases that need to be distinguished:

1. **Exploration:** when the possibility of making use of an innovation is explored.
2. **Installation:** when an organization is in the process of acquiring or repurposing the resources needed for innovation.
3. **Initial implementation:** the first situation in which the innovation is implemented.
4. **Full implementation:** when more than 50% of policy officers implement innovation with good outcomes.

Although the research by the National Implementation Research Network (n.d.) and Dymnicki et al. (2014) offer great insight into assessing readiness within governmental policy, it is not aimed at full-fledged transitions. It does create an interesting contrast to the transition management cycle by Loorbach (2010), as the National Implementation Research Network looks at the innovation/transition in a more operational sense. An article written by Noori et al. (2020) presents an integrated framework to measure Smart City readiness, called 'The Theory of Change', reflecting on the possibilities of Iranian cities in transitioning to a Smart City. In this article, Noori et al. (2020) differentiates the readiness of cities between three different components: socioeconomic readiness, technological readiness, and political readiness. These three different components each focus on a different aspect needed to successfully implement a large transition on the city level. This framework will serve as an inspiration for the conceptual framework for this thesis, which will focus on evaluating the readiness of Dutch municipalities for a transition related to mobility and spatial planning.

Mobility Transitions

Transition in the field of mobility has played a pivotal part in the forming of modern society we know today. From the first operating train to the sale of the first commercial automobile, the field of mobility has been filled with many innovations and transitions. The irony of contemporary mobility transitions, however, is that it is trying to reverse the transitions of the past. This alludes to the transitions that are trying to overturn the car-oriented transitions of the past, as studies have shown the various negative effects these have brought to urban living (e.g., CO² emissions, traffic, air quality), which has led to an increased focus on modal shift & sustainability transitions (Nykvist, B., & Whitmarsh, L. 2008).

The modal shift transition has very similar ideas to that of the anti-car city and the slow city, as they all strive for less car usage (Nykvist, B. & Whitmarsh, L. 2008). However, they differ in their strategies; the anti-car city wants to dismiss usage of the car altogether and promote all other forms of transport (PT, cycling, walking) (Ortegon et al., 2016). The Slow city wants to make the use of (private) vehicles less attractive by lowering speeds and primarily promote 'healthy' forms of transport such as cycling and walking (Tranter, P. & Tolley, R. 2020). The modal shift differs in this optic, as it does promote the other forms of transport (PT, cycling, walking), yet it does not apply hard measures to discourage car usage. Modal shifts focus on making the other forms of transport more attractive to travellers and thus 'winning them' by fair competition.

One of the main challenges in the field of mobility today, like many other fields within planning, is sustainability. Experts see today's mobility as inherently unsustainable, pointing at problems like inequality of access, growing numbers of traffic incidents, pollution, energy consumption, and the growing number of infrastructures built to accommodate it (Berger et al., 2014). The transition to a sustainable mobility system is very complex, as it is difficult to address all the aforementioned issues in one single solution. Researcher Tim Cresswell argues for a 'mobilities approach' to mobility transitions in the article by (Temenos et al., 2017, p8), as he describes the following:

"A mobilities approach to mobility transitions means starting with movement, meaning, and practice as central and interconnected components of mobility as it exists today and mobility as it will exist after transition, and to ask what changes need to happen in these three realms in order to reduce carbon emissions and dependence on fossil fuels. Sometimes the answer will include technology, and sometimes it will not".

This approach advocates for a reduced reliance on technology to bring the solution to current sustainability problems within mobility. This is one of the many different perspectives on the topic of the transition to sustainable mobility, which is hoping to be the answer to this problem. The only problem with that is that there is no definitive answer, global challenges like the sustainability transition cannot be solved by a single answer, but rather by a combination of different answers, which makes it important that current innovations within transitions ought to be analysed thoroughly. This makes the analysis of the innovation of speed-limit change of such importance, as it could be one of the building blocks to achieve more sustainable, liveable cities worldwide.

2.2 Towards a Conceptual Framework for assessing Municipal Readiness for the Speed Change Transition

To be able to implement a transition in a city successfully, the readiness of a city for this transition must first be considered to ensure the achievement of the desired effects (e.g., improved traffic safety, environment). As this speed change transition is still in a young stage, it is important to assess the current status of the municipalities involved in this nation-wide transition to understand how soon this transition can be implemented across the country. By understanding which characteristics are needed and the compliance of the municipality with these characteristics, different uncertainties and barriers can be defined, from which a better understanding can be developed of the problems municipalities face in this transition and how they can be solved by the Dutch government.

Using these core elements of this thesis namely; effects, characteristics readiness, uncertainties, and barriers, a conceptual model was formed to visualize the different steps taken in this research to assess municipal readiness for this transition. In figure 2 this visualisation is shown:

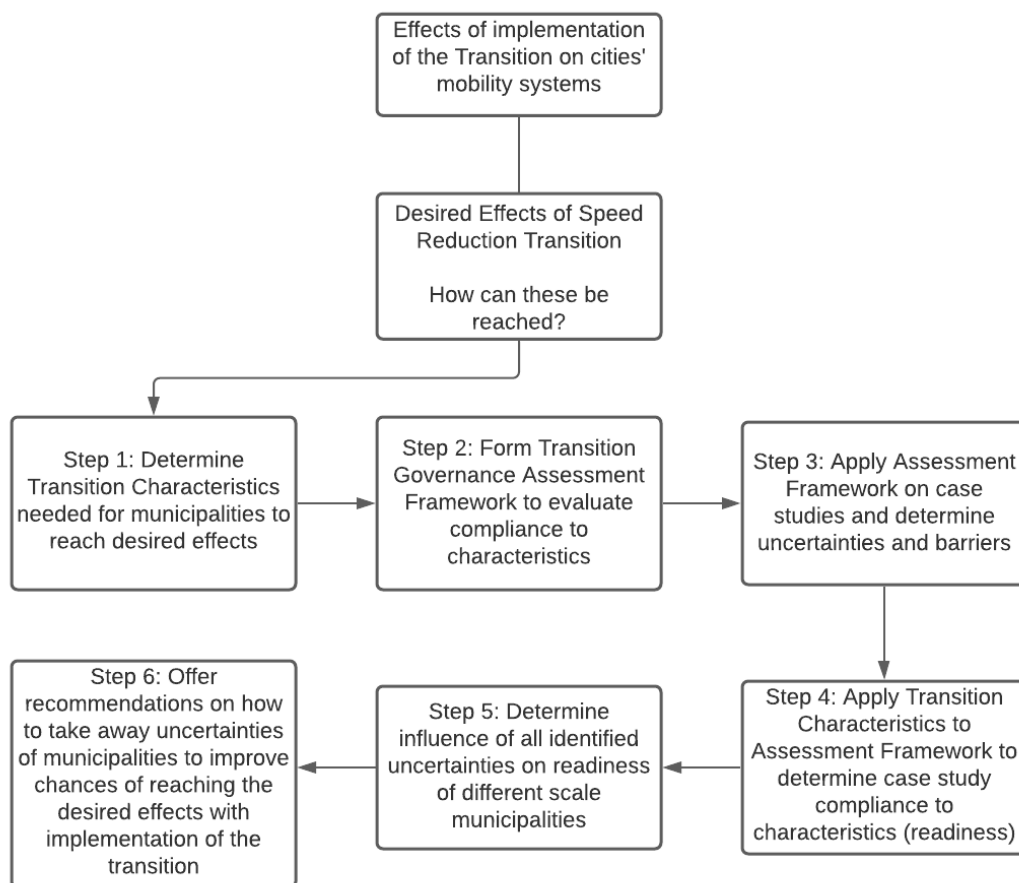


Figure 2: Conceptual Framework Thesis

In figure 2, the conceptual framework of this thesis reveals the different steps taken to research the speed limit transition in the Netherlands. Starting with the desired effects, these are the positive effects this transition brings to a city’s mobility system. Reaching these desired effects is the main goal of this transition, and therefore it is important to investigate whether Dutch municipalities are in the right state to achieve this goal. This starts with looking at the ideal situation: determining the characteristics a municipality should comply with to be able to reach this goal. This is then followed by forming a transition governance framework which will help assess the compliance of municipalities to these characteristics. The ‘Transition Characteristics’ can be seen in figure 3.

Inspired by the three components of readiness by Dymnicki et al., (2014) and the three readiness aspects of the Theory of Change by Noori et al., (2020), this Transition Governance Assessment Scheme (Figure 4) features a list of variables which represent important pieces in this transition puzzle. These variables are based on document analysis, expert interviews, and review of the literature. Each of these criteria refers to a different aspect of the speed change transition within the municipality, which will be investigated to determine the different uncertainties and barriers which are stopping municipalities from implementing the transition with the desired effects. Uncertainties are described as the problems municipalities face that can be solved internally or with external help, which are currently stopping them from being able to implement the transition with the desired effects. Similarly, barriers also describe problems that are stopping municipalities from being able to implement the transition with the desired effects, with the difference being that barriers require large structural changes to be solved without possible short-term solutions.

After determining the uncertainties and barriers, the Transition Characteristics will be applied to the results of the Transition Governance Assessment Scheme to determine the compliance of the case study municipalities to the different characteristics. This level of compliance is named as the ‘readiness’ of the municipality to achieve the desired effects of the transition. Following this, the influence of all the identified uncertainties on the readiness of the different scale municipalities is assessed. Afterwards, the results of these different municipalities are compared to form conclusions about the uncertainties, the influence of municipal scale on the readiness, additional conclusions about the data, and finally a list of recommendations which will help resolve uncertainties to help Dutch municipalities comply to the transition characteristics to implement the transition with the desired effects.

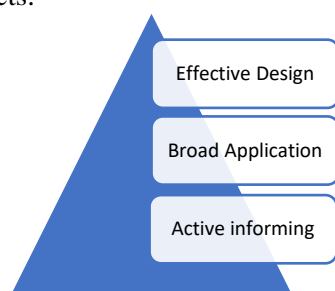


Figure 3: Transition Characteristics

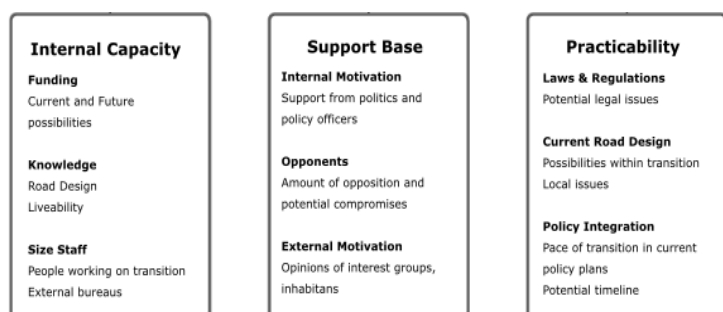


Figure 4: Transition Governance Assessment Scheme

3. Methodology

This methodology chapter will describe the different steps taken within this thesis to collect empirical data and information to answer the various research questions. The research design will describe the different qualitative research methods used, their different strengths and weaknesses, validity and reliability, and suitability, and why they can best be applied in the context of the research in this thesis. To critically analyse municipal governance arrangements within transitions, it is important to justify the choices made within the research methodology, which makes this a critical part in the credibility of the results of this thesis. Following the research design is the case study design, which will describe the different case studies used within the context of this thesis. This will mainly focus on the who, what, where and why questions of the case selections, which will be followed by a detailed description of how these cases were selected and what they will individually bring to this research.

3.1 Research Design

This research is based on accumulated qualitative empirical data using the developed conceptual framework. It will take the form of three situated case studies within the Amsterdam Transport Region, assessing transition readiness within the municipalities, evaluating the different uncertainties that may arise with the implementation of the lowered inner-city speed limit.

3.1.1 Research Methods

The qualitative research performed in this thesis will - as written in the conceptual framework – be occurring mainly with policy officers and politicians within municipalities. Performing governance research on municipalities will help to grasp an understanding of the complex governance arrangements that occur here to fully determine the readiness and uncertainties of the municipality for the speed limit transition. The Transition Governance Assessment Scheme will help to understand the uncertainties that municipalities face in this transition, which will require qualitative data to apply in case studies.

Qualitative Research

To develop a better understanding of qualitative research and understand its applicability to this research, the following pages will discuss different theories within qualitative research and its methods. These theories are then used to determine which research methods are best suited for this research. Describing the meaning of qualitative research, Fossey et al., (2002, p1) argue that

“qualitative research aims to address questions concerned with developing an understanding of the meaning and experience dimensions of humans’ lives and social worlds”. Although this is a description of the Journal of Psychiatry, it encapsulates the meaning of qualitative research very well, even with respect to spatial planning. Planning holds strong roots in other fields like sociology, as discussing and understanding its social dimensions are critical in achieving good planning practice. Due to the social dimensions and the normative nature of spatial planning, qualitative research is widespread, which makes it perfectly suited for this thesis.

Bryman (2016) describes that while the main line in qualitative research is for it to be more concerned with words than numbers, three other features are noteworthy: the first feature is that of the inductive view of the link between theory and research, in which the theory is generated out of research. This aligns with the work done in this thesis, as the research on the effects and uncertainties of the transition has provided theory on the subject that can be applied in the remainder of the research. The second feature is the interpretivist epistemological position, which describes that the stress of qualitative research is on the understanding of the social universe through examining the interpretation of that universe by its participants rather than adopting a natural scientific model. As the subject of this thesis is quite unique, it is difficult to apply a natural scientific model without any alterations being made to the model to make it applicable to the subject of this thesis. By using the results of the qualitative analysis, a better understanding of this unique subject can be provided, which can then be used to form an own conceptual model.

The third and final feature is the constructionist ontological position, which implies interactions between individuals result in social properties rather than phenomena separate from those involved in its construction. This feature shows the importance of stakeholder’s position in the transition, which plays an important role in this analysis of this thesis.

As Bryman (2016) described, qualitative research is most often applied to examine the social context in research. As transition governance research examines the coordination or steering of affairs between actors and specific sectors, it is an inherently social topic (Obeng-Odoom, 2012). Because of this, qualitative research seems to be the best option when it comes to municipal governance research, as it can shed light on different social dimensions and normative positions of actors within the governance of this large mobility transition.

Choice of Methods

Within the field of qualitative research, there are a multitude of different research methods to select from. The three most commonly used forms of qualitative research are in-depth interviews, participant observation, and focus groups (Bryman, 2016). Although these three different methods have strengths and weaknesses, they differ when it comes to applicability within the context of this research.

Participant observation cannot be used in the context of this governance research as the required data for the analysis cannot be acquired with observation of actors. Focus groups and interviews could both offer insight into governance arrangements and will thus be analysed in the next paragraphs to determine which one (or both) can best be applied in this research.

Focus groups are a method of group interview in which several participants are questioned on a predefined topic with the goal of acquiring information and debating a different theorem (Bryman, 2016). Focus groups also consist of focused interviews, which are more often performed individually to ask questions without the interference of the group. Within focus group research there has also been a growing interest in the usage of online focus groups (Reid, and Reid, 2005), which could be helpful during the current covid restrictions in which this research is performed. In the context of a focus group, participants are more often challenged by their peers for their views and argumentation, which could spark relevant debates. As this research is centred around the different points of view and perspectives on the proposed speed limit change, this method could offer valuable insights into different challenges.

Performing interviews can be done in several ways. According to DiGicco-Bloom & Crabtree (2006), there are three types of interviews: unstructured interviews in which data is gathered through participant observation and no questions are prepared, semistructured interviews are the most popular form of interviewing and most often used in focus groups around a set of predetermined open questions, and in-depth interviews which are most often used by health care researchers focused on reconstructing perceptions of events and experiences. Within the context of this research, the choice of a semistructured interview is the clear best choice, as it is best fitted with focus groups, as it allows the subjects within the interview to be predetermined, and thus easier to coordinate, and allows the researcher to also delve into social and personal matters, which is important to the social nature of the subject of this thesis.

3.1.2 Research Design and Justification

In the following paragraphs, the usage of the aforementioned research methods will be explained in more detail by looking at their application in this research, strengths, weaknesses, suitability, validity, and reliability. This research design will be divided into two parts: desk research, which will describe the evaluation and usage of (scientific) literature, and field research, which will dive into the specifics of the usage of qualitative research methods (focus groups, expert interviews).

Desk Research

In this thesis, the desk research involved a general review of the academic literature through databases such as Google Scholar. As there is a limited amount of English literature on the specific subject of speed-limit reduction effects, the review of academic literature has mainly occurred on specific subject which are similar to the subject of this thesis. Transition governance, governance structures, and car-free city literature are all examples of academic literature that can help grasp a theoretical understanding of the subject. The literature used in this thesis was primarily written in the last ten years to ensure reliability of the information. However, in the case when this is not possible, the quality of the source was checked by looking at whether or not the particular source has been used in other recent scientific literature. When this is the case, this means that the source is still reliable for current literature and can thus be used in this thesis. The main search terms utilized were transition governance, readiness, car-free city, speed change, speed change governance, municipal transitions, and mobility transitions

As this national speed-limit transition is only occurring in the Netherlands, document analysis has an important role in this research. Dutch researchers working at consultancies and government bodies have already done some research on the subject in the form of reports and journals, which could help the understanding of the subject. To ensure the credibility of the sources, only documents published by relevant organizations were considered. The most prominent sources that will be used in the analysis are shown in Table 1.

Source	Description of Source	Web Address Information
SWOV	Research Foundation of Traffic Research	https://www.swov.nl/onderzoek
CROW	Dutch Information Center for Infrastructure Guidelines	https://www.crow.nl/kennis
SWECO	Dutch Consultancy Company	https://www.sweco.nl/diensten/mobiliteit-en-infrastructuur
Goudappel Coffeng	Dutch Consultancy Company	https://www.goudappel.nl/publicaties

Table 1: Sources Desk Research

The sources mentioned in Table 1 were chosen because they are leading researchers on the subject within the Netherlands. Every source has performed research on a different aspect of the speed limit change (e.g., traffic safety, environmental effects, governance effects) and could all offer valuable information to the resolving of the research questions. This desk research will occur as a first phase of the analysis to get an overview of the different effects of the speed change on various aspects, which will then serve as a knowledge base for field research.

Field Research

Field Research can be defined as a qualitative method of data collection with the aim of observing, interacting, and understanding people in their natural environment (Burgess, 1984). While field research is commonly characterized as a form of qualitative research, it often comes with aspects of quantitative research. In this research, the field research will mainly be focused on qualitative research, as focus interviews and expert interviews will act as the main pillars of this qualitative research. In the next paragraphs the focus interviews and experts' interviews will be separately discussed in terms of choices made, reliability, validity, and achievability.

Expert Interviews

The Cambridge Dictionary (2021) defines an expert as 'a person with a high level of knowledge or skill related to a particular subject or activity.' It is important for experts to be defined properly in this method section, as the goal of interviewing experts differs from focus interviews. Within expert interviews, the main goal is to obtain information and knowledge about the subject that can be used in the analysis. With focus interviews, emphasis is placed on understanding what the interviewee's thoughts and feelings are about certain subjects and how they can substantiate their arguments. In the context of this research, 'experts' are defined as people who have worked with/researched the topic of

speed limit change within the Netherlands. As no municipality in the Netherlands has implemented the full-scale speed-limit transition, this means that few policy officers can really be seen as experts on the subject as of yet and will thus mainly be targets for focus interviews. This contrast between interviewees will make it relevant to see if there are differences between the theoretical and practical view of this transition.

To gather as much information as possible about the experts' views on certain topics, the Delphi-method was used within the interviews. The Delphi Method is centred around the questioning of experts' views of certain topics, summarizing and comparing the results of this question, after which the experts are shown their own views and other views and asked to potentially reassess their opinion on the matter (Mahajan et al., 1976). The value of this method lies in the different ideas generated, both those that lead to consensus and those that do not, with even extreme positions offering relevant insights into different topics.

The expert interviews were mainly focused on retrieving information about the effects of speed limit change, while the focus interviews were more focused on the governance aspect. Expert interviews, in combination with document analysis, will provide the information needed to determine the effects of lowering inner-city speed limits on a city, which will result in the knowledge needed on the subject to assess the uncertainties of this transition. To further validate this research, the professional opinions of experts on this research and its analysis were used to adjust the methods of work to ensure the most optimal result. The choice of which experts were contacted for interviews was primarily focused on contacting the authors of relevant literature, after which snowball sampling was used to get into contact with other experts on the subject.

In total, five expert interviews have been conducted. The interviews were conducted online (30-60 minutes) through Microsoft Teams and recorded for transcription purposes with the full permission of the interviewees. One interviewee wished that the interview with he/she would not be transcribed, which was agreed upon. The transcripts of the expert interviews can be found in the attached appendix file. An overview of the different interviewees for the expert/focus interviews can be found in this as well.

To further substantiate the research, the Delphi-method was utilized as a tool to assess the uncertainties which arose from the research into the effects of this transition. Six experts were asked to assess the risk of different uncertainties on a scale of one to five. This information was gathered in the interview or via an online survey. Expert assessments of the 'danger levels' of uncertainties are then used to divide the uncertainties into higher and lower risks. The uncertainties on the higher risks were then presented in the focus interviews to assess whether the opinions of the experts and the municipal officers were aligned. The results of this can be seen in Appendix 1.

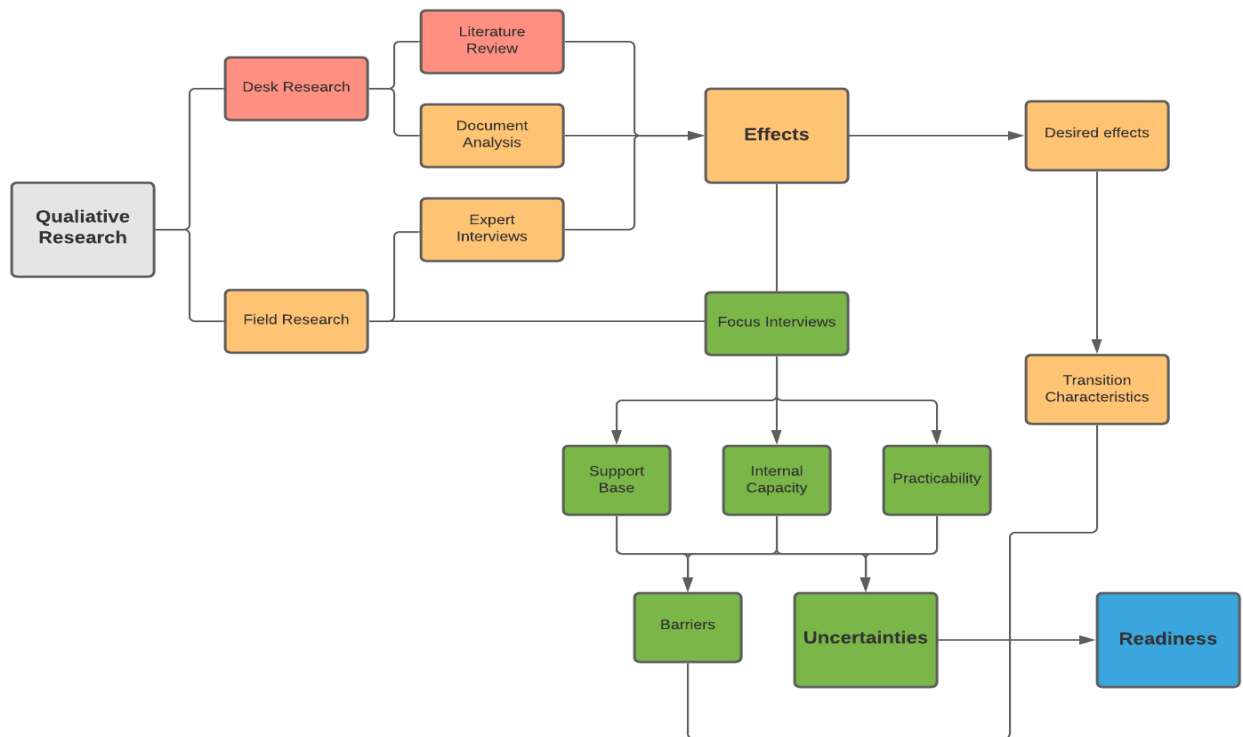
Focus Interviews

Focus interviews consist of interviews with officials from selected municipalities of the case studies. Two interviews were conducted in each municipality, one with a municipal policy maker and the other with a political figure within the municipality. Gaining the perspective of both a political figure and municipal officers will give an interesting insight when certain viewpoints are compared with those of the interviewed experts and the existing literature. By corresponding the results of the focus interviews with the literature further validity is ensured. Reliability has been achieved by offering the interviewees a list of their quotes used in the thesis to offer them the opportunity to alter certain responses and phrasing. Both officials were questioned about the readiness of their municipalities for this transition. These interviews will be fully analysed on the basis of the responses, reactions, and formulation of the interviewee to gain a complete understanding of readiness and uncertainties in their respective municipalities.

The interviews were conducted in a total of three different municipalities, ranging from small to medium to large municipalities. How these municipalities were selected can be read in paragraph 3.3. To ensure that a controlled amount of data is being retrieved from these interviews, the sessions had a duration of 20-30 minutes. These interviews will occur in the same controlled environment via Microsoft Teams to guarantee reliable results. Unlike expert interviews, the questions in these interviews were mainly predetermined to ensure that the results of each are consistent, reliable, and compatible for further analysis.

Framework

Figure 5: Framework Research Methods Thesis



The framework in Figure 5 describes the different research methods used in this thesis and the time frame in which they were performed. Each of these different research phases are described below.

1. **Phase One:** In this first research phase, a review of the literature was performed mainly to serve as a basis for the theoretical framework. In this phase, the thesis topic was shaped and the main academic literature was analysed to form a conceptual framework.
2. **Phase Two:** In the second phase, the first start was with the analysis of this thesis. By performing document analysis and expert interviews in combination with previous research done in the literature review, an analysis could be performed in which the effects of the transition on the mobility system are determined, resulting in ‘desired effects’. This phase also results in determining the transition characteristics that municipalities need to reach these desired effects.
3. **Phase Three:** The third research phase was aimed at applying the Assessment Framework of Support Base, Internal Capacity, and Practicability on the three case studies to determine which uncertainties and barriers are stopping them from successfully implementing the transition with the desired effects.
4. **Phase Four:** In the last phase of the research, all previous analysis was combined to evaluate the readiness of the different case studies for the transition. In this phase the Transition Characteristics are applied to the results of the Transition Governance Assessment Scheme to determine the readiness of the case study municipalities.

Covid Restrictions and Online Research

Due to the current Covid-19 pandemic and lockdown, there have appeared to be a few restrictions for this research. Working from home is considered mandated, which makes in-person interviews a non-viable option. When it comes to qualitative research, this only leaves the option of online interviewing, which has its pros and cons. Lobe & Morgan (2020) argue that in online interviewing it is more important for the interviewer to be well-prepared and to inform participants on the best approach for the video call. Transcribing can be made more difficult if the video/recording quality is insufficient, making it more difficult to analyse results. This makes it important to make sure that interviewees go to a quiet place, speak clearly, and have sufficient internet connection. When considering ethical challenges, it is also important to request permission for interview recording and the use of data and personal information to ensure that interviewee rights are put first (Deakin & Wakefield, 2014).

3.1.3: Data Analysis

After performing the field research, the data originated from the interviews will be analysed. Here, a distinction is made between the expert interviews and focus interviews. Focus interviews will be fully transcribed and then further analysed using the selective coding method, which focuses on selecting a core category and systematically linking it to other categories, making it best suited to relate the content of the interview to the concepts of the conceptual framework (Bryman, 2016). To look at the data from a nonbiased perspective, inductive coding was applied to improve the validity of the analysis. In contrast to the focus interviews, the expert interviews were not coded as the main goal of these interviews was to gather personal viewpoints on the subjects and reflect on the knowledge gathered from literature review and document analysis, which makes the wording/phrasing of the experts in the interviews not highly relevant for this thesis. The answers of the expert interviews were summarized to make them available for use when discussing certain topics within the analysis.

The coding applied in analysis of the focus interviews were mainly focused about the core concepts of this thesis - the criteria of the Transition Governance Assessment Scheme and the transition uncertainties -, analysing the answers relating to these subjects and evaluating the different phrases used in discussing these subjects. Coding was not applied in the desk research segment of this thesis, as the information deprived from these sources was only used in the analysis of effects and was not used as a tool in determining the readiness of municipalities.

3.2 Case Study Design

In this paragraph, the design of the case study for this research will be described. First the case study selection will be shown in which the choice of municipalities will be substantiated. Subsequently, the three municipalities will be presented, which will serve as the basis for qualitative analysis in this thesis.

3.2.1 Case Study Selection

As described in the introduction of this chapter, the cases selected in this thesis will all be located within the Amsterdam Transport Region, as this partnership organization helped with the forming of this thesis subject and contacting experts on the subject. The first selection process that the municipalities went through was that of population. The focus of this thesis is on comparing the readiness of municipalities of different scales; small, medium, and large, and the scale of the municipality will be determined by population numbers. As different-scale municipalities have different governance structures and deal with different challenges, a distinction is made between the different scales in this thesis to explore whether this structural difference also leads to different results in this transition. Based on the table provided by the Ministerie van Sociale Zaken en Werkgelegenheid (2019), the definitions of the different size municipalities are as follows:

- **Large:** municipalities with populations exceeding 100.000 inhabitants
- **Medium:** municipalities with populations between 50.000-100.000 inhabitants
- **Small:** municipalities with populations less than 50.000 inhabitants

In the Amsterdam Transport Region, this means that case studies will be selected from:

- **Large-sized municipalities:** Amsterdam, Haarlemmermeer, and Zaanstad.
- **Medium-sized municipalities:** Amstelveen, Purmerend.
- **Small-sized municipalities:** Aalsmeer, Beemster, Diemen, Edam-Volendam, Landsmeer, Oostzaan, Ouder-Amstel, Uithoorn, Waterland, Wormerland.

From this selection, the municipality of Amsterdam was eliminated as a policy officer working at this municipality was interviewed as an expert for this thesis. This selection was sent an email by the Amsterdam Traffic Region asking for volunteers to participate in an interview. From the municipalities that volunteered to contribute, a selection was made (based on which municipality is the most representative for the whole group), which resulted in the selection of the following municipalities: the municipalities of Haarlemmermeer, Purmerend and Edam-Volendam.

3.2.2 Case Study Description

Municipality of Haarlemmermeer

The municipality of Haarlemmermeer is situated to the south-west of Amsterdam and counts 157.778 inhabitants (CBS, 2021). The largest city in the municipality is Hoofddorp, and it also contains the largest airport in the Netherlands. Schiphol. The municipality contains 25 towns and cities, which offers an interesting urban-rural contrast for this thesis.

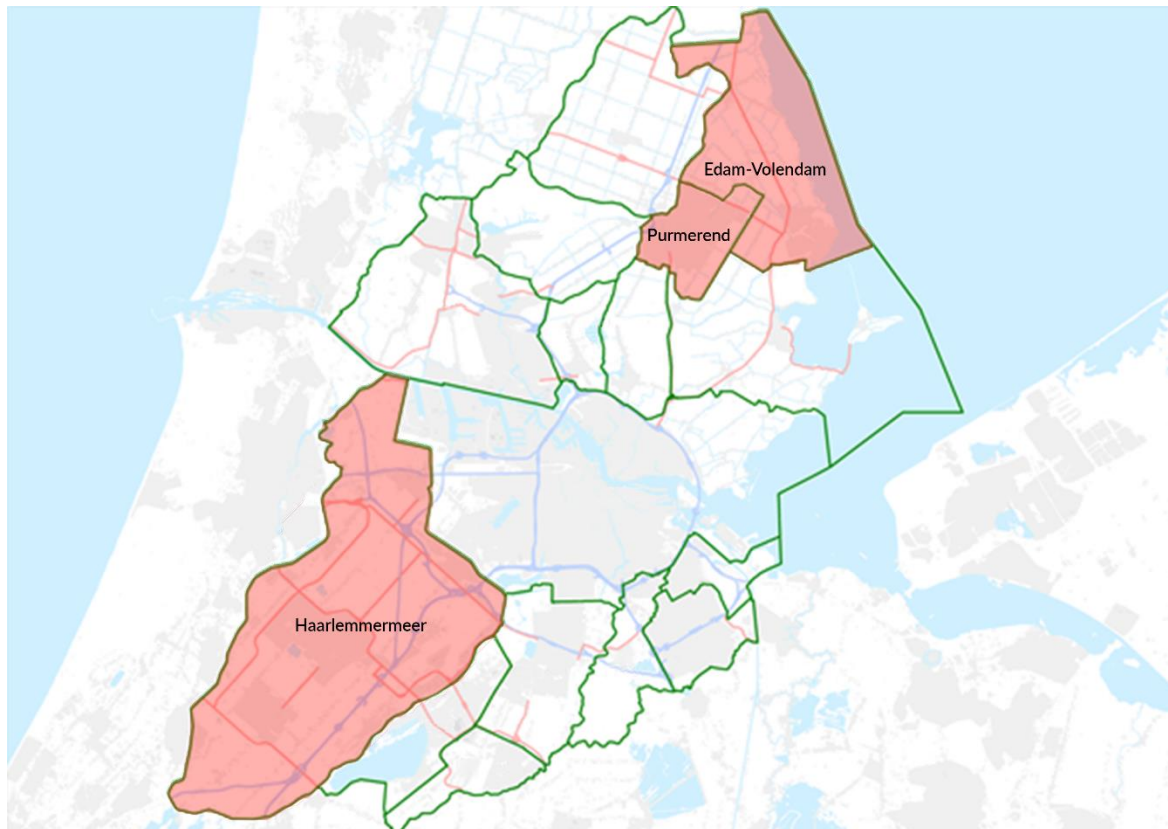


Figure 6: Case Study Municipalities selected for this thesis

Municipality of Purmerend

The municipality of Purmerend is located to the north of Amsterdam, below the other case study of Edam-Volendam. The municipality has 80.117 inhabitants (CBS, 2021), which are mainly located in the only city of the municipality: Purmerend. As this municipality is centred around one city instead of multiple towns and cities this could provide insight into the governance of a single-city municipality in this transition as the other case-selections include multiple towns/cities.

Municipality of Edam-Volendam

The municipality of Edam-Volendam is located north of Purmerend, bordering the IJsselmeer. The municipality counts 36.262 inhabitants which are mainly located in the town of Volendam and the city of Edam. The municipality also includes a number of small towns surrounding the two main locations of Edam and Volendam. Edam and Volendam are both historical locations with old city centres as is the case with many small municipalities in the region, making the case a great sample to understand the problems of a small municipality in this transition.

4. The Effects of Speed Limit Change on the Mobility System

This first analysis chapter will focus on the different effects the proposed inner-city speed limit change could have on a city / city's mobility system. As a transition as large as a speed-limit change could have effects on a range of different research fields, this chapter will focus on the effects related to the study of spatial planning. The analysis in this chapter will be based upon the information retrieved from expert interviews, document analysis, and academic literature review. The first paragraph will offer an introduction to the different planning research fields involved with this speed-limit change and the different uncertainties the transition brings to these fields. Paragraph 4.2 will provide an in-depth analysis of the effects, resulting in the formulation of the 'desired effects'. Finally, this section will describe the 'Transition Characteristics', which will be used to determine readiness in Chapter 5.

4.1 Introduction of effects

Transitions within the field of planning are inherently wicked, as the number of academic disciplines involved in planning-related transitions is numerous and often strictly opinionated, leading to decisions that benefit some while worsening others. This section will introduce the normative stances and effects of the speed-limit change on these different disciplines to form an overview of the different research fields involved.

When discussions around vehicle speed limits arise, the main 'perpetrator' involved is always traffic safety. This should not be a surprise, as countless studies have shown the correlation between higher vehicle speeds and an increased risk of crash death, with the research by Dijkstra & van Petegem (2019) being one of the main examples. This research shows how crash prevention becomes more

difficult and crash impacts seem to rise with the increase of vehicle speed, ultimately leading to increased problems in traffic safety. In the example of the Netherlands, the development of high safety regulations on the roads with the highest speed limits (e.g., separated roads, no mix with other road users on 80+ km/h roads) has made the 50 km/h road the most dangerous in the country, as its combination of relatively high vehicle speeds and mixed usage leads to the most traffic-related deaths and injuries (Weijermars, 2019). This has led the Netherlands to act with the implementation of its 50- to 30-year legislation making 30 km/h roads the new norm of inner-city speed limits.

The goal of this decision is clear; by lowering the speed of vehicles within the inner-cities potential crashes would become less lethal, leading to fewer traffic-related incidents and deaths. Besides the positive effects it would have on traffic safety, it would also make the city more liveable as the decreased speeds would create less noise, pollution and reduce heat-island effects (Dijkstra & van Petegem, 2019). This shows the first connection of this transition with other planning fields. When performing measures that address the liveability of a city, this will also have consequences on other research fields such as environmental planning, (road) infrastructure, and land-use planning.

Looking at the potential effects of this transition on the environment, there seem to be great opportunities. Pollution is one of the greatest challenges we face as cities, and reducing car speed limits could have positive effects on the amount of air and noise pollution in the city, as discussed in the article by Lopez-Aparicio et al. (2020). In this article, Lopez-Aparicio et al. mention a pilot with an "environmental speed limit," which shows that the positive environmental effects alone have been reasons for cities to adjust their speed limits. Looking at the topic of (road) infrastructure, this situation has similarities to the situation of land use planning. Because of the defined rise of anti-car policies, see *Anti-Car City*, Sect. 2.1 -, it seems that this proposed speed limit change could also go hand in hand with additional (physical) measures to reduce car usage and make more room for other road users such as cyclists or pedestrians. The speed-limit change alone should be reason for infrastructure changes for it to be effective, "as simply putting up 30km/h instead of a 50km/h sign will barely reduce the average speed on a road" (Dijkstra & Weijermars, personal communication, February 19, 2021). This means that the change in speed limit alone could provide significant challenges to land use.

One of the strongest counterpoints to the speed-limit transition is the negative effects it could have on traffic flow. Traffic models used to measure the effects of the lowered inner-city speed limit show that there would be a slight decrease in traffic flow if the speed limit were to be changed to a portion of the roads (Dijkstra & van Petegem, 2019). If it were to be applied on all roads, the traffic flow would decrease further, but it would also lead to an increase in the number of cars taking shortcuts through residential areas, reducing the hierarchy of the traffic system.

In line with the point about increased shortcuts, the reduction of the speed limit could also have several behavioural consequences. In 90% of traffic incidents, behaviour plays a large part, hence it is reasonable to assume that changing traffic rules/infrastructure could have an impact on the behaviour of people in their daily commutes (Koster & Faber, 2020). It remains to be seen whether or not lowering speed limits will influence the speed of drivers, accompanied by the thought that lower speed limits could lead to more risky behaviour by the "weaker road users" (e.g., cyclists, pedestrians). It has been known for quite some time that infrastructure design can have a large influence on traffic safety/behaviour (Wegman, 1995). This makes it important that this transition will be accompanied by guidelines for infrastructural changes which will influence traffic behaviour in a way in which the desired positive effects on traffic safety will be achieved.

This need for guidelines aligns with the last main planning aspect of this transition, governance. The governance of this transition can be seen as quite difficult, as there are quite a few uncertainties (Dijkstra & van Petegem, 2019; Dijkstra & Weijermars, personal communication, February 19, 2021; H. Thalens, personal communication, March 1, 2021). One problem with this transition is that of who will act. As land use governance has become decentralized in the Netherlands in the last decades, this has led to an increased amount of responsibility for municipalities. As the legislation passed on new speed limits does not prohibit or force municipalities to implement renewed speed limits, it could lead to several municipalities opting not to implement the measure or waiting for other municipalities to do it. This could lead to a free-riding-type situation in which municipalities sit and watch, which would delay the progress of this national transition.

A second major problem is who will pay for the transition. Research by Drolenga (2021) concluded that 80% of Dutch municipalities would need to implement infrastructure changes on their roads to ensure a safe transition to the reduced speed limit. Moreover, 50% of municipalities describe that it does not have sufficient funds in its infrastructure budget to implement these changes, which could lead to municipalities either not implementing the lower speed-limit or choosing to implement the lower speed-limit without appropriate infrastructure changes, which would both prove to be harmful to the success of this transition.

4.2 Analysis of Effects

As Section 4.1 has offered an introduction to the main planning disciplines involved in this transition, this section will dive deeper into these different disciplines to form a good understanding of the different consequences that the transition will have on these fields. This paragraph will mainly focus on the topics of traffic safety, environment, traffic flow, (traffic) psychology & infrastructure, and land use planning.

Traffic Safety

As proposed by government and research organizations, the main goal of speed reduction is to improve traffic safety. Estimates by Dijkstra & van Petegem, 2019 suggest that speed limit reduction could lead to a 22-33% decrease in traffic fatalities and injuries. The main reason this decrease will occur is that potential collisions are far less dangerous because of the lower speeds and the fact that fewer collisions will occur as drivers have more time to brake or manoeuvre in the case of a dangerous traffic situation (Richards, 2010).

However, this decrease in traffic fatalities and injuries seems to be based on the premise that when speed limits get decreased from 50 to 30, a large sum of drivers will obey these limits. A study by SWOV (2018) on speed obedience on roads with a 30 km/h limit in the Netherlands reveals that more than half of the time drivers do not obey the speed limit, sometimes even exceeding it by 10 km/h. This research was based on roads that have had a speed limit of 30 km / h for a longer period, which means that this speed obedience number could drop even further in a situation where the speed limit is changed from 50 to 30, as drivers have grown accustomed to driving that speed.

Breaking driver habits may be the most crucial factor in this transition. Humans are creatures of habit, which is also the case within mobility patterns. Drivers will regularly travel on the same route, even if it does not benefit them in some situations (Innocenti et al., 2013). The same may be the case with a speed change, putting up a sign with a different speed limit will not be enough, as a large sum of drivers will continue driving the same speed as their instinct tells them to, which would exceed the speed limit and potentially create dangerous situations. To avoid this potential effect, a method of modification of travel behavior by Gärling et al. (2009) can best be applied, namely changing the traffic situation in such a drastic manner that the driver's habits will undergo a 'reset' which will lead to a reevaluation of their traffic behaviour. This directly links to the views of Dijkstra & Weijermars (personal communication, March 1, 2021), who described that critical infrastructure changes would need to be made to make this transition work. To make drivers undergo a re-evaluation of their driving behaviour and obey the speed limit, Yao et al., (2019) argue there needs to be a 'credible speed limit'. This credible speed limit is defined as:

"a limit that drivers consider logical or appropriate in light of the characteristics of the road and its immediate surroundings through specific consistency and continuity of road design, including the type of the road, road layout, road surface, road curvature, traffic density, weather conditions and a mix of traffic" (Yao, Carsten, Hibberd, & Li, 2019).

Considering that achieving a credible speed limit is the best approach to make drivers obey the new speed limit, it can be argued that the design of the infrastructure plays an important role in achieving better road safety. By designing the road in a way that lowers the credible speed limit for drivers, the average speed would decrease, leading to improved traffic safety. This means that when discussing traffic safety in the case of this transition, it is most important to discuss the relation of traffic psychology (human behaviour in traffic) and the infrastructure to offer insight into the influence the infrastructure design of the 'new 30 km/h speed limit roads' would have on the behaviour of commuters and the obedience of rules. From this it could be concluded whether or not a suboptimal design of the new 30-road would decrease the chances of a successful transition.

Traffic Psychology & Infrastructure

As early as the year 1996, author Fred Wegman of SWOV discussed the large influence road design has on human behaviour and traffic safety saying: "There are still a substantial number of unsolved problems in the field of road design (i.e., geometric design), human behaviour and road safety, even though researchers and road designers have been working on the issue for decades" (Wegman, 1996, p4.). He argued that while there was a large amount of existing knowledge on the subject showing there is a connection, road authorities and researchers were still not willing to fight this uphill battle together, resulting in road networks being designed worldwide without applying the design principles of a safe road network, functional use of the road network, homogenous use, and predictable use. Although these three principles are 25 years old, they still are as relevant today, as they will prove to be an important factor in this transition from 50 to 30.

The main goal of the lowered speed limit is simple; mandating a lowered speed limit will make vehicles drive slower, which will then result in fewer traffic injuries- and deaths. However, this first assumption is not a simple goal to achieve. The effect the lowered speed limit will have is dependent on the displayed behaviour by road users. Within the traffic system, there will always be several users who disobey rules and social norms, as there are in any system. The main challenge here lies in how to make sure that the disobedience of rules does not become the social norm, increasing the number of users in the system's disobedience. According to TRB (1998), there are three reasons for regulating drivers' speed choices:

- Externalities i.e., the imposition of risks and uncompensated costs on others because of inappropriate speed choices made by individual drivers.
- Inadequate information that limits a motorist's ability to determine an appropriate driving speed.
- Driver misjudgement of the effects of speed on crash probability and severity

Looking at these three reasons for speeding there are opportunities to be found which could help mitigate drivers demonstrating this behaviour. An example of this is in the city of Amsterdam. In an interview with Wiard Kuné, a policy officer from the municipality of Amsterdam, the context was provided about the importance of information and logical design within this transition (W. Kuné, personal communication, 7 May, 2021). Kuné described that for the transition from 50 to 30 to work, it is of great importance that the road users know about this speed change in both information that is provided to them, as in the information analysed in the situation. When the transition occurs, the municipality of Amsterdam is planning to start a large-scale media campaign, informing residents and visitors of the city of Amsterdam of the change in speed limit. This is an example of the information provided to road users about the reduced speed limit. The information analysed factor speaks to the ability to communicate to the users of the renewed 30-roads that the speed limits have been lowered in the design of the road itself. This can be done through proper signiation, but also (small) infrastructure interventions such as speed bumps and narrower roads (W. Kuné, personal communication, 7 May 7, 2021).

These two planned interventions by the municipality of Amsterdam are examples of approaches to tackle the reasons for speeding by TRB (1998), as supplying extra information will improve the motorist's ability to determine the appropriate driving speed, and infrastructural interventions can improve drivers' judgment on crash consequences and probability, increasing chances for them opting to drive slower. As these measures make road users more aware of their traffic safety, the chance that they obey the speed limit increases, as Figure 7 shows that safety is the most important reason to obey the speed limit on a 50 km/h road (Biervliet et al., 2010).

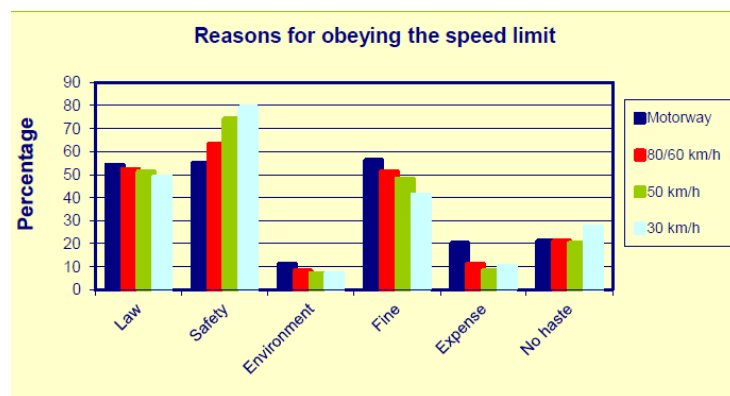


Figure 7 : Reasons for obeying the speed limit. Source: PROV 2009 (Biervliet et al., 2010)

When discussing the link between infrastructure, behaviour, and traffic safety and this transition the influence of objective and subjective traffic safety could also prove to be important factors. Objective traffic safety is described as the whole of the critical convergence of traffic conditions, incidents, conflicts, and accidents with their undesirable (permanent) consequences, primarily focused on empirical evidence (Vlakveld et al., 2008). Subjective traffic safety has a behavioural foundation; it describes the feeling of safety people have when they are in a certain traffic situation. These forms of objective and subjective traffic safety can both be positive or negative, but do not have to be correlated. The link between objective and subjective traffic safety can almost be described as a

paradox, as the research by Vlakveld et al., (2008) describes that a feeling of unsafety in traffic can almost be seen as beneficial to traffic safety, as this feeling will lead to road users paying extra attention and engaging in safer driving behaviour, while a feeling of safety will lead to road users engaging in more risky driving behaviour. Linking this with the transition, lowering speed limits could give road users a feeling of extra safety in traffic, which could lead to an increased amount of risky behaviour, resulting in a worse objective traffic safety. As debates around the subject of subjective traffic safety are still ongoing (should society accept drivers feeling unsafe in traffic if this results in better safety) there is not going to be a clear answer to this challenge yet, which could still prove to be an important factor in this transition and should thus be considered.

As described in the interview with Kuné (Personal communication, May 7, 2021), there are multiple small infrastructure measures a city can implement to make the new speed limit of 30 km/h a credible speed limit. A study by van der Horst & Ridder (2007) shows that factors such as the width of the road, the presence of trees next to the road, the number of turns on the road, and the clear vision of the road all influence the speed of the car of drivers. This means that to lower the credible speed limit, measures outside of infrastructure on the road could be taken to increase the risk-awareness of drivers, lowering their speed. Therefore, land use planning will also play an important role in this transition, as it can influence driving speeds and is also responsible for improving liveability in the new situation.

Land-use

Land use refers to the activities of humans on the land and is related to physical and functional characteristics of space. The physical character of land use refers to the built space. This often refers to urban design, the physical aspects of land use, including a street layout, and the provision of parking spaces (Meurs & van Wee, 2003). A street layout can have a large influence on human behaviour, allowing urban designers and planners to promote 'correct behaviour' through their design. They are also responsible for increasing liveability in streets, promoting a green, vibrant look, improving the wellbeing of people walking these streets. Within this transition there is a unique role for urban designers, as they have to create both temporary and permanent designs for a large number of streets within different municipalities, offering them the chance to change the 'look' of a city as a whole.

The reason urban designers can have such an influence on these new 30-roads is that the design of these roads has not yet been decided. Within the Netherlands, the speed limits of a road determines which road category it is, with options like Stroomwegen (SW: highway, a speed limit of 100), Gebiedsontsluitingswegen (GOW: distribution road, speed limit of 50 or 80), and Erftoegangswegen (ETW: property access road, a speed limit of 30 or 60). In the current situation, within the city limits,

there are GOW 50 roads and ETW 30 roads, which each serve a different function in the traffic system. These different road categories also have their design principles, determined by the CROW in cooperation with the state and municipalities (CROW, 2021). One of the plans for the transition from 50 to 30 is to form a hybrid of these two road categories which will offer the road safety of an ETW 30, but the traffic flow functions of a GOW 50, forming the new category of GOW 30 (Dijkstra & van Petegem, 2020).

CROW is currently working on developing a guideline for the road design principles of this potential GOW 30 road, which will offer municipalities support in the way they wish to implement these road design principles and urban design (H. Thalens, personal communication, March 1, 2021). The main principle behind this new GOW-30 guideline is making it an official new road category, which will tempt more municipalities to implement reduced speed limits. As CROW guidelines are actively used by municipalities across the Netherlands, this could prove to be an effective measure in increasing awareness and lowering the threshold for municipalities to take action.

One of the most important challenges within the formation of the new GOW-30 guideline will be its implementation; The guideline will help municipalities implement the GOW-30 roads but not where. Municipalities will have to decide on their own which GOW-50 roads are the best fit to be GOW-30 roads, which could create unequal outcomes between different municipalities. An example of this difference in decision making is the research by (Dijkstra & van Petegem, 2020) suggesting that the decision between a speed limit of 50 and 30 needs to be decided by the factor of its bicycle paths, in which roads with a separated bicycle path can have a speed limit of 50 and roads with adjacent bicycle paths should have the limit of 30. While bicycle paths are the main factor by this author, the municipality of Amsterdam is planning to judge the decrease in speed limit by its urbanity; roads that have an urban character should be 30, while other roads can have a 50-speed limit (Kuné, personal communication, May 7th, 2021). This difference in approach could have very different outcomes on cities' structures, which could lead to speed limit unclarities for commuters driving through multiple municipalities, potentially decreasing traffic safety. Although it can be argued that each municipality is unique and that this lack of homogeneity would not have a large effect on traffic safety, it is still an important factor to consider.

Over the past century, the Netherlands has undergone a process of decentralization when it comes to spatial planning, increasing the responsibility of municipalities, and decreasing the government's power (Gier, 2011). While this offers municipalities more freedom, it also increases uncertainty in implementation. Linking this to the speed transition, this offers the municipalities freedom in the approach of how and where to implement this lowered speed change, while this lack of binding legislation gives uncertainty about whether this is the right approach.

Traffic Flow

One of the biggest concerns in this transition is the potential problems that the lowered speed limit could bring to traffic flow throughout the city. This seems to be an inherently logical concern; lowering the speed of cars will make their time spent traveling from point A to B longer. However, the question policy officers must ask themselves is: is this a problem? Research by Dijkstra & van Petegem (2020) reveals that this transition from 50 to 30 would have negative effects on traffic flow; increased pressure on the 50-roads would decrease traffic flow at intersections, while the lowered speed limit would also influence travel times. This could also have some influence on traffic flow on road networks outside city limits (Kuné, personal communication, May 7th, 2021). While these are negative effects on overall traffic flow, they don't offset the massive benefits it would bring for traffic safety (Dijkstra & Weijermars personal communication, February 19, 2021). Kuné (personal communication, May 7, 2021) also argues that savings in travel time do not occur in the city but on highways and that the increased travel time within the city would thus only have a small effect on the overall travel time of commuters.

While the increased travel time is often considered a negative consequence of this transition, it could also benefit cities' mobility patterns in the future. Innocenti et al. (2013) argue that implementing 'hard measures' which negatively affect car usage could lead to a change in future mobility patterns by car users. By making the car a less attractive mode of transport within the city by lowering speed limits, it could discourage future car users and cause a modal shift under current car owners to more sustainable modes of transport (e.g., bikes and public transport). In the case of the Netherlands, this transition will likely also come with an increase of car-free zones, as this has been in an upwards trend since the '70s (Dijkstra & Weijermars, personal communication, February 19th, 2021), which could push this modal shift even further. Long term, this could lead to a decrease in car usage within the city, offsetting the short-term decrease of traffic flow within the city.

In general, this would mean that the negative influence on traffic flow in the short term can be seen as a legitimate cause of concern for municipalities. However, when reviewing these negative effects from a broader perspective, it seems that the positive effects that the transition would bring on mobility patterns and a modal shift should help mitigate these issues. It could also help create a more sustainable transport system, improving the use of more efficient and environmentally friendly modes of transport.

Environment

Environmental effects may not be the largest factor in this transition, but they do serve an important role in transition governance. As described in the theoretical framework, the largest mobility transitions at the moment are those of sustainable transport and modal shift, both of which aim to decrease carbon output by mobility in two different ways. This transition will likely also contribute to the same goal, since a decrease in speed from 50 to 30 leads to a 25% decrease in CO² and NO_x emissions on inner-city roads (Marireddy et al., 2011). The approach taken by municipalities in this transition, particularly, will also be very telling of their investment in achieving carbon neutral mobility. Decreasing the speed limit in the municipality will create a brand new urban environment that offers opportunities to implement more sustainable mobility innovations. This transition could change urban street design as a whole and create a fresh start, and how far the municipality will go in making this new situation sustainable will offer insight into how determined they are in achieving carbon-neutral mobility.

Overview of effects

<i>Subject</i>	<i>Effect</i>
Traffic Safety	22-33% decrease in traffic fatalities and injuries
	Decrease in injuries will only occur with credible speed limit
	Lower speeds give drivers more time to react, leading to fewer traffic accidents.
Traffic Psychology & Infrastructure	Disobedience of the new maximal speed limit without extra infrastructural measures
	Better subjective road safety can lead to more risky behaviour.
Land-use	Change to a more liveable urban street design with a new GOW-30 road category
Traffic Flow	Decreased traffic flow on intersections, outer-city motorways
	Change in future mobility patterns (modal split)
Environment	25% decrease of CO ² and NO _x emissions
	Room for new sustainable initiatives

Table 2: Summary of effects of speed limit transition on different subjects

In table 2 the different effects as a result of the implementation of the speed limit transition have been summarized to provide a clear overview. From Table 2, it can be seen that most of these effects would lead to positive developments for the municipality. Risky behavior and decreased traffic flow could both have negative consequences in the short term, but, as the analysis shows, these consequences can

be mitigated by long-term developments such as changes in mobility patterns and behavioural adjustments by road users.

These results show that the transition can have numerous positive effects on a municipality, with improved traffic safety, reduced emissions, and improved liveability. Therefore, these different effects can be seen as 'desired effects': the positive effects on the mobility system that come with the successful implementation of GOW-30. However, to accomplish these 'desired effects', the municipality must successfully implement the transition, which means its implementation should comply to the following characteristics:

1. The design of the GOW-30 road must effectively slow down road users towards the new speed limit with the use of infrastructure measures and obstacles.
2. The GOW-30 road must be applied in as much road situations as possible to achieve homogeneity within the municipality
3. The municipality must actively engage in informing campaigns and/or other behaviour modification measures to decrease risky/speeding behaviour of road users in the municipality

These three characteristics will be used in the assessment of municipal readiness in the next section of this thesis. By applying the data from the interviews in the Transition Governance Assessment Scheme, each criteria will be analysed to investigate their compliance with these three characteristics, to determine whether this criteria contains uncertainties/barriers which could jeopardize the implementation of the transition.

5. Assessing Municipal Readiness in the Speed Limit Transition

In this final analytical chapter, the readiness for the speed-limit transition of three Dutch municipalities will be discussed, from which the uncertainties and barriers that are most influential on the implementation of this transition will be concluded. The first paragraph of this chapter will discuss the different criteria which will be used to assess the readiness of the municipalities. Paragraphs 5.2, 5.3, and 5.4 will evaluate the readiness for this transition of the Municipality of Haarlemmermeer, Purmerend, and Edam-Volendam. In conclusion, we have Section 5.5, which will discuss the results of the Transition Governance Assessment Scheme, elaborate on the uncertainties and barriers detrimental to this transition, and concludes with recommendations for the Dutch approach to this transition.

5.1 Introduction Readiness Assessment

This section will discuss the criteria used to assess the readiness of the three case studies for this transition. Here, this thesis will go into detail of which aspects are going to be looked at in the interview analysis, how these aspects influence the criteria, and which effect this has on the readiness of the municipality. This section will conclude with the connection that readiness has with the uncertainties element of this thesis.

5.1.1 Assessment criteria

Support Base

Starting with the support base, these criteria look at the motivation a municipality has, both internally and externally, to implement this transition. This is done by looking at the opinions and actions of different key figures within the municipality. The three most important groups evaluated for the support base are the municipal policy officers working on traffic and transport, local councillors and political parties, and the citizens of the municipality. This is because all these three parties play crucial roles in the implementation of the lowered speed limit; policy officers have to research and implement the measure on different roads, the councillors have to form the policy and persuade the aldermen and political parties to vote in favour of the implementation, and citizens have to agree with the implementation of the GOW-30 roads in their neighbourhoods without too many compromises. Outside these three parties there can also be other opponents and stakeholders which could also influence the implementation of the transition, so these will also be discussed separately.

The three variables used to assess the criteria are described as followed:

- **Internal Motivation:** Internal motivation looks at the support for the transition inside of the organizational structure of the municipality. In the case of this transition, this variable will focus on the perspective of policy officers and councillors within the municipality and their motivation to implement the lowered speed-limit.
- **Opponents:** The opponent variable will discuss the parties who have objections against the lowered speed limit. These opponents can be from all over, politics, policy officers, emergency services, bus companies, etc. This variable will look at the different arguments these opponents present against the transition and how this influences the municipality's motivation to implement the measure.

- **External Motivation:** External motivation focuses on the parties which are on the outside of the decision-making process. As it is difficult to know the opinion of all inhabitants, this primarily looks at the actions taken by interest groups and citizens in relation to the transition. Do they actively try to oppose its implementation, or do they campaign for lowered speed limits to local politicians?

After discussing the results of these three variables, an insight is provided into the municipality's support for this transition. This will provide information on the municipality's willingness to implement lower speed limits and what challenges / uncertainties could prevent them from implementing the transition on a larger scale.

Internal Capacity

The second criterium is that of internal capacity, which looks at whether the municipality's capacity is strong enough to support this transition. As this transition has large impacts in a number of different fields, it is important that the municipality is fully equipped to apply the reduced speed limit. Several factors are important in this, and two of the three selected variables were also classified as high uncertainties in Section 4.3. The utilized variables are described as followed:

- **Funding:** Looking at funding evaluates the municipality's capability and willingness to invest into this transition. Also considered the greatest uncertainty, lack of funding has been documented in half of municipalities. This makes it important to find out whether the municipality has; a) invested or plans for investing in this transition, b) the funding to implement right away or has to combine with maintenance, or c) overall financial shortages.
- **Knowledge:** Knowledge looks at whether the municipality has the expertise on the change in speed limits to be able to successfully implement this transition. This includes general knowledge of road design and its influence on liveability within the policy team and the number of different disciplinary backgrounds within the team. In the interviews, this is evaluated by looking at the knowledge of this transition by both the policy officer and the councillor by asking about their questions regarding this transition and contradictory statements made by the interviewees to the effect analysis performed in his thesis.
- **Size Staff:** The size of the staff is a simple variable that looks at the number of people within the municipality who work on topics related to this transition. This also relates to the knowledge variable by reviewing whether the policy team has the capacity to implement this transition or if it needs outside help (e.g., consulting firms, external bureaus). When asking interviewees if they have the manpower to implement the transition, it can be very telling of their readiness for implementation.

These three variables will ultimately provide insight into the foundation of the municipality for this transition. To achieve a positive assessment of these criteria, the municipality will need to have adequate funding, a diverse staff, and adequate knowledge of the transition. This will ultimately be an integral part to the municipality's readiness.

Practicability

The final criteria to assess the readiness of the municipality is practicability. Practicability is mainly centred around the feasibility of the transition in the specific municipality; there is a lowered speed limit applicable when factoring in specific circumstances. For these criteria, the interviewees are asked about the potential implementation of lowered speed limits in their municipality and which problems could arise in their specific situation. By understanding the problems municipalities face with the reduction of the speed limit at the political, infrastructure, or legal level, this will provide real insight into their potential readiness for implementation. The three variables used to assess practicability are as follows.

- **Laws & Regulations:** This variable is primarily focused on potential legal issues that could arise with the implementation of this transition. As laws and regulations can be complex for municipalities, also factoring in the coming of the new national Omgevingswet (Environment and Planning Act) this could provide a challenge for municipalities in this transition.
- **Current Road Design:** The variable Current Road Design will focus primarily on the challenges that arise around the infrastructural aspect of this transition. Does the municipality have space-related issues, are there reasons the GOW-30 can't be applied, and other infrastructural uncertainties will be evaluated in this variable.
- **Policy Integration:** The final variable is that of policy integration; This variable will reveal whether municipalities have already implemented the transition on certain locations and if it is already part of their current Traffic&Transport policy. This will primarily show which phase of the transition the municipality is in and how they are planning to proceed with further implementation.

After applying the framework in the case studies and evaluating the different variables with the data from the interviews, it is time to determine the uncertainties and barriers of the transition. In this step the results of each variable is analysed to see whether the presented data contains any statements describing uncertainties/barriers which could obstruct municipalities from successfully implementing the transition. After this, each variable will be placed in one of four categories to see which variables present the biggest challenges for the implementation of this transition. To determine which variable belongs in which category, each variable is assessed with the usage of the three main characteristics of

a successful implementation (presented on page 29), to analyse whether the data from the variable shows statements made by interviewees which obstruct the municipality's ability to comply with the characteristics. The four categories used to divide uncertainties and barriers are described below.

- **Red category: Major barriers that require structural changes:** This category is applied in the situation when a municipality presents a structural problem which prevents them from being able to implement the transition. These barriers can be recognized by the fact that neither intern or extern help can fix the problem, and structural change (e.g. other political parties, fundamental change in perspective) is necessary to overcome the barrier.
- **Orange category: Uncertainties that can be solved with external help:** This category is applied in the situation in which the municipality is dealing with certain uncertainties that prevent them from implementing the transition in a way that it can achieve the desired effects. In this category, it is possible that this uncertainty could be resolved by an external organization (e.g. CROW, provinces, or the government), in which case it could still be possible for the municipality to successfully implement the transition.
- **Yellow category: Uncertainties that can be solved internally:** Similarly to the orange category, this category is applied in the situation in which the municipality is dealing with certain uncertainties which are stopping them from implementing the transition in a way that it can reach the desired effects. In this category however, the municipality could resolve the issue internally by using good communication, forming of compromises with opponents, and small internal changes to still be able to reach the desired outcome in this transition.
- **Green category: In perfect state to reach desired effects:** In this category, the data from the assessed variable do not present any uncertainties or barriers that prevent the municipality from successfully implementing the transition and would therefore be in the right state to handle this transition.

Ultimately, after placing each variable for the three case study municipalities in the right categories, these results will provide an overview of the different uncertainties and barriers municipalities face. From this overview, one can conclude whether or not the municipality has the groundwork to comply to the Transition Characteristics, from which the readiness of the municipality can be determined. After this analysis, recommendations can be given for the uncertainties that were presented, which will help remove the main challenges that stand in the way of municipalities implementing the transition successfully with the desired effects.

5.2: Case of Haarlemmermeer

To analyse the readiness of the municipality of Haarlemmermeer, two interviews were conducted with a policy officer from the traffic policy department and a councillor from Haarlemmermeer’s labour party (PvdA). Both these interviewees already had affiliations with the transition as the municipality of Haarlemmermeer has already implemented lowered speed limits in the form of a GOW-30 road for 10 years. This is because “the original idea of CROW was to implement five categories of roads for ‘Duurzaam Veilig’ instead of four. Because our local policy was already established before this change, we have always kept it”. While this gives reasons to expect this municipality to have a large number of GOW-30 roads, this is not the case. Political opponents, a car-oriented culture, and a lack of knowledge of the implementation of the GOW-30 road are examples of some of the hurdles the municipality has had to face in this transition. This has resulted in both interviewee’s grading their municipality’s readiness for this transition a 3 on a scale of 1-5.

Support Base

Support Base	Major barriers that require structural changes	Uncertainties that can be solved with external help	Uncertainties that can be solved internally	In perfect state to reach desired effects
Internal Motivation		x		
Opponents			x	
External Motivation			x	

Table 3: Categories Support Base

Starting with the evaluation of the support base, the interviews show that most of the references made to the opinions of the most important factors (politics, inhabitants, policy officers, and external stakeholders) for the proposed lowered speed limit were negative in nature. The councillor interviewed was mainly positive as she was in one of the parties trying to increase the number of GOW-30 roads, while the policy officer was very hesitant about the transition, as he still had a number of questions that needed answering.

Internal Motivation

Internal motivation, or support from politics and the municipality, brought mixed results from the interviews. The policy officer said that 'the municipal council has not yet been convinced' and there was 'no political support' for the reduced speed limit. He also mentioned an example in which the Labour Party proposed to lower the speed limit in a certain neighbourhood, in which the council quickly shut down this idea with arguments such as *"this will increase travel time"*, *"how the municipality enforces the speed limit on bicycles and cyclists, as it would be unfair for cyclists to have a higher speed limit than the car"*. These arguments show a very car-oriented perspective, which was confirmed by the policy officer as the spoke of the municipality of Haarlemmermeer being a "car-oriented municipality for both politics and inhabitants".

The councillor's viewpoint aligned with that of the policy officer, as she described that *"the right-wing parties are very stubborn in implementing the GOW-30 roads"*. As Haarlemmermeer's municipality council is largely right-wing, this leads to difficulties in implementing this seemingly car-unfriendly measure. While on a national level the speed of 30 km/h is set as the new standard, the right-wing parties of Haarlemmermeer prefer to apply 'maatwerk' or 'custom work', which implies that each situation needs to be evaluated individually to decide on which speed-limit is best. The councillor described that this *"leads to extra time and work"* which would often lead policy officers and politicians not to investigate the possibility.

Looking at the motivation of the policy team, it was described that they were very reserved about implementing the GOW-30 road. This was mainly because of a number of problems they had experienced during the implementation of the GOW-30 road. The first problem mentioned was with emergency services and public transport not reaching their arrival times. For public transport companies, this could *"lead to an increase in service hours that could lead to a cut in supply"*. Second, the policy officer mentioned the problems with enforceability and credibility saying: *"If you make a road 30 km/h and it is not a credible speed limit, no one will follow this speed limit, and because 30-roads cannot be enforced by the police due to legislation, this could lead to complaints"*.

He also expressed doubts with the effect the speed limit would have on the hierarchy of roads and cut-through traffic. Ultimately, he concluded that policy officers prefer to implement the speed limit of 50 because 'if speeds on the road exceed 50 you can enforce it, and you cannot with a GOW-30 road'. The councillor agreed that the policy officers are often very hesitant to implement the GOW-30 road because of the number of uncertainties, which has led to a small number of GOW-30 roads being implemented. In conclusion, this shows that the internal motivation in the municipality currently depends on the different uncertainties that the interviewees presented. As these uncertainties can only be solved externally, this places the internal motivation in the orange category.

Opponents

In these focus interviews, the potential opponents to the transition were very similar to those of the expert interviews. The opponents to this transition being named were mainly public transport companies and emergency services. Because of the increased travel time that comes with the lowered speed limit emergency services would have more difficulties arriving on time which could have harmful consequences. Looking at public transport, this similar effect would primarily have financial implications that the municipality would ultimately have to pay for. A new opponent mentioned in the interviews were right-wing political parties. This perspective could be interesting, as predominantly left-wing municipalities Amsterdam and Utrecht are seen as the frontrunners in this transition (W. Kuné, personal communication, May 7th, 2021). An interesting disagreement between the interviewees was about the civilian perspective, of which the policy officer expected mainly negative feelings about the transition, while the councillor sees civilians as the largest proponents of the transition. There are a variation of different opponents in the municipality, yet it seems that most of the issues between these parties can be resolved internally, placing opponents in the yellow category.

External motivation

When asked about potential opponents against the transition within the municipality, the policy officer expected the most discussions to be with the citizens of Haarlemmermeer, as the strong car culture of the municipality would make the citizens distraught about the thought of a decrease in traffic speed and flow. An example mentioned by him was the placement of shared mobility vehicles on the streets, in which the placement of two share scooters caused the inhabitants to be upset while the whole street was full of cars. The policy officer also spoke about the “*rigorous transition of Amsterdam*” which would never get support from the inhabitants of Haarlemmermeer. This shows that this policy officer primarily views a full transition of all 50-roads to 30 to be an impossible feat in Haarlemmermeer.

While the policy officer viewed the citizens as the largest opponents, the councillor saw the inhabitants of Haarlemmermeer as the biggest proponents of this transition. She described that almost all previous implementations of the GOW-30 were implemented because of citizen participation in interest groups such as the ‘Fietsersbond’ or Cyclists Union, individual citizens or neighbourhood councils would come to the municipal councils demanding lowered speed changes in their neighbourhoods. To that she also added: “*The population of Haarlemmermeer generally wants a lowered speed limit, though they also want to move fast from place to place*”. From this, it can be concluded that the inhabitants of Haarlemmermeer want a ‘YIMBY’, in which they only want the lowered speed limit to be in their 'backyard' and to be able to drive faster on other roads in the

municipality. The problems with external motivation in the municipality of Haarlemmermeer are however very minor, and can be solved with proper communication and active participation, placing external motivation in the yellow category.

Internal Capacity

Internal Capacity	Major barriers that require structural changes	Uncertainties that can be solved with external help	Uncertainties that can be solved internally	In a perfect state to reach desired effects
Funding			x	
Size Staff				x
Knowledge		x		

Table 4: Categories Internal Capacity

As the municipality of Haarlemmermeer is the largest of the municipalities investigated in this thesis, its internal capacity is naturally larger than that of the other case studies. The yearly budget of the municipality is around 500 million euro’s, which is used to finance the municipality of 157.000 inhabitants. Although a larger capacity means more hands-on deck, it also increases the workload and number of projects within the municipality. This could have mixed effects on the readiness of the municipality for a transition of this size.

Funding

As mentioned in the last paragraph, the municipality of Haarlemmermeer’s yearly budget is around 500 million euro’s, of which 4-8 million is spent annually on Mobility & Transport, a small piece of the overall budget. Because of the recent covid-crisis, a large number of cuts will be made into this budget. However, the councillor described that because of the power of the right-wing parties the budget of Transport will likely not decrease, as there is a strong focus on improving several mobility-related issues. According to the policy officer, a large amount of this budget would go primarily to housing development and road access, making it possible to design a new road infrastructure to accommodate the GOW-30 road only when combined with sewerage and road maintenance. Overall, this would only make this transition possible in the long-term, making this a minor uncertainty best fitted for the yellow category.

Size Staff

As Haarlemmermeer is a large municipality, it also has larger and more diverse staff than smaller municipalities. The policy officer described that almost all policy officers within the municipality work on traffic policy, as it is such a broad subject that affects other fields. Overall, people directly working on the policy, maintenance, and external workers from consultancies there are around 5-10 people working on subjects related to this transition. This, however, does not mean that they are directly working on lowering speed limits, as this is not an emphasis within this municipality. In the traffic department overall, there are round 25-30 people working on mobility challenges for the municipality of Haarlemmermeer, placing it in the right state to implement the transition.

Knowledge

Looking at the knowledge of the policy team, the municipality was described to have “*enough knowledge internally*”. The policy officers come from relevant backgrounds and the policy officer interviewed had a large amount of knowledge on the subject and its developments. The biggest knowledge problem within the municipality lies in the GOW-30 guidelines. In the municipality there was a desire for a “checklist that could be used to design a road with the right characteristics”. He said that in the current situation the policy officers have been “*searching for the right design of a GOW-30 road, which has led to our current GOW-30 roads to look different from each other, as we apply it purely as custom work*”. In the interview, the policy officer also linked the size directly to the knowledge within the staff: 'If you compare our situation to that of the municipality of Ouder-Amstel which has one traffic engineer, or Amstelveen that has about three or four, in that case the amount of knowledge is limited.' In this, he indicated that the larger the municipality, the greater the amount of knowledge on the subject, making the transition easier to implement for larger municipalities. While the knowledge within the team is at a high level, they do require the assessment framework by the CROW implement the GOW-30 road in the most effective way, placing knowledge in the orange category.

Practicability

Practicability	Major barriers that require structural changes	Uncertainties that can be solved with external help	Uncertainties that can be solved internally	In a perfect state to reach desired effects
Policy Integration			x	
Laws & Regulations		x		
Current Road Design		x		

Table 5: Categories Practicability

As the municipality of Haarlemmermeer has already started with the implementation of their own GOW-30, this makes it an interesting case to look at from a practicability standpoint. With this experience, the municipality should have a great understanding of the potential problems that could occur with the implementation of this GOW-30 and the effects and uncertainties that have affected them the most. By looking at how this municipality dealt with these problems, much could be learned about the readiness of Dutch municipalities for these effects.

Policy integration

As stated earlier, the GOW-30 has been implemented in the policy of the municipality of Haarlemmermeer since the adoption of the ‘Duurzaam Veilig’ road categorization 10 years ago. While this road category has had its place in municipal policy for 10 years, it has not been applied often. After being asked if the policy officer had seen an increase in GOW-30 roads in the municipality in the last few years, he answered: “no, no, not really, one of the main causes is because we have been too hesitant, we still see several constraints that have not been answered”. Because of this lack of implementation, he also did not see this as a transition but like a “gradual change”. On a policy level, the transition is not high on the agenda, as the main focus of the policy officers has been on housing construction projects and its access roads.

Regarding future policy, the policy officer described that the municipality of Haarlemmermeer has the goal of designing all 30-roads according to the design principles of Duurzaam Veilig by CROW. However, this does not include the downgrading of speed limits to 30 within the municipality. This is

another example of how the GOW-30 roads are present in the municipal policy, but are not being implemented. This is a consideration that is made internally and can also be solved in the formation of the next policy, and should thus be placed in the yellow category.

Laws & Regulations

As mentioned earlier in the internal motivation, the enforceability seems to be the largest legal problem this transition is facing. As of right now, the Dutch police department does not enforce upon roads with the speed limit of 30 km/h and lower, as the design of these roads should make it impossible for drivers to be able to drive any faster. While the goal of the Dutch police of not enforcing was to make sure that municipalities put extra focus into the safe design of 30 km/h roads, it has had a backwards effect. This has occurred in Haarlemmermeer, as policy officers here when given the choice between a speed limit of 50 or 30, regularly choose for 50 because it is the lowest speed that can be enforced by police, ultimately leading to a situation with worse traffic safety. The Haarlemmermeer councillor also mentioned that the *“enforceability of the GOW-30 is the greatest challenge”*, which stands in the way of a more widespread implementation of this new road category. In conclusion, if the police enforcer's rule on 30 km / h does not change, the implementation of the GOW-30 roads will increase very slowly, placing laws & regulations in the orange category.

Current road design

When asked about the situations in which the municipality implements the GOW-30 roads, the policy officer responded: *“We only apply the GOW-30 in situations that fall between two stools in the Duurzaam Veilig guidelines, the so-called ‘grey roads’, to make the real speed limit clearer”*. He explained that the main idea within the municipality was to apply GOW-30 on all 'gray roads' (roads that have characteristics of both GOW-50 and ETW-30 roads), but *“since there are no clear guidelines on how to implement GOW-30, we have been very reserved in the number of implementations”*.

When the municipality implements the GOW-30, a number of infrastructure challenges arise. Since GOW-30 roads can't be enforced by police, infrastructural changes have to be implemented to slow down car traffic. But some of these changes are difficult to implement, as the policy officer described: *“we cannot implement speed bumps close to houses which do not have piles underneath their house, because the soil can't support it. And because of this, we are seeing real problems in lowering the speed on these roads to 30 km/h”*. When it is possible to implement speed bumps, the municipality has problems implementing it as bus companies are often opposed to the measure, often leading to compromises being made in the form of plateau's which do not interfere with traveling time- and

comfort. This is an example of the difficult choices the municipality has had to make when implementing the GOW-30 road. As these choices are very difficult, the demand for guidelines addressing these issues is very high. With this need for external help this variable is placed in the orange category.

Conclusions

In general, it can be concluded that the municipality of Haarlemmermeer has found itself in a unique position within this transition. Of the three case studies, it was the only municipality to already have the GOW-30 in its policy; thus, it has not led to the implementation of many of these roads within the municipality. The strong car-centred culture that influences the largest political parties and inhabitants has made it more difficult to implement lower speed limits. While the motivation internally is present, in the current situation, there are too many hurdles to implement this transition on a broader level.

Both interviewees agreed that the largest hurdle they face is the enforceability of the measure; when spatial problems make it difficult to implement infrastructure changes to make the speed limit of 30 realistic, the possibility of using police to enforce the speed limit is not a possibility, giving drivers no incentive to follow the speed limit, potentially leading to an even more dangerous traffic situation.

Both interviewees made clear that if this major uncertainty is not resolved, its implementation of the GOW-30 road will hardly increase in the upcoming years.

In the municipality of Haarlemmermeer, resources are not scarce, the municipality's budget for infrastructure projects is quite high, it has a large team working on traffic projects and has a lot of knowledge within the organization. While the foundation for this transition is present, the motivation is mainly lacking, as the main opponents of the transition seem to be within the municipality's politics and policy team itself. The main causes for this seem to be the uncertainties surrounding the enforceability of the transition, and the quality of the assessment framework, which will be provided by the government later in this year. The policy officer saw the quality of this framework being an integral part of this transition: *"I think that the hesitant nature of most municipalities in this transition comes from being dependent on this framework, as they don't have the capacity and resources to be able to make this decision themselves. I think that if it is a framework with real content, most municipalities will participate in this transition"*.

Looking at the results of the variables in Table 6, it seems that while the foundation for the transition is present, there seem to be too many hurdles to face to be able to implement this transition on a high level in the near future. Although the table displays four different variables with orange-level uncertainties, it can be concluded that these are all derived from two main uncertainties: the problems concerning the road design of the new GOW-30 road and the lack of enforceability for this GOW-30 road. These uncertainties are affecting the motivation of the municipality to implement the transition,

and are thus important for the readiness of the municipality. These are two problems that can be solved with external help, but will stand in the way of complying to the characteristics to Haarlemmermeer as long as they are not resolved. From this can be concluded that the municipality of Haarlemmermeer will not be ready for this transition until these uncertainties have been resolved.

Variables	Major barriers that require structural changes	Uncertainties that can be solved with external help	Uncertainties that can be solved internally	In perfect state to reach desired effects
Internal Motivation		x		
Opponents			x	
External Motivation			x	
Funding			x	
Size Staff				x
Knowledge		x		
Policy Integration			x	
Laws & Regulations		x		
Current Road Design		x		

Table 6: Summary all categories municipality of Haarlemmermeer

5.3 Case Purmerend

Just like the case of Haarlemmermeer, two interviews were conducted with a policy officer from the traffic policy department and a councillor from Purmerend’s Democratic Party (D66). Both interviewees had over 5 years of experience in their respective fields, with the policy officer paying close attention to the developments within the speed-limit transition. The municipality of Purmerend had implemented speed limit decreases in the city before, with the change of the speed limit within a number of streets in the city centre from 50 to 30. However, this change was not accompanied with the needed infrastructural change, resulting in roads where people “can still easily drive 50 or even 80 km/h”. This shows that the municipality may have the right intention, yet does not want to take the measures needed, making this an interesting case. When asked about their ‘1 to 5 grades’ for readiness for this transition, the policy officer and counsellor were interestingly far apart, with the former giving a 1 and the latter answering a 4. This discrepancy is noteworthy and will also be considered in this analysis.

Support Base

Support Base	Major barriers that require structural changes	Uncertainties that can be solved with external help	Uncertainties that can be solved internally	In perfect state to reach desired effects
Internal Motivation	x			
Opponents			x	
External Motivation				x

Table 7: Categories Support Base

Starting with the support base, it seems that neither the interviewed policy officer nor the councillor is very positive when it comes to the support for the measure in Purmerend. A speed limit reduction which was implemented 5 years ago in the city centre was an example of the lack of support in the municipality; while they did create a new 30 km/h zone, the necessary infrastructural measures to effectively lowered speed were not implemented because politics did not want to spend the one million euro’s needed for successful implementation, leading to a 30 km/h road in which cars “drive 50 km/h, and sometimes even 80”.

Internal Motivation

The internal motivation in the municipality of Purmerend for this transition has its foundational issues, which can be concerning for the potential implementation. Starting with the policy team, which keeps changing its perspective because there is still so much uncertainty about the transition. The policy officer interviewed said he is personally a proponent of implementing the reduced speed limit but cannot seem to create the support needed politically to implement the measure at the right level. Inside the policy teams there are still some concerns regarding the speed limit transition, namely about the dilemma surrounding road design versus enforceability versus the Duurzaam Veilig programme, in which they have a lot of unclarity.

Looking at the perspective from the political side, the results show that there are a few barriers to overcome before the municipality can successfully implement the transition. Starting with the actions surrounding traffic and transport, in which all projects are primarily focused on improving the accessibility of Purmerend. These accessibility goals are also a large reason why the transition is having trouble breaking ground, the main argument against the transition is *“traffic flow, traffic has to be able to flow and not lead to traffic jams in the city centre or a certain neighbourhood. There is quite a discussion about the extent to which speed reduction really affects traffic safety, and while some think it has a large effect, some others have their doubts.”* Another quote by the councillor shows that the majority of traffic projects are also focused on traffic flow: *“We have three important issues, a parking garage near the city hall, the traffic flow of the A7 highway, and the redevelopment of the station area”*. The councillor also ended the quote with *“and aside of that something that does not always get as much attention but, traffic safety, the number of accidents is also something politics looks at”*. These quotes show a clear focus distinction, favouring traffic flow projects with reduced attention to traffic safety.

Prior projects like the city centre speed reduction also show a lack of focus on traffic safety, which makes the politic perspective on this transition a potential barrier. Although *'left-wing parties do not have a problem with lowering the speed, on average it seems that right-wing parties have more difficulties with lowering the speed'*. This internal preference, which is heavily focused on improving traffic flow, seems to be a barrier for this transition in the municipality of Purmerend, as prior implementation of the GOW-30 roads is either being stopped politically or allowed without the proper funding needed leading to a substandard implementation of the measure. Although the uncertainties of the policy team could be solved externally, the barriers within politics seem to be barriers that need structural change, placing internal motivation in the red category.

Opponents

When asked about potential opponents for the transition in Purmerend, the policy officer answered “*I think emergency services and public transport are not really opponents, but do have the largest effect. If you decrease the speed this would impact their travel times which would have to lead to increasing capacity. It is not really about opposing the transition, but more about the effects and consequences that this has on other policy fields*”. While public transport is not seen as a large opponent, the interviews do show that bus companies have quite a large influence on Purmerend’s politics. One example by the councillor is “*In the past we have had a few discussions about downgrading a road in speed. Often the main argument was that the bus had to use that road that would not fit. Then some measures would not be taken, as the bus must be able to easily drive through that road.*” Another example by the councillor shows otherwise when it comes to the downgrading of the speed in the city centre: “*if the other advantages are large enough then the bus should never be an obstacle to implement a measure*”.

This shows that the municipality does not see public transport as a large opponent to this transition, but does put a large emphasis on a strong public transport system. In addition to emergency services and public transport, the councillor only named one other opponent of the transition, which were local entrepreneurs who did not want their road design changed into a situation that could decrease their clientele. Looking at presented problems by the interviewees, it is clear that these uncertainties can be solved internally, which would put opponents in the yellow category.

External Motivation

In the interviews, external motivation was not often mentioned, showing that civilian groups are not yet actively participating in groups that promote the transition. In a specific redevelopment project, the inhabitants would sometimes often ask about the possibility of a speed reduction to make the neighbourhood calmer and safer. The councillor also described “*the Dutch Cycling Union is a clear promotor of the transition for the safety of cyclists. That is in entire Purmerend, making it a generic pain deliverer*”. This phrase of language is interesting, as it suggests a negative image by the councillor when it comes to parties promoting the transition. Overall the external motivation for the transition is in the right state for this transition, as there are not any civilian parties actively campaigning against the measure, placing it in the green category.

Internal Capacity

Internal Capacity	Major barriers that require structural changes	Uncertainties that can be solved with external help	Uncertainties that can be solved internally	In perfect state to reach desired effects
Funding	x			
Size Staff		x		
Knowledge		x		

Table 8: Categories Internal Capacity

Continuing with internal capacity, which faces various challenges within the municipality of Purmerend. As the policy officer described: *“we are not working on this transition at the time, it is primarily a capacity issue at the moment”*. This shows the problems the municipality is facing when it comes to the capacity and political foundation when it comes to this transition. These issues offer the municipality strong uncertainties and barriers to face in the implementation of this transition.

Funding

Looking at the finances within the municipality, it appears that the funding available for mobility is strictly used in housing development programmes and projects surrounding traffic flow. When asked about the transition, the policy officer described: *“We do not have a budget available for this. The situation of the city centre was a separate project and not part of policy, which made it easier to choose another road design which was cheaper, leading to a more sober choice of design”*. The councillor also described that this transition *“would cost millions, which has not been chosen yet”* and that *“finances are not generous”*. To conclude the policy officer also described that *“smaller and medium sized municipalities are very dependent on the government in the financing of this transition, which makes it difficult for smaller municipalities. Capacity is a problem, even in Purmerend en Zaandstad there are so much projects in which mobility is an issue that there is not enough capacity for projects like this”*. From this it can be concluded that funding is a true barrier for the municipality of Purmerend, as it will not receive the funding needed for proper implementation in the current political climate, placing it in the red category.

Team Size

Following the last statement of the policy officer, it appears that capacity is a problem within the municipality of Purmerend. The policy officer described that the municipality currently has “8 policy officers working on traffic and transport. These people are policy officers but are barely working on creating policy as they are all busy working on current projects”. This has also led to the municipality frequently choosing to make use of external advisors to help them with certain projects, with an example being the city centre. This shows that capacity is a real problem in the municipality and that Purmerend does not have the funding to hire additional policy officers to work on policy which could facilitate the transition. With external help (extra funding by the government) these uncertainties surrounding the capacity could be resolved, which places team size in the orange category.

Knowledge

When asked about different aspects of the transition, there was an apparent difference in knowledge about the transition compared to the case study of Haarlemmermeer. This shows that a municipality like Purmerend that has never really implemented a GOW-30 road does not have a clear picture of what it looks like. While the policy officer was very knowledgeable about the transition, he had problems projecting it on Purmerend, as current policy does not require the policy team to think about it. Overall the knowledge problem Purmerend is facing could be resolved with the assessment framework by the CROW, placing it in the orange category.

Practicability

Practicability	Major barriers that require structural changes	Uncertainties that can be solved with external help	Uncertainties that can be solved internally	In perfect state to reach desired effects
Policy Integration			x	
Laws & Regulations		x		
Current Road Design	x			

Table 9: Categories Support Base

In conclusion, this shows that the problems the municipality has in internal motivation also carry over to the practicability of the transition. Its influence on policy and the design of GOW-30 roads cannot be understated and has led to more uncertainties and barriers which need to be resolved.

Policy Integration

As described above, the municipality currently does not have lowering speed limits in its policy. The current mobility policy in Purmerend focuses mainly on housing development projects and its access roads and improving the accessibility of Purmerend with a number of projects aimed at improving traffic flow. Traffic safety is important in the municipality, but seems to be less important than these projects. Part of the reason why the policy officer gave the municipality the grade of 1 when it comes to the readiness of the municipality is because the transition is not on the agenda. While these answers give little hope for a place for the transition in future policy, the policy officer does say: *“I think there are going to be chances in the future, as Purmerend still has to make a few rigorous choices when it comes to infrastructure. The urban densification that will occur will bring opportunities, so it is not like there is no chance that we will be implementing it”*. This raises the question whether this should be seen as an uncertainty or a barrier, as there are opportunities to solve this issue internally, but it will require a different stance from the political side. However, because adding the transition to its policy is not a giant step for the municipality, it should be feasible to achieve it without major political changes. This places policy integration into the yellow category.

Laws & Regulations

In contrast to the case study of Haarlemmermeer, the problems surrounding the enforceability of the transition were only mentioned twice in the interviews with Purmerend. This could be attributed to the fact that Purmerend has not put the speed reduction in its policy, and thus has not heavily considered the problem of enforceability that extensively. The policy officer did name it as one of the largest uncertainties *“putting up a sign with 30 on it is not difficult, but how do you deal with the enforceability and the logic issues. The problem in the city centre was that the police would not enforce the 30 km/h speed limit”*. The two mentions of the enforceability issue were both by the policy officer, showing that the councillor may not have been aware yet of the issue. As this issue needs to be addressed with new legislation, it needs external help thus making this category orange.

Current Road Design

When analysing the thoughts of the interviewees on the GOW-30 roads, there were many interesting discussions when it comes to its implementation in the municipality of Purmerend. The most interesting discussion was on the implications of the lowered speed in the city centre. The external bureau made a design for their vision of a GOW-30 road, which got rejected because of its high costs and the negative influence it had on traffic flow. This resulted in the implementation of a GOW-30 road which had barely any infrastructural design principles which would slow cars down, leading to the roads still regularly having cars drive 50km/h on it. This shows a form of decision making that is trying to find a balance between improving traffic safety whilst also keeping its traffic flow at the highest level. The policy officer explained: *"The choices we can make and the consequences they have are not yet clear to us. And we wait for the translation between those two factors"*. In this, the policy officer refers to the CROW assessment framework, which is key in implementing this transition.

The councillor also expressed concerns for the GOW-30 road explaining : *"you never know 100% sure that a lowered speed will lead to improved traffic safety. That is an assumption that I think is true for the most part. But you never know for sure as certain intersections and roads could provide a whole other situation."* The doubt that is present in the municipality of Purmerend for the effectivity of the measure is a true barrier they need to overcome. The desired effects of the transition can only be reached with the appropriate measures, and as long as these are not implemented due to financial / political reasoning, it will be very unlikely that Purmerend will start to implement GOW-30 roads at a large scale any time soon. This puts the current road design in Purmerend in the red category.

Conclusions

In the municipality of Purmerend, many of the barriers and uncertainties which are presented are connected with each other. The perspective and decision-making of the governing political parties in Purmerend are detrimental to the implementation of the transition. Starting with the strong preference for improving traffic flow in its policy, this shows that the main goals in traffic policy are to improve the accessibility of the city. Unfortunately, this does not go hand in hand with decreasing speed limits, which shows why the municipality has been hesitant to implement such measures. In the situation where the municipality implemented the transition (the city centre), it was not willing to provide the funding needed for the proper implementation of the GOW-30 road. The capacity of the municipality is not strong enough to implement a transition of this size, but the municipality also did not show much intention to implement the transition, as it is not mentioned in its traffic policy.

The municipality of Purmerend is also facing uncertainties that are also not improving its chances for successful implementation. Two of these uncertainties were similar to the case study of Haarlemmermeer, namely being the enforceability and the unclarity about the design of the GOW-30 road. The other uncertainty that Purmerend faced was a lack of capacity in his policy team. In part, this can be attributed to the emphasis the municipality is putting on improving its accessibility, but this lack of capacity could also be resolved with increased government funding. This shows a clear distinction between large and medium-sized municipalities.

Overall, the municipality of Purmerend has a large number of barriers and potential uncertainties it needs to overcome before it can be implemented. Problems with internal motivation for the transition, funding transition projects, and implementing these in the right way are standing in the way of potential implementation. Political change and/or massive change in policy are the two main factors from which the readiness could be improved, as this would take away a large amount of the barriers and uncertainties described in this analysis. In the current structure, the municipality of Purmerend does not comply with the characteristics, which means it is not ready for this transition.

Variables	Major barriers that require structural changes	Uncertainties that can be solved with external help	Uncertainties that can be solved internally	In perfect state to reach desired effects
Internal Motivation	x			
Opponents			x	
External Motivation				x
Funding	x			
Size Staff		x		
Knowledge		x		
Policy Integration			x	
Laws & Regulations		x		
Current Road Design	x			

Table 10: Summary all categories municipality of Purmerend

5.4 Case Edam-Volendam

Concluding with the Case of Edam-Volendam, the smallest municipality of the case study. In this case study interviews were conducted with a policy officer from the department of Traffic & Transport and the alderman responsible of traffic and transport in the municipality from the VVD party (Freedom and Democracy Party). Interviewing the alderman instead of the councillors should provide an interesting perspective of the political side of the transition. The municipality of Edam-Volendam has not implemented a ‘real’ GOW-30 before, but are planning to on a city-centre project. As the municipality does not have a large number of 50 roads due to its size, it provides insight into the decision-making for this transition in smaller municipalities with smaller budgets and capacity. When discussing the readiness of the municipality for the transition, the policy officer answered with a 3.5/5 while the alderman gave it a 4/5.

Support Base

Support Base	Major barriers that require structural changes	Uncertainties that can be solved with external help	Uncertainties that can be solved internally	In perfect state to reach desired effects
Internal Motivation		x		
Opponents		x		
External Motivation				x

Table 11: Categories Support Base

Analysing the results of the support base in the municipality of Edam-Volendam, it seems that the uncertainties they are dealing with differ from the other two case studies. The interviewed alderman was very positive about the transition, as he described that consultations with the Amsterdam Transport Region has concretely led to the municipality opting to implement the GOW-30 in the reconstruction of the main road to the town centre. He described that within discussions with the councillors about the subject: *“That kind of discussions you can have very varied opinions on, and that’s why I mainly let myself be informed by experts, because I don’t want to project my personal opinion”*. This shows that the alderman is not heavily influenced by political opinions, giving the transition a larger chance for success.

Internal Motivation

The internal motivation within the municipality was described to be 'very varied'. The alderman said: *"We have 25 councillors, and I think we have as many opinions as we have people. Some parties value safety more, some value accessibility, some prefer the car, some prefer the bike. There are so many different beliefs that lead people to different conclusions, and it is our job to bring these opinions together to come to a result that is acceptable for the majority"*. While this quote shows that there are a lot of different opinions on the subject, it does show that they try to find the best solution and that the alderman is not blindly led by his political beliefs.

However, the political side does have some uncertainties about the transition, starting with their main point: enforceability. This major uncertainty is making it difficult for both the council as the alderman to confidently implement the GOW-30 roads. However, the alderman does see a possibility that this could be solved internally, describing: *"The main question is how problematic the council finds this problem. If the council says: they are driving 50 anyways, we are not slowing down to 30, is a possibility. But the council could also say: no, we are implementing the GOW-30 even with the enforceability issues, we want to send out a signal even if a portion of road-users exceeds the speed limit"*. Although this quote does place responsibility with the council, it does describe a viewpoint for municipalities in which they can ignore the enforceability issues.

The perspective of the policy team was somewhat uncertain, the policy officer describing that the attitude toward the transition was *"pretty positive, but we do not like the solution on the real arterial roads. People often exceed the speed limit in this municipality, so it is important that the road design fits the speed decrease; otherwise we will receive a lot of complaints from residents"*. The opinion of the policy officers did not seem very strong on the matter, and the policy officer also described that: *'If the newly elected council says there needs to be an increase in GOW-30 roads, that will happen.'* This shows that the policy team is generally on-board with what politics decide. This, combined with the strong cooperation within the council, places the internal motivation in the yellow category, in which the uncertainties could be solved internally.

Opponents

Looking into the opponents in the municipality of Edam-Volendam, both interviewees answered that *"there have not been any real opponents thus far"*. The alderman of the municipality did describe that he still has some questions concerning public transport. Most of these questions were the same as in the other case studies, that is, the traffic flow and arrival times of the buses. He did, however, also mention a new uncertainty; the financial effect this would have on the municipality. He described:

“Looking at this, it would mean that the buses would drive slower, which would lead to a demand for more buses. This would mean that these costs would have to be paid by the municipality, while the bill for public transport is already increasing due to an increase in electric transport”. This would make it financially difficult for the municipality to justify the measure to public transport companies, which means that this uncertainty would require outside help, placing it in the orange category.

External Motivation

Looking at the motivation of the inhabitants, it seems that they do not object to the measure. The alderman described: “it often happens that civilians come to us asking for a lower speed limit. This is often also paired with a demand for increased speeding-enforcement in their streets, which we sometimes cannot provide. However, there have been no large-scale demands”. The policy officer also described: “The residents and shop owners often think that parking-possibilities are the most important, there is hardly any criticism against a lowered speed limit”. A municipal survey also showed that residents put traffic safety and traffic flow as the most important characteristics of the roads, showing a positive attitude towards transition, which places external motivation in the green category.

Internal Capacity

Internal Capacity	Major barriers that require structural changes	Uncertainties that can be solved with external help	Uncertainties that can be solved internally	In perfect state to reach desired effects.
Funding			x	
Size Staff		x		
Knowledge			x	

Table 12: Categories Internal Capacity

Funding

In previous interviews, funding was often seen as a major uncertainty for small-scale municipalities for this transition. When the alderman was asked about this, he replied: “This really depends on how much time we give ourselves. It is not just about putting up a 30 sign, you need the additional infrastructural measures, which costs money. If we were to do this in the short term, we would not have the funding. But if you were to say, this transition can take 20,30,40 years, then we can combine it with maintenance, solving the financial issue”. This shows that the narrative of funding being the

issue in this transition is largely dependent on what the national goals are. If the transition needs to occur as fast as possible the vast majority of municipalities will not be able to implement the transition, if it can occur over a longer trajectory this increases the possibilities for municipalities. The policy officer did notice that the financial aspect did bring problems in the past, with earlier speed limit reductions being implemented without the necessary infrastructure measures due to cost issues. He did however not see finances as a large uncertainty, describing: *“You would say that finances are a major uncertainty but this would not have to be the case with the support of the Amsterdam Traffic Region”*. This shows that the financial uncertainties that are present in the municipality are largely dependent on the goals they set, resulting in funding being places in the yellow category.

Size Staff

The team in the municipality of Edam-Volendam consists of three policy officers working on traffic and transport. The municipality often makes use external organizations like Goudappel Coffeng, which help them with forming their future policy and traffic modelling. The policy officer sees capacity problems as a major uncertainty, describing: *“I think one of the largest uncertainties is that these are really large projects and I don't think we have the capacity to get this done. You can already see this right now, as we are postponing a lot of projects because we cannot get it done. Couple that with the fact that we think participation is really important which also takes time, and you have a lot of time and not enough workers, especially with a transition of this size”*. From this it can be concluded that external help will be needed to help the municipality with its capacity problem, placing size staff in the orange category.

Knowledge

When the policy officer was asked about knowledge within the municipality, he was very positive: *“When it comes to planning I would say yes, we have many urban planners on our team, with good cooperation from colleagues from different departments”*. As the municipality often uses consulting firms in large projects, knowledge is not really a large factor in this transition. The policy officer agreed with this describing: *“It is dangerous for a small municipality to want to do all by yourself. Mobility is very complicated, nothing is black and white and it is important to make use of as much specialists as possible when looking at urban design”*. While it is important that the staff is not over-reliant on consultancies in this transition, it does show that each redevelopment is being looked at from multiple perspectives with people with knowledge on the subject. This places knowledge in the yellow category, as it is in right state for the transition, but it is important for the policy officers to also improve their knowledge on the subject for the success of the transition.

Practicability

Practicability	Major barriers that require structural changes	Uncertainties that can be solved with external help	Uncertainties that can be solved internally	In perfect state to reach desired effects
Policy Integration			x	
Laws & Regulations		x		
Current Road Design			x	

Table 13: Categories Support Base

In the interviews the largest emphasis was put on the problems with enforceability. This seems to be a major catalyst for the municipality to be able to implement GOW-30 on more roads. In the past, the municipality has decreased the speed limit on certain roads without the appropriate infrastructure measures. However, this was more than five years ago, and the answers of the alderman suggest an emphasis on the right infrastructural measures. The upcoming years will primarily show if this is really the case.

Policy Integration

Looking at the current Traffic & Transport policy in the municipality of Edam-Volendam, it appears that speed limit reduction is not actively mentioned. The policy officer did say however that there is a new plan coming in a year which could possibly mention this, as the recent policy’s were created in 2017, before the passed national legislation which promoted the transition. Nowadays it is on their mind however, as the alderman is actively participating in working groups concerned with the subject. This shows that its inclusion in future policy is close to a guarantee, which is the only uncertainty for this variable. This places policy integration in the yellow category, as the motivation to place it in the next policy plan is present.

Laws & Regulations

The problems concerning the enforceability of the transition was named multiple times in both interviews. In particular, the alderman of the municipality was very concerned about the subject, as he described enforceability as *'by far the largest uncertainty'*. He describes that he understands why the police force not to enforce these roads as *"there are larger crimes that need to be addressed"*, but he said that it ties the hands of the municipality. The municipality often receives complaints from civilians to which they cannot offer real solutions, which makes the possibility of imposing speeding on GOW-30 roads an important factor in its implementation. The alderman described: *"There is a gaping hole between regulations and enforcement, which the government is not prepared to seriously look at. The most important factor in this is that the prosecution does not want municipalities to be able to fine those violations"*.

He also provided a solution to the financial issues it brings, describing a situation in which the municipalities can fine road users for speeding on their roads, and using the money of the fines to finance the enforcement. To conclude it seems that this uncertainty, as was the case in the other case studies, needs external help to fix. While the alderman did describe that it is possible to ignore the issue, it is an issue that needs to be resolved to improve the readiness of the municipality, which places Laws & Regulations in the orange category.

Current Road Design

As described earlier, the municipality of Edam-Volendam is planning to implement a new GOW-30 road, and has also already conducted speed limit reductions to 30 within the municipality. However, in this new GOW-30 city centre project, they face some difficulties. The enforceability and public transport issues were already a problem here, but lack of space is also often an issue. This often creates the situation in which certain infrastructure measures cannot be implemented to effectively slow down traffic, which could lead to suboptimal results. The policy officer spoke of this problem similarly to the alderman: *"The earlier speed reduction implemented in Edam is a location where they implemented road narrowing but forgot to remove the asphalt, which is why the average speed there is too high. It is not the case that we do not want to implement more GOW-30 roads, but there is a need for the appropriate space and resources to be able to implement it in the right way."*

Both the policy officer and the alderman mentioning the importance of implementing physical measures to slow down traffic is a great sign, as it shows a determination to implement the transition in the right way. The alderman did mention the problematic relationship between traffic flow and traffic safety, saying: *"Traffic flow means as little delay as possible and higher speeds, while safety*

means bringing back speed and implementing obstacles and visual aids to decrease speeds. These goals work against each other and it is important to find the right balance in design". The uncertainty of lack of space is problematic, but the answers the interviewees have given show real intent to implement the GOW-30 road more often and do this with the right infrastructural measures. This places the current road design in the yellow category, as there are uncertainties, but there the foundation is good enough to resolve these internally.

Conclusions

The municipality of Edam-Volendam showed a unique perspective on the transition from 50 to 30. Although the municipality had many of the same uncertainties as the other case studies were also facing, the interviewees were more eager to look for solutions and ask for external help to act on these uncertainties. Examples of this were the enforceability in which the alderman saw the possibility of ignoring this problem and focusing on the design, and the uncertainty of the design of the new GOW-30 road, to which the municipality of Edam-Volendam actively made use of consultancies to help them with this new concept.

The support base in the municipality for the transition will be interesting to look at, as the alderman was enthusiastic about the transition, but some councillors still had doubts. To fully persuade these councillors, it is important that some of the described uncertainties be resolved, as this will create more political backing for more extensive implementation of the transition. The capacity and funding problem presents itself as the largest uncertainties the municipality will have to face, as it makes it impossible to implement the transition in the short term while complying with the characteristics. These problems do make the municipality unready for this full transition, as with the current staff and funding shortage the transition would be occurring at a very slow rate. However, compared to the other case studies, it does seem that the municipality of Edam-Volendam has the most optimal political climate to implement this transition, making it an interesting case study.

Variables	Major barriers that require structural changes	Uncertainties that can be solved with external help	Uncertainties that can be solved internally	In perfect state to reach desired effects
Internal Motivation		x		
Opponents		x		
External Motivation				x
Funding			x	
Size Staff		x		
Knowledge			x	
Policy Integration			x	
Laws & Regulations		x		
Current Road Design			x	

Table 14: Summary all categories municipality of Edam-Volendam

Haarlemmer-meer	Major barriers that require structural changes	Uncertainties that can be solved with external help	Uncertainties that can be solved internally	In perfect state to reach desired effects
Internal Motivation		x		
Opponents			x	
External Motivation			x	
Funding			x	
Size Staff				x
Knowledge		x		
Policy Integration			x	
Laws & Regulations		x		
Current Road Design		x		
Purmerend	Major barriers that require structural changes	Uncertainties that can be solved with external help	Uncertainties that can be solved internally	In perfect state to reach desired effects
Internal Motivation	x			
Opponents			x	
External Motivation				x
Funding	x			
Size Staff		x		
Knowledge		x		
Policy Integration			x	
Laws & Regulations		x		
Current Road Design	x			

Edam-Volendam	Major barriers that require structural changes	Uncertainties that can be solved with external help	Uncertainties that can be solved internally	In perfect state to reach desired effects
Internal Motivation		x		
Opponents		x		
External Motivation				x
Funding			x	
Size Staff		x		
Knowledge			x	
Policy Integration			x	
Laws & Regulations		x		
Current Road Design			x	

Table 15: Summary all categories for the three case studies of Haarlemmermeer, Purmerend and Edam-Volendam

5.5 Conclusions of the analysis

This final paragraph will form conclusions based on the analysis performed in Chapter 5. This paragraph will mainly focus on answering the remaining research questions. This will be achieved by linking theory to the accumulated data, looking for patterns/interesting differences, describing the main uncertainties for this transition and concluding with recommendations on how the approach of these uncertainties.

5.5.1: Main uncertainties

This paragraph will describe the most important uncertainties that need to be resolved to provide municipalities with the tools to implement the transition in a way that achieves the desired effects. This paragraph will focus on the uncertainties that were placed in the orange category in Table 14, as these are uncertainties that need external help to be resolved.

Enforceability

Out of the three case studies, each municipality described the same uncertainty of the enforceability of the new GOW-30 road. This is because the policy of the police and enforcement agents is to only enforce speed-limits on roads which have the minimum speed limit of 50 km/h. Exceptions for this are only made with structural gross offences over 30 km/h roads. This creates the situation in which municipalities can implement GOW-30 roads but cannot enforce the speed driven on these roads, which gives municipalities no second option to fall back on if the infrastructure measures taken are not enough to slow traffic. As many municipalities struggle with space-related and financial issues, it is reasonable to assume that many of the GOW-30 roads implemented do not have the necessary obstacles and infrastructure measures to slow traffic to 30 km/h. Without the option of enforcement to fall back on, this would mean that the average speed on these roads would hardly decrease, leading to a situation in which the actual average speed is higher than the expected average speed, which could lead to dangerous situations.

The uncertainty of the enforceability of the measure was most often referred to in the interviews, which makes it an important challenge that needs to be resolved. From the interviews, it became abundantly clear that some municipalities will not consider implementing the GOW-30 road as long as this problem has not been resolved. This makes enforceability an uncertainty that is very harmful to the readiness of municipalities and the potential success of this transition.

Guidelines for the GOW-30 road

The second uncertainty all case municipalities were facing was the problems with the implementation of the GOW-30 road. It was clear that municipalities were in need for guidelines, as interviews with all three municipalities point out that there was not a clear idea of what the design of the new GOW-30 road would look like. Municipalities like Haarlemmermeer have struggled with this problem for years, as they design each GOW-30 in a different way, which could hurt the homogeneity of the road-category. At this moment the CROW and the Dutch government are working on an assessment framework which will help municipalities in this transition. For municipalities, it is still very unclear what this assessment framework will bring. From the interviews can be concluded that municipalities have the following demands for the assessment framework to be able to implement the GOW-30 road:

1. An assessment protocol that helps municipalities select which roads are best suited to be downgraded from a GOW-50 to a GOW-30.
2. Road design principles for the ideal GOW-30 road
3. Alternatives to Road Design Principles which can be implemented in situations where space-related issues and underlying infrastructure hinder certain infrastructural measures
4. An overview of the consequences the GOW-30 has on aspects such as traffic flow

If the CROW assessment framework contains these different elements, this will provide municipalities with the right tools to be able to implement the GOW-30 road.

Funding & Capacity

As this is a large transition, this also means that adequate funding is needed to facilitate this transition. The Delphi method applied in Appendix 1 shows that experts see funding as the largest uncertainty in this transition, as it can lead municipalities not opting to implement the transition or do so at an insufficient level. All three municipalities had financial problems related to this transition in some way or another; Haarlemmermeer municipality had difficulties accessing funds, as politics made it difficult to implement GOW 30, Purmerend municipality did not want to pay the one million euros needed for the right implementation of GOW-30 in the city centre, which led to a suboptimal end result, and concluded with Edam-Volendam municipality, which was unable to implement enough infrastructure measures to successfully downgrade a certain road to 30 km/h. Although the budget for traffic safety is increasing in the coming years (Rijksoverheid, 2018), municipalities still face difficulties in implementing the GOW-30 road.

Adding to the problem of funding is the capacity municipalities have for this transition. Due to the rise in housing development in municipalities, policy officers are often busy working on connecting roads to these new areas. Due to the large amount of projects policy officers are working on, there is often no time to work on projects related to this transition. Increased funding for municipalities would increase opportunities to hire consultants or more policy officers who can help facilitate the transition.

As the municipality of Edam-Volendam showed, funding for the transition does not need to be a problem, as long as municipalities receive enough time to implement the GOW-30 roads in combination with road maintenance. However, if the government wants to send the message that it wants this transition to occur in a shorter term, then it will need to increase the transportation budgets for the municipality to help make this transition possible. This will not only help with the implementation, but also help finance plans to deal with the negative effects the transition can bring to traffic flow and public transport.

Internal motivation

The motivation of municipalities to implement the transition is an interesting uncertainty, as it is dependent on the results of the other uncertainties. In the three case studies only the municipality of Purmerend presented structural motivational issues which prevents the transition from occurring. In the other two case studies motivational issues were mainly based on real concerns that politicians and policy workers have on this transition. The uncertainties above are based off these concerns, and in the situation in which the government is able to solve these problems, the political motivation to implement the GOW-30 will rise. Taking away uncertainties is key to creating a larger support base within municipalities nationwide, and thus the most important step in improving the readiness of municipalities for this transition.

5.5.2: Other conclusions

The analysis performed in this research provided not only the uncertainties, but also a list of other interesting results. This section will discuss the other conclusions that came out of the analysis.

Influence of municipal scale on readiness

One of the goals of this thesis was to explore the potential link between the readiness of municipalities and their scale. Looking at the case studies of three municipalities on small, medium, and large scales, this analysis provided potential insight into the differences between these municipalities when it comes to the transition. From the analysis it can be concluded that while the different scale municipalities do differ in certain aspects, they all share the same uncertainties which limit them in the implementation of the transition. When asked about whether large- or smaller-scale municipalities would have more problems in the transition, the policy officer of Haarlemmermeer suggested that smaller municipalities would have more problems as these are limited by capacity issues, while the policy officer of Edam-Volendam described that large-scale municipalities would face more difficulties in this transition as they would have to implement more GOW-30 roads, which would lead to more work.

An explanation for this lack of difference between the different scale municipalities could be that the challenges small and large municipalities face are very specific to them, which makes them experienced with dealing with these challenges and potentially solving them. This was shown by the alderman of the Edam-Volendam municipality, who reacted very calmly to the potential capacity and funding challenges the municipality would face, while the other two municipalities were more pessimistic overall. In the case of the municipality of Amsterdam however, the interview with Kuné

(personal communication, 2021) showed that they would be able to fully implement the transition on a short term, with other large cities like Utrecht following suit. When comparing this to the data of the three case studies it can be concluded that only the largest cities can have the capacity to be fully ready for a transition like this, which does show a difference. But when the number of inhabitants decreases to under the 150.000 mark, the data from this research show no inherent differences in readiness for this transition.

Uncertainty about the transition

As the transition is still relatively young, it is understandable that most municipalities do not have a clear picture of what the transition entails. This was also visible in the interviews, as there was a lot of uncertainty about the GOW-30 road and its potential implementation. When asked about the reduction of speed limits in their municipality, a large number of interviewees responded saying that they already have many roads with speed limits of 30 km / h (in this case ETW-30). Among the interviewees, most saw this transition as a transition from GOW-50 ETW-30 instead of GOW-50 GOW-30, which will be inherently different in its design and application. They also saw the transition as a full-fledged transition, in which every single 50-road would be downgraded to a 30-road, which raised their concerns about this transition. To increase the motivation of municipalities for this transition, it will be important to inform them about the structuring of this transition, so that they are able to fully assess for themselves whether they can apply this transition. Informing could also help with taking away uncertainties and questions regarding the effects of the transition.

Phases of implementation

After the analysis of the case studies, it can be concluded that these three municipalities all had similar stances to the transition. When the municipalities were asked about whether they had a passive or active stance to the transition, all case studies chose for a more passive stance, as they still had a lot of uncertainties about the transition. Relating this to the National Implementation Research Network (n.d.) framework, these three municipalities did differ in their research phases. While the municipality of Purmerend was in the first phase of exploration: when the possibility of making use of an innovation is explored, the municipality of Edam-Volendam was in phase two: Installation, when the funds needed for the transition were being allocated. The municipality of Haarlemmermeer had an interesting case, as it had already implemented the GOW-30 in certain situations, but was still not broadly applying it. But since the GOW-30 was part of their traffic policy, it can be put in phase 3: initial implementation: the first situations in which the innovation is implemented.

Looking at the transition management framework of Loorbach (2010), a similar distribution of phases can be concluded. First the municipality of Purmerend, which is still in the first 'strategic phase', which entails the structuring, envisioning and establishment of the transition arena. The municipality of Edam-Volendam is currently in the second 'tactical' phase, which includes the development of coalitions, images, and transition agendas. Concluding with the municipality of Haarlemmermeer, which is in the third 'operational' phase, which describes the mobilization of actors and executing projects and experiments. This shows while the municipalities are in different phases of the transition, this does not impact their readiness, as they all had similar passive stances when it came to the full implementation of this transition.

Safety versus speed

One of the more reoccurring themes in the interviews was the discussion of safety versus speed. Interviewees often spoke of the negative side effects the transition would have on the traffic flow of their mobility systems. In the municipality of Purmerend this negative effect on traffic flow was even seen as the main reason it did not want to see a full-fledged transition. The interviewees of the different case studies often spoke of finding 'the right balance' between traffic safety and traffic flow in their designs, which can be an impossible feat. To implement this transition with the desired effects, the speed of road traffic needs to be effectively slowed down to 30 kilometres per hour to improve traffic safety. If municipalities will try to find a way to balance safety and speed, it could lead to a compromising design in which neither effect is improved. Coupled with the fact that lowering the speed limit also comes with the improvement of subjective traffic safety, this could lead to even more dangerous traffic situations if the objective traffic safety is not also on the right level.

Traffic flow remains an important pillar in each city's mobility system, which will make it difficult in a lot of municipalities to encourage them to lower speed limits. A notable fact among the interviewees was that only one mentioned the effects the lowered speed could have on changes in the mobility system (reduced car usage, potential to use car parking spaces for other purposes). This could in the long term also improve traffic flow within municipalities, leading to an improvement in both safety and speed. To conclude, it can be noted that the strong role of speed in society will prove to be a difficult hurdle to overcome in this transition, as it can make or break municipal decision-making related to this transition.

Different perspectives experts and municipalities

Another notable conclusion about the interviews was the differences in perspectives between the expert and focus interviews. When talking about uncertainties in the transition, most experts agreed that funding would prove to be the biggest problem, while none of the experts mentioned the uncertainties surrounding the enforceability. There was also a notable difference in optimism about the project, as experts were mostly positive about the goals and effects of the transition, while the interviewees of the focus interviews were often more hesitant and distant. These differences in perspective were notable, showing there is a contrast between the supervising powers (the experts) and the executing powers (the municipalities).

Main barriers of the transition

In the case studies, several barriers were identified that could prevent municipalities across the Netherlands from implementing this transition. In the case studies only the municipality of Purmerend presented these barriers, however as these barriers are not location-specific, there is a large chance that these also occur in other municipalities in the Netherlands. The largest barrier Purmerend was facing was the support for the transition. As the municipality is very accessibility-oriented, the political parties were not in favour of lowering the speed limits. This aversion against the lowered speed limit affected the projects that sought to lower speed limits, as they did not receive the appropriate funding to implement the measures needed to effectively lower the speed. This political stance could possibly be changed with persuasion, however, will prove to be detrimental in municipalities for the transition.

5.5.3: Recommendations

This final paragraph will offer recommendations based on the conclusions of the analysis. These recommendations are aimed at improving the uncertainties presented in the Transition Governance Assessment Scheme, with the goal of increasing the awareness of organizations like the CROW and the government of the problems at hand.

Enforceability

Starting with the most often referred to uncertainty, the enforceability of the GOW-30 roads. In the current state municipalities do not have the option to enforce on roads with a 30 km/h speed limit. This provides a barrier for some municipalities, as besides the fact that enforcing the speed is an

effective measure to lower the speed, it is also an important argument for municipalities to persuade political parties to implement the GOW-30 road. By changing legislation to allow municipalities to enforce on GOW-30 roads, a major barrier is removed for the transition and it will also allow municipalities to lower the average speed on its roads, improving traffic safety.

Funding

To provide municipalities with the capacity to implement this transition, the government needs to help in the form of financial compensation. If the government wants to take this transition seriously, it is important to help municipalities that are struggling financially to implement the transition. While this could be implemented with an increase of traffic budgets, it could also be in the form of a subsidy, which the state offers to municipalities implementing this transition. As this transition is part of the Stockholm Declaration, this could also be arranged on a European level, which could also offer other countries greater incentive to participate in this transition. Eliminating this uncertainty from municipalities will prove to be a great way to accelerate this transition and improve traffic safety throughout the country.

Assessment Framework

The assessment framework that the CROW will produce to help municipalities with the transition to GOW-30 is highly anticipated. Several municipalities are carefully monitoring the progress of this framework, as they hope that this will provide them with answers to the questions they have. From the analysis performed in this thesis; the following recommendations for this framework can be offered. First, the framework must help municipalities determine which roads are best suited to be downgraded to a GOW-30. Currently, many municipalities seem to be struggling with this decision, while some think that this transition is aimed at making all GOW-50 roads GOW-30. Secondly, the framework should contain specifics about the road design principles for the ideal GOW-30 road. In addition to that, the framework should also provide alternatives to certain speed-lowering infrastructure measures for the situation in which compromising issues present themselves. Finally, it should provide municipalities with an overview of the effects of the different measures to give them all the tools to determine the best solution for themselves. If the assessment framework contains this information, it will provide municipalities with all the tools needed to implement the transition with the desired effects.

6. Conclusions and Discussion

This final chapter aims to conclude the research performed in this thesis by drawing conclusions to the research question and its main subquestions. Following the conclusion is the discussion, which will look into the different limitations this research had to face, the influence these had on the quality of the research, and its eventual solutions. The chapter is then concluded by forming recommendations for future research into this topic.

6.1: Conclusions

This thesis set out to answer the research question of:

How are identified uncertainties influencing the readiness of different-scale Dutch municipalities to reach the desired effects for the transition into a lowered inner-city speed limit?

It engaged with this question through the answering of four sub-questions which will be discussed below.

1. Which effects does the lowering of the inner-city maximum speed limit have on a city's mobility system?

From document analysis and expert interviews it can be concluded that lowering the inner-city maximum speed limit has various effects on a city's mobility system. Starting with traffic safety, this research shows that with effective implementation will decrease traffic fatalities and injuries by 22-33%, whilst also giving drivers more time to react in potentially dangerous situations, leading to a decrease in overall traffic incidents as well. Decreasing the speed limit will also lead to a restructuring of street design, offering municipalities opportunities to increase the livability of inner city roads. The transition also comes with positive effects on the environment, as this thesis shows that it can lead to a 25% decrease in CO² and NO_x emissions. These effects on traffic safety, livability and the environment can be seen as the 'desired effects' of this transition.

The analysis also shows that there are several negative effects aswell which can occur when implementing this transition. Starting with traffic flow, in which there is a risk that traffic flow on intersections and outer-city highways will decrease. It is also possible that better subjective road safety on the GOW-30 road will lead to more risky behavior from road users. However, these negative effects could be mitigated over time, as decreased traffic flow could offer opportunities for modal shifts which would lead to increased traffic flow in the long term, while risky behavior could also be solved when road users get more used to the new speed limit.

An important step however in reaching the desired effects in the transition is implementing the reduced speed limit in the right way. The analysis shows that a municipality must comply with the following characteristics if it wishes to reach the desired effects: the design of the GOW-30 road must effectively slow down road users towards the new speed limit with the use of infrastructural measures and obstacles, the GOW-30 road must be applied in as many road situations as possible to achieve homogeneity within the municipality, and the municipality must actively engage in informing campaigns and/or other behaviour modification measures to decrease risky/speeding behaviour of road users in the municipality. Research shows that failing to meet these characteristics results in insufficient speed reduction of traffic on the new GOW-30 road, nullifying the desired effects this transition brings. In the situation where a municipality is complying with these characteristics, the implementation can be done successfully and the desired effects will be achieved.

2. To which transition characteristics does a municipality need to comply to in order to be ready to reach the desired effects in implementation?

To reach the desired effects of this transition, the implementation of the transition needs to be at an optimal level. This is because the desired effects are dependent on the level of effectiveness of the implementation, an example of this is a GOW-30 road without any infrastructural changes, which would not lead to a significant speed decrease, preventing the positive effects on traffic safety from occurring. To ensure that the desired effects are reached, the analysis in this thesis formulated the 'Transition Characteristics', characteristics which municipalities must comply to in order to implement the transition with the desired effects. Each of these characteristics contributes to the slowing down of inner-city transport, leading to the desired effects. These three characteristics are as followed:

1. The design of the GOW-30 road must effectively slow down road users towards the new speed limit with the use of infrastructural measures and obstacles.
2. The GOW-30 road must be applied in as much road situations as possible to achieve homogeneity within the municipality
3. The municipality must actively engage in informing campaigns and/or other behaviour modification measures to decrease risky/speeding behaviour of road users in the municipality

Ultimately, these three characteristics will decide whether a municipality can successfully implement this transition, as they are all vital in achieving an effective speed decrease in the inner-city. The compliance to these different characteristics will ultimately determine the readiness for the municipalities to implement the transition with the desired effects.

3. What uncertainties and barriers arise from the analysis of the internal capacity, support base, and practicability of municipalities?

In the analysis, this thesis looked at the readiness of three municipalities for the transition. The readiness was determined by three main criteria: the internal capacity, support base, and practicability. The readiness of the municipalities was mainly impacted by the uncertainties and barriers that present themselves in these criteria, which made these vital for the analysis. Many uncertainties presented themselves in the support base due to the political perspective on the transition. In the case studies the motivation of the local politicians to implement the transition was often not high, as uncertainties and negative opinions had large influence on decision-making. Because local politics play a major role in the implementation of the transition in the different municipalities, the support base in the case studies often proved to be detrimental to the potential implementation of the transition. This shows that uncertainties do not only have influence on effective implementation, but also on the motivation of the support base to implement the transition.

The internal capacity, which looks at the resources and capacity a municipality has, also played a role in the readiness of the municipalities. The size of the policy staff often proved to be a problem, as the number of traffic-related projects in the municipality would often exceed the capacity of their staff. This made it more difficult for the transition to be implemented. Funding shortages often also played a role in this, as municipalities often don't have the needed finances to implement this transition in the right way. However, some municipalities showed that by implementing this transition at a slower rate would mitigate these aforementioned issues, making the impact of these uncertainties on the readiness of the municipality relatively small.

The practicability of municipalities often proved detrimental to the transition. All three municipalities in the case studies found it difficult to implement the transition, as there are still multiple uncertainties that need to be resolved. Enforceability issues and the lack of official guidelines make it very difficult for municipalities to be able to implement this transition both on a spatial as a political level. These two major uncertainties have highly impacted the readiness of the municipalities, which makes the practicability for municipalities the largest challenge for this transition.

4. In which aspects does the readiness for the transition differ in different scale municipalities?

This thesis examined the readiness for this transition for municipalities of three different scales; small, medium, and large populations. This was to investigate the possibility that the scale of a municipality has influence on the implementation of the transition. After analysing the compliance of the Transition Governance Assessment Scheme to the transition characteristics, it became apparent that

the differences between the readiness of the three different scale municipalities were rather small. The main differences were observed in the methods the municipalities used and how the projects were designed, but it can be concluded that while the municipalities in this case study between 20.000 and 150.000 inhabitants had different challenges, these did not lead to inherent differences in readiness.

However, after also looking into the example of the municipality of Amsterdam, it did become apparent that there were differences between the readiness of the municipalities, as Amsterdam is far more ready than the municipalities in the case studies. The aspects which had the most impact on these large differences were mainly centred around the municipalities differences in capacity (funding and staff), and the strong political backing the municipality of Amsterdam has for this transition. From this can be concluded that the scale of a municipality does not have a large impact on the readiness for this transition between ~20.000 and ~150.000 inhabitants, but when cities exceed this limit the improved capacity for the transition will greatly improve their readiness.

5. How are uncertainties and barriers influencing the readiness of municipalities for this transition and what can be done?

The analysis of this research showed that there are a few barriers and uncertainties which are heavily impacting the readiness of municipalities to implement this transition with the desired effects. The main barrier to come out of this research was traffic policy mainly directed to improving accessibility. The analysis showed that improving accessibility and traffic safety at the same time is a goal that can not be achieved when it comes to this transition in the short-term. This makes a strong accessibility policy a barrier to this transition, as this means that it is very unlikely that a municipality is willing to implement GOW-30 roads with the necessary infrastructural measures as this will likely decrease traffic flow. Accessibility-oriented policy often are often strongly backed by the local political climate, making it difficult to make a shift towards lower speed limits within the municipality, making this the main barrier for this transition. To solve this barrier this will need structural political changes, making it a difficult hurdle to overcome for this transition.

The data revealed that the main uncertainties that impact the readiness of municipalities are enforceability, lack of guidelines, and capacity. Starting with enforceability, municipalities are presented with the issue that the new GOW-30 roads cannot be enforced by police. This limits the possibilities that municipalities have to effectively slow down the average speed at certain locations in the municipality. As long as this wont be resolved, a lot of municipalities will be hesitant to implement the transition as it does not have effective measures to limit speeding drivers. The main solution to this would be to implement new nation-wide legislation which enables municipalities to enforce on the new GOW-30 roads, which will also help the legitimacy of this new road category.

The second uncertainty is also closely linked to the problem of enforceability; the lack of guidelines. As the transition is still young, it can be seen as logical that not many guidelines have been presented on the GOW-30 road yet, but it still is a major uncertainty for municipality's at this point in time. Municipalities that want to implement this transition still have a lot of questions about numerous elements such as which roads are best suited to be GOW-30, which road design principles need to be applied, which alternatives can be applied if the road situation prohibits certain measures (e.g. lack of space), and the effects that the measures will have on the city. The best solution to these problems is to include these elements in the assessment framework which will be presented by the CROW in cooperation with the state sometime in 2021. This would offer municipalities the support needed to effectively implement GOW-30 to achieve the desired effects.

The third uncertainty is capacity issues which harms certain municipalities. The analysis suggests that 50% of municipalities do not have the budget to effectively implement this transition, while experts also see it as the largest uncertainty for this transition. This lack of budget also affects the number of staff municipalities have in their policy teams to work on these projects. Increased funding for mobility related projects could offer municipalities the needed financial backing to be able to implement the transition. Another option could be in the form of subsidies by the state or the EU, which financially support speed limit transition-related projects for municipalities, giving municipalities the opportunity to successfully implement this transition.

Finally, to answer the main question of this thesis, it can be concluded that enforceability, lack of guidelines, and capacity issues are the main uncertainties which are influencing the readiness of Dutch municipalities to reach the desired effects of the transition into lowered inner-city speed limits. These three uncertainties prevent municipalities from complying to the Transition Characteristics, as they make it very difficult for municipalities to effectively slow down traffic in the inner-city to reach the desired effects. Capacity issues bring finance and personnel problems preventing municipalities from informing citizens and implementing infrastructural measures to slow down the speed. The lack of guidelines makes it difficult for municipalities to determine which infrastructure changes are needed to slow down traffic, while enforceability issues do not give municipalities the option of enforcing the speed limit, leaving them no options to effectively slow down traffic.

However, these uncertainties can be mitigated if the right measures are taken by the Dutch government. Whether these measures are taken will show the willingness of the Dutch state to go all-in to implement this transition nation-wide, which could benefit future generations into living in more safe, livable cities, with no need for speed.

6.2: Discussion and Future Research

This final section of this thesis will discuss the limitations within this thesis and the possibilities for future research. The limitations paragraph will look into the different problems that were encountered in the production of this thesis while future research will describe different topics this thesis did not discuss but could be interesting subjects to research in the future.

6.2.1: Limitations

Looking at the limitations of this research, this paragraph will describe why some choices were made in this thesis and how the challenges were overcome to ultimately finish this thesis. The first obvious limitation that this research endured was the Covid-19 pandemic. The pandemic made it difficult to work for a company in the form of an internship, as working from home was the norm. This ultimately led to the decision to only collaborate with the Vervoerregio Amsterdam, while a real internship could have offered some supervision which could have helped improve the eventual product. Second, the pandemic also made it difficult to interview people in person, making it more difficult to apply qualitative research. Although online interviewing did create some opportunities, it did make it difficult to actively transcribe and code the emotions and phrasing of the interviewees, which could have benefitted the research.

Another limitation of this research is the youth of the subject. As the Netherlands are the first country to implement this transition nation-wide, there are no other case studies to compare, and thus a shortage of literature on the subject. Due to this, this research had to rely on similar ideas such as car-free cities and other mobility transition ideas to form a strong theoretical foundation. The youth of the subject also led to the fact that there have not yet been any guidelines for the implementation of the transition, which made this uncertainty a somewhat obvious one. However, the lack of knowledge on the subject also led to some interesting conclusions in the interviews, which might have offset this limitation.

A concluding limitation to this research was the size of the case studies that were applied in this research. Looking into 3 municipalities with 6 total interviews makes it difficult to form real strong conclusions, due to the small data sample. However, since this research also included a substantive analysis of the effects of this transition, it made it difficult to include more interviews/case studies in this thesis because of possible time-management issues. The analysis performed on the municipalities did however give great insight into the different uncertainties and barriers municipalities are dealing with in this transition, which will help the further development into this transition.

6.2.2: Future Research

This research has uncovered the different uncertainties that are stopping Dutch municipalities from implementing the transition with the desired effects. This research can be used with pre-existing literature concerning the speed limit transition related to the case of the Netherlands to substantiate future research in this field. This research brings together effects, municipal transition governance and its challenges providing a unique insight into the subject. Future research around the subject could focus on comparing the governance challenges Dutch municipalities go through in comparison with abroad, as certain other world cities have chosen to implement this reduced speed limit (e.g. Brussels). Future research could also further delve into effects a reduce of speed would have on urban living, as prior research has primarily been focused on the spatial effects (traffic flow, safety). This could have potential as the potential improvements to urban liveability has not often been researched in literature regarding the speed limit change. In addition to that, researchers around the world should continue to monitor the progress of this transition in the Netherlands, as it has the potential to structurally change urban living for the good.

Furthermore, from the analysis in this thesis a few other interesting subjects came to mind which are related to this transition. The first subject is the importance of speed for cities. In this thesis, the case studies showed that the car culture, even in a bicycle-oriented country like the Netherlands, is still prevalent across all layers of governance. From politics to civilians, there is a strong need for accessibility within the city and preferably by car. While politicians and policy officers (both local and nationally) often speak of improving public transport facilities and promoting bicycle use, it is prevalent that the largest focus is still on improving the status of the car. It would be interesting for a research to look into the strength of the car as a status symbol in governance and how it influences decision-making in mobility discussions.

Another interesting topic related to the reduction of speed limits is the influence of the implementation of the transition on municipal policy. As this transition transcends single policy areas, it will be interesting to see whether implementation of the GOW-30 road will lead to changes in other policy areas. Will the reduced speed influence housing developments, the improvement of other modalities, changes in street design? These and others will be interesting subjects to monitor in the future to get an overview of the different effects of this transition on the city.

References

- Ausubel, J., Marchetti, C., & Meyer, P. (1998). Toward green mobility: The evolution of transport. *European Review*, 6(2), 137-156. doi:10.1017/S1062798700003185
- Barkly, T. (2009) Regulation and Voluntarism: A Case Study of Governance in the Making. *Regulation & Governance* 3, 360–375.
- Berger, G., Feindt, P., Holden, E., & Rubik, F. (2014). Sustainable Mobility—Challenges for a Complex Transition. *Journal of Environmental Policy & Planning*, 16(3), 303-320.
- Bertolini, L., Brömmelstroet, M., Pelzer, P. (2019). If a mobility transition is what we want, transport research should... *Transportation Research Procedia*. Volume 41, 824-829.
<https://doi.org/10.1016/j.trpro.2020.01.001>
- Biervliet, N., Zandvliet, R., Schalkwijk, M. & Gier, M. de (2010). *Periodiek Regionaal Onderzoek Verkeersveiligheid PROV 2009: hoofd- en bijlagenrapport*. Dienst Verkeer en Scheepvaart DVS, Delft.
- Bruzz.be. (2019, 18 oktober). *Good Move-enquête: drie op vier deelnemers wil minder plaats voor auto's*. BRUZZ. <https://www.bruzz.be/mobiliteit/good-move-enquete-drie-op-vier-deelnemers-wil-minder-plaats-voor-autos-2019-10-18>
- Bryman, A. (2016). *Social research methods*. (5th Ed), Oxford University Press, Oxford.
- Burgess, R. (1984). *In the field: An Introduction to Field Research*. (4thEd), Taylor & Francis e-library.
- Cambridge Dictionary. (2021). Meaning of expert in English. Retrieved on April 9th, 2021 from: <https://dictionary.cambridge.org/dictionary/english/expert>

- CBS. (2021). Voorlopige bevolkingsaantallen per gemeente. March 10th, 2021. Retrieved on June 3rd, 2021 from <https://www.cbs.nl/nl-nl/maatwerk/2021/10/voorlopige-bevolkingsaantallen-per-gemeente-1-1-2021>
- Chini, M. (2020, 3 maart). 'Stockholm Declaration' wants general 30 km/h speed limit in 140 countries. *The Brussels Times*. <https://www.brusselstimes.com/news/belgium-all-news/98187/flanders-hesitant-about-introducing-30-km-h-speed-limit-as-new-normal-stockholm-declaration-mobility-speed-zone-road-safety/>
- Crawford, JH. (2000.) *Carfree Cities*, International Books. Paragraph 2.1.
- CROW. (2021). Veelgestelde vragen over thema verkeer en vervoer. Retrieved on March 2nd, 2021 from: <https://www.crow.nl/ondersteuning/helpdesk/veelgestelde-vragen-thema-s/verkeer-en-vervoer>
- Curry, N. (2012). Community Participation in Spatial Planning: Exploring Relationships between Professional and Lay Stakeholders. *Local Government Studies*, 38(3), 345–366. <https://doi.org/10.1080/03003930.2011.642948>
- Deakin H, Wakefield K. (2014) Skype interviewing: reflections of two PhD researchers. *Qualitative Research*. 14(5):603-616. doi:10.1177/1468794113488126
- Dear, M. and S. Flusty, 2002. Los Angeles as Postmodern Urbanism. In: Dear, M. (ed.). *From Chicago to L.A.: Making Sense of Urban Theory*. Sage: Thousand Oaks, London, pp. 55-84.
- DiCicco-Bloom, B. and Crabtree, B.F. (2006). The qualitative research interview. In Wolcott, *The Art of Fieldwork*, "The Fieldwork Part of Fieldwork", pp. 101 – 121.

- Dijkstra, S.A.M & Weijermars, W. (2020, 9th of December). Informeren over stand van zaken onderzoek '30 km/u als norm in de stad'. Number: V&OR/UIT/2020007525. Retrieved on January 13th, 2021 via:
https://amsterdam.raadsinformatie.nl/document/9532353/1/Commissiebrief%2030%20als%20norm%20v1_0
- Dijkstra, A.; Petegem, J.W.H. van. (2019). Naar een algemene snelheidslimiet van 30 km/uur binnen de bebouwde kom? SWOV. Retrieved on January 21st, 2021 via:
<https://www.swov.nl/publicatie/naar-een-algemene-snelheidslimiet-van-30-kmuur-binnen-de-bebouwde-kom>.
- Drolenga, H. (2021). In een lagere versnelling, van 50 naar 30 binnen de bebouwde kom. SWECO. Retrieved on April 16th, 2021 via: <https://whitepaper.sweco.nl/in-een-lagere-versnelling/cover/>
- Dymnicki, A. Wandersman, A. Osher, D. Huang, L. (2014). Basics and Policy Implications of Readiness as a key Component for implementation of evidence-based interventions. U.S. Department of Health and Human Services. Retrieved on May 25th, 2021 from https://aspe.hhs.gov/system/files/pdf/77076/ib_Readiness.pdf
- Fischer, F. (2012). Participatory Governance: From Theory to Practice. *Oxford Handbooks Online*, 1. <https://doi.org/10.1093/oxfordhb/9780199560530.013.0032>
- Fung, A. (2015), Putting the Public Back into Governance: The Challenges of Citizen Participation and Its Future. *Public Administration Review* 75 (4), pp. 513-522 (10 pp.).
- Fossey, E., Harvey, C., Mcdermott, F., & Davidson, L. (2002). Understanding and Evaluating Qualitative Research. *Australian & New Zealand Journal of Psychiatry*, 36(6), 717–732. <https://doi.org/10.1046/j.1440-1614.2002.01100.x>
- Gärling, Tommy, & Fujii, S.. (2009). Travel behavior modification: Theories, methods, and programs. *The Expanding Sphere of Travel Behaviour Research*. 97-128.

Geels, F. W. (2012). A socio-technical analysis of low-carbon transitions: introducing the multi-level perspective into transport studies. *Journal of Transport Geography*, 24, 471–482.

<https://doi.org/10.1016/j.jtrangeo.2012.01.021>

Genus, A., & Coles, A.-M. (2008). Rethinking the multi-level perspective of technological transitions.

Research Policy, 37(9), 1436–1445. <https://doi.org/10.1016/j.respol.2008.05.006>

Gier, A.A.J. (2011). Kan het Tij worden gekeerd? De spanning tussen centralisatie en decentralisatie in de ruimtelijke ordening. Essays written for VROM-council. Retrieved from:

https://www.rli.nl/sites/default/files/essays_0.pdf

Gössling, S. (2020) Why cities need to take road space from cars - and how this could be done,

Journal of Urban Design, 25:4, 443-448, DOI: [10.1080/13574809.2020.1727318](https://doi.org/10.1080/13574809.2020.1727318)

Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. (2004). Diffusion of Innovations in Service Organizations: Systematic Review and Recommendations. *The Milbank Quarterly*, 82(4), 581–629. <https://doi.org/10.1111/j.0887-378x.2004.00325.x>

Häußermann, H./Haila, A. 2005. The European City: A Conceptual Framework and Normative Project. In: Y. Kazepov (ed.): Cities of Europe: Changing Contexts, Local Arrangement, and the Challenge to Urban Cohesion. Studies in Urban and Social Change, Blackwell: Malden et al., pp. 43-63.

Horst van der, Richard & Ridder, Selma. (2007). Influence of Roadside Infrastructure on Driving Behavior: Driving Simulator Study. *Transportation Research Record*. 2018. 36-44.

10.3141/2018-06.

Hufty M. 2011. Investigating policy processes: The Governance Analytical Framework (GAF). In: Wiesmann U, Hurni H, editors; with an international group of co-editors. Research for Sustainable Development: Foundations, Experiences, and Perspectives. Perspectives of the

Swiss National Centre of Competence in Research (NCCR) North-South, University of Bern, Vol. 6. Bern, Switzerland: Geographica Bernensia, pp. 403–424.

- Hysing, E. (2019). Responsibilization: The case of road safety governance. *Regulation & Governance*, 1–12. <https://doi.org/10.1111/rego.12288>
- Islam, M. T., El-Basyouny, K., & Ibrahim, S. E. (2014). The impact of lowered residential speed limits on vehicle speed behavior. *Safety Science*, 62, 483–494. <https://doi.org/10.1016/j.ssci.2013.10.006>
- Innocenti, A., Lattarulo, P. & Paziienza, M. G. (2013). Car stickiness: Heuristics and biases in travel choice. *Transport Policy*, 25, 158–168. <https://doi.org/10.1016/j.tranpol.2012.11.004>
- I&O Research. (2019, mei). *Is 30 het nieuwe 50?* https://www.ioresearch.nl/wp-content/uploads/2019/10/Is-30-het-nieuwe-50_Resultaten-Peiling-IO-Research_mei-2019.pdf
- Kahler, M., & Lake, D. (2004). Governance in a Global Economy: Political Authority in Transition. *PS: Political Science and Politics*, 37(3), 409-414. Retrieved February 24, 2021, from <http://www.jstor.org/stable/4488853>
- Klijn, E.H. & Koppenjan, J.F.M. (2014). Complexity in governance network theory. In: *Complexity, Governance & Networks*, 1 (1), 61-70. doi: 10.7564/14-CGN8
- Koster, L. & Faber, S. (2020). Quicksan effecten 50 naar 30 op verkeersveiligheid. Gemeente Amsterdam. Retrieved on April 16th, 2021 from <https://www.binnenlandsbestuur.nl/ruimte-en-milieu/kennispartners/sweco-nederland/verlaging-maximum-snelheid-van-50-naar-30-km-uur.16334501.lynkx>
- Levkovich, O., Rouwendal, J., & van Ommeren, J. (2019). The impact of highways on population redistribution: the role of land development restrictions. *Journal of Economic Geography*, 20(3), 783–808. <https://doi.org/10.1093/jeg/lbz003>

- Lobe B, Morgan D, Hoffman KA. (2020) Qualitative Data Collection in an Era of Social Distancing. *International Journal of Qualitative Methods*. January 2020. doi:10.1177/1609406920937875
- Loorbach, D. (2010). Governance: An International Journal of Policy, Administration, and Institutions, Vol. 23, No. 1, January 2010 (pp. 161–183). <https://doi.org/10.1111/j.1468-0491.2009.01471.x>
- Mahajan, V., Linstone, H. A., & Turoff, M. (1976). The Delphi Method: Techniques and Applications. *Journal of Marketing Research*, 13(3), 317. <https://doi.org/10.2307/3150755>
- Lopez-Aparicio, S., Grythe, H., Thorne, R. J., & Vogt, M. (2020). Costs and benefits of implementing an environmental speed limit in a Nordic city. *Science of The Total Environment*, 720, 137577. <https://doi.org/10.1016/j.scitotenv.2020.137577>
- Mammen, K., Shim, H. S., & Weber, B. S. (2019). Vision Zero: Speed Limit Reduction and Traffic Injury Prevention in New York City. *Eastern Economic Journal*, 46(2), 282–300. <https://doi.org/10.1057/s41302-019-00160-5>
- Madireddy, M., De Coensel, B., Can, A., Degraeuwe, B., Beusen, B., De Vlieger, I., & Botteldooren, D. (2011). Assessment of the impact of speed limit reduction and traffic signal coordination on vehicle emissions using an integrated approach. *Transportation Research Part D: Transport and Environment*, 16(7), 504–508. <https://doi.org/10.1016/j.trd.2011.06.001>
- Ministerie van Sociale Zaken en Werkgelegenheid. (2019, 17 april). *Tabel aantal inwoners gemeenten per 1 januari 2019*. Publicatie | Uitvoering van Beleid. <https://www.uitvoeringvanbeleidszw.nl/subsidies-en-regelingen/veranderopgave-inburgering-pilots/documenten/publicaties/subsidies/veranderopgave-inburgering-pilots/tabel-aantal-inwoners-gemeenten-per-1-januari-2019/tabel-aantal-inwoners-gemeenten-per-1-januari-2019>
- National Implementation Research Network. Implementation stages. Retrieved from <http://nirn.fpg.unc.edu/learn-implementation/implementation-stages>
- Nieuwenhuijsen, M. J., & Khreis, H. (2016). Car free cities: Pathway to healthy urban living. *Environment International*, 94, 251–262. <https://doi.org/10.1016/j.envint.2016.05.032>

- Noori, Negar, Martin de Jong, and Thomas Hoppe. 2020. "Towards an Integrated Framework to Measure Smart City Readiness: The Case of Iranian Cities" *Smart Cities* 3, no. 3: 676-704. <https://doi.org/10.3390/smartcities3030035>
- Nykvist, B., & Whitmarsh, L. (2008). A multi-level analysis of sustainable mobility transitions: Niche development in the UK and Sweden. *Technological Forecasting and Social Change*, 75(9), 1373–1387. <https://doi.org/10.1016/j.techfore.2008.05.006>
- Obeng-Odoom, F. (2012). On the origin, meaning, and evaluation of urban governance. *Norsk Geografisk Tidsskrift_Norwegian Journal of Geography* Vol. 66, 204_212. ISSN 0029-1951.
- Richards, DC. (2010) "Relationship between Speed and Risk of Fatal Injury: Pedestrians and Car Occupants." Transport Research Laboratory, Department of Transport, London, UK: 2010. Retrieved on the April 21st, 2021 from <https://nacto.org/references/richards-d/>
- Rijksoverheid. (2018). Het strategisch plan verkeersveiligheid 2030 Veilig van deur tot deur. Retrieved on July 8th, 2021 via: <https://www.rijksoverheid.nl/documenten/rapporten/2018/12/05/bijlage-1-het-strategisch-plan-verkeersveiligheid-2030-veilig-van-deur-tot-deur>
- Rijksoverheid. (2020). Motie tot verlagen maximumsnelheid naar 30 km h binnen bebouwde kom als nieuwe standaard. Retrieved on January 12th, 2021 via: <https://www.rijksoverheid.nl/documenten/kamerstukken/2020/11/17/reactie-op-moties-helmplicht-snorfietsen-30-km-h-in-bebouwde-kom-en-continu-voeren-autoverlichting>
- Rode, P. (2017). Urban planning and transport policy integration: The role of governance hierarchies and networks in London and Berlin. *Journal of Urban Affairs*, 41(1), 39–63. <https://doi.org/10.1080/07352166.2016.1271663>
- Rotmans, J., Van Asselt, M., Kemp, R., 2001. More evolution than revolution: transition management in public policy. *Foresight* 3 (1), 15–31.

Sartori, G. (1991). Comparing and Miscomparing. *Journal of Theoretical Politics*, 3(3), 243-257.
doi:doi:10.1177/0951692891003003001

SWOV. (2018). 30km/h-gebieden. Retrieved December 18, 2019, from SWOV-factsheet website:
<https://www.swov.nl/feiten-cijfers/factsheet/30kmuur-gebieden>

Sugiyanto, G., Jajang, & Santi, M.Y. (2019). The impact of lowering speed limit on mobility and the environment. *AIP Conference*, 1. <https://doi.org/10.1063/1.5097488>

Temenos, C., Nikolaeva, A., Schwanen, T., Cresswell, T., Sengers, F., Watson, M., & Sheller, M. (2017). Ideas in motion: Theorizing mobility transitions an interdisciplinary conversation. *Transfers: Interdisciplinary Journal of Mobility Studies*, 7(1), 113-129.
<https://doi.org/10.3167/TRANS.2017.070109>

Tranter, P. & Tolley, R. (2020). Introduction: changing cultures of speed. *Slow Cities*, 3–37.
<https://doi.org/10.1016/b978-0-12-815316-1.00001-0>

TRB (1998). Special Report 254: Managing Speed: Review of Current Practice for Setting and Enforcing Speed Limits. Transportation Research Board, Washington DC.

Upham, PJ, Virkamäki, V, Kivimaa, P, et al. (2 more authors) (2015) Socio-technical transitions governance and public opinion: the case of passenger transport in Finland. *Journal of Transport Geography*, 46. 210 - 219. ISSN 0966-6923

Verkeersnet. (2020). Motie aangenomen: 30 kilometer per uur wordt het nieuwe 50. Retrieved on January 12th, 2021 via: <https://www.verkeersnet.nl/mobiliteitsbeleid/35285/motie-aangenomen-30-kilometer-per-uur-wordt-het-nieuwe-50/>

- Vervoerregio Amsterdam*. (2017). Overzicht gemeenten Vervoerregio Amsterdam. February 3rd. Retrieved on the June 3rd, 2021 via <https://vervoerregio.nl/artikel/20170203-overzicht-gemeenten-vervoerregio-amsterdam>
- Vlakveld, WP., Goldenbeld, Ch. Twisk, DAM. (2008). Beleving van verkeersonveiligheid. Published by SWOV in 2008. Retrieved from: <https://www.swov.nl/publicatie/beleving-van-verkeersonveiligheid>
- Warren, Michael S. & Skillman, Samuel W. (2020). "Mobility Changes in Response to COVID-19". arXiv:2003.14228 [cs.SI], Mar. 2020. Via: arxiv.org/abs/2003.14228
- Wee, B. & Meurs, Henk. (2004). Land use and mobility: A synthesis of findings and policy implications. *European Journal of Transport and Infrastructure Research* 3(2)pp. 219-233. 3.
- Wegenwiki. (2020). Informatie over de Gebiedsontsluitingsweg. Retrieved on May 3rd, 2021 via <https://www.wegenwiki.nl/Gebiedsontsluitingsweg>
- Wegenwiki. (2021). Informatie over de Erftoegangsweg. Retrieved on May 3rd, 2021 via <https://www.wegenwiki.nl/Erftoegangsweg>
- Wegman, F. (1996). Road design, human behaviour and road accidents: towards a 'learning design community'. Paper presented at the International Conference 'Road Safety in Europe', Birmingham, September 9-11, 1996
- Weijermars, W. (2019). Monitor Verkeersveiligheid 2019, effectieve maatregelen nodig om het tij te keren. SWOV. Retrieved on April 14th, 2021 via <https://www.swov.nl/publicatie/monitor-verkeersveiligheid-2019>
- Yao, Y., Carsten, O., Hibberd, D., & Li, P. (2019). Exploring the relationship between risk perception, speed limit credibility and speed limit compliance. *Transportation Research Part F: Traffic Psychology and Behaviour*, 62, 575–586. <https://doi.org/10.1016/j.trf.2019.02.012>
- Zhang, S., & Witlox, F. (2019). Analyzing the Impact of Different Transport Governance Strategies on Climate Change. *Sustainability*, 12(1), 200. <https://doi.org/10.3390/su12010200>

Appendix

Appendix 1: Uncertainties and Delphi Method

The first uncertainty to come from the literature review is the problems with the financial aspect of this transition. The research carried out by Drolenga (2021) showed that 50% of municipalities do not have enough funds in their infrastructure budget to properly implement (infrastructural) changes to make the transition work. This makes full implementation of the transition impossible and could lead to the choice of 'cheaper solutions' which do not have the same effect. The second uncertainty is of infrastructural origin; How are the renewed 30-roads structured? The interview with Dijkstra & Weijermars (personal communication, March 1, 2021) revealed that it remains unclear how the new 30 km/h road will be structured. In this, the main problem could be that this uncertainty would lead to negligence in the implementation (e.g., no infrastructural changes, just a new maximum speed sign) which would lead to suboptimal results. The third uncertainty aligns with the second one, as this is mainly focused on the liveability in the situation after the transition. The transition from 50 to 30 will have to be accompanied by (infrastructural) measures to improve the quality of life, as that is one of its main goals. If municipalities opt for the simplest implementation of the new speed limit by, for example, "only putting down a sign", great opportunities could be missed in improving the liveability in the new situation.

Another infrastructural uncertainty is the effect the lowering of the speed limit will have on the hierarchy within the system. Within cities, the 50 and 30 km/h roads have different roles in the overall travel system, with the 50-roads mainly functioning as an arterial road that distributes large amounts of traffic through the city and serves as a connection to the highways (Wegenwiki, 2020), while the 30-road's main function is to facilitate slower traffic through residential areas. By lowering the inner-city speed limit from 50 to 30 could have consequences on the ways roads are being used, which could lead to dysfunction within the traffic system. Another consequence of this speed limit change is the increase in risky behaviour by road users. This uncertainty described in the article by Koster, L. & Faber, S. (2020) shows that there is a potential risk within the lowering of the speed limit for 'subjective traffic safety'. As the lowered speed will make road users feel safer, they could display more risky behaviour which could mitigate the effect the measure would have on improving traffic safety.

The last three uncertainties are mainly focused on the topic of governance. The first uncertainty specifies the unclear situation about who is mainly responsible in this transition. As the Netherlands has decentralized land-use planning to a municipal scale, municipalities are responsible for a

transition legislated by the government. In addition, there is the CROW, which provides guidelines for the implementation of the transition. The question here lies: which organization or governmental body is mainly responsible for the successful implementation of this transition? This also leads to the seventh uncertainty, namely, the willingness of municipalities to implement the transition. The transition is not mandated in any form which could lead to a free-riders-type situation in which a large number of municipalities wait and see how the implementation goes within other municipalities to 'wait and see how it goes. The transition process in this situation could then be delayed and lead to large differences in road systems between different municipalities.

The last uncertainty primarily lays on the process before the implementation. Within each transition, there are different opponents and proponents to the different measures taken and decisions made. Within municipalities, various parties do not agree on lowering the speed limit, for example politicians, fire brigades, or bus companies. Swaying public opinion in favour of the transition will prove to be vital to the success of the transition. The municipal transition governance will need to perform to 'sell the idea' to the public, increasing the chance of success for this transition. In the article by Upham et al. (2015), the importance of swaying public opinion in the context of a transition is described: "Public opinion has the potential to strengthen or weaken stresses that are internal or external to the regime ' and to constitute those stresses themselves". While convincing the public is needed, to perform the transition successfully it is important to not make to many compromises. Ultimately, the main question within this last uncertainty is: How does a municipality ensure that road safety improves in the municipality without making too many concessions?

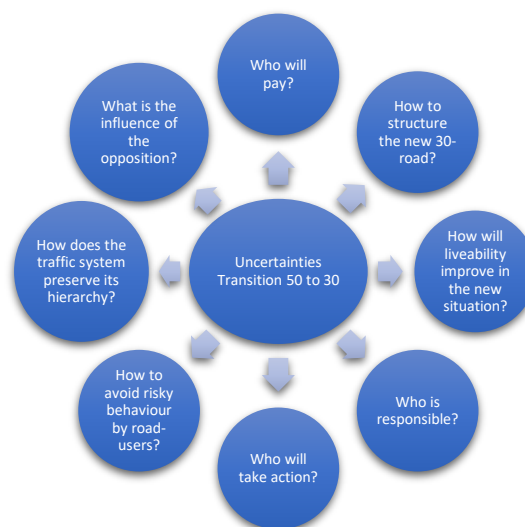


Figure 8: Analysed Uncertainties Transition 50 to 30

Results Assessment uncertainties

The uncertainties described in Figure 8 were evaluated using the Delphi method, in which six experts were asked to evaluate if these uncertainties could prove to be a potential challenge that could risk the potential success of the transition. Here, a risk for municipalities is described as chance, the uncertainty is present*potential consequence. The most highly ranked on a scale of 1 to 5 (in which 1 was no risk for the transition, and 5 is very high risk for the success of the transition) would then be used as an example case in the in-depth interviews, to see how a municipality official would assess this risk in their municipality. In the table below, the results of this Delphi method are displayed, evaluating the risk (low, moderate, or high, based on the scores given) followed by argumentation by the experts.

<i>Uncertainty</i>	<i>Risk Level</i>	<i>Average Grade</i>	<i>Argumentation</i>
Who will pay	High	4,7	The first assessed uncertainty was that of the financial question, who will pay for this transition. In the assessment by the experts, this uncertainty was ranked highest in terms of highest risk for the transition. Four out of six experts graded the uncertainty with a very high-level risk, while the other two experts gave it a high risk. The main arguments that were given were that “shortage of funding could lead to the transition not being implemented by municipalities or lead to the implementation of lower speed limits without sufficient infrastructural changes to substantiate the new speed limit”. Another expert argued that 'implementation can be combined with standard road maintenance', making large infrastructure overhauls possible.
How to structure the new 30-road?	Moderate	3,0	The structuration of the new 30-road is considered moderate risk, as the consequences are difficult to avoid. Most of the expert agreed upon the notion that in some situations it will not be possible to implement all the infrastructural changes to follow the new guidelines, making it essential that communication about the new speed limit is at a high level. In an interview with Wilms (Personal Communication, May 7, 2021) an example of this was given, as in his speed reduction project in Oostzaan it was not deemed possible to apply speed bumps to lower car speeds as the underground infrastructure could not support this. This ultimately

			led to suboptimal results as the average speed limit in the new situation could have been lower than its current 37 km/h.
How will liveability improve?	Moderate	2,8	In the case of liveability most experts agree that it is important to improve the liveability in the new situation. Most experts argue that the liveability will improve in the new situation as a result of the lower speed limit, deeming it a low risk. However, other experts also argue that it is important that municipalities possess the knowledge to improve liveability in the new situation, as improved liveability is all but confirmed when only the speed limit is lowered. This split in opinions makes this uncertainty a moderate risk.
Who is responsible?	Low	2,3	Responsibility for this transition is seen as a low risk, as all experts agree that responsibility lies completely with the municipalities as they implement the measures. However, one expert also argued that this high level of responsibility for municipalities could lead to a lack of uniformity in the implementation of the transition.
Who will take action?	Moderate	3,0	In this uncertainty, there seemed to be a lot of doubt among the experts. One expert argued that “the transition will hold more ground if a large number of municipalities implement it”, while another expert argued that “the lack of implementation in one municipality does not influence the success of a municipality that has implemented it. Other experts argued that 'only time will tell', which gives this uncertainty a large variance in results.
Influence of opposition	High	3,5	This uncertainty was rated the second highest in terms of risk. A large portion of the experts fear that certain parties like emergency services and public transport companies will oppose themselves against the lowered speed limit which could lead to compromises that may harm the implementation. An example of this from the case of Wilms (Personal Communication, May 7, 2021) is the bus company objecting to road narrowing, which led to a suboptimal design of the new GOW-30 road. Overall, this is regarded as an important factor for this transition.
Risky behaviour	Low	2,2	Overall, experts were less concerned with this uncertainty, as they argued that you cannot account for all consequences of the transition and that the overall improvement in safety should help mitigate the problems caused by increased risky behaviour in traffic.

Hierarchy in the traffic system	Low	2,3	Experts argue that the new GOW-30 road will combine the role of controlling the traffic flow within the city while decreasing the average speed on these roads. Adding to that, many municipalities will not decrease the speed limit of all GOW 50-roads, which keeps the hierarchy intact in most cases.
--	-----	-----	--

Table 15: Results Delphi Method

One of the largest potential effects of this transition to governance is an effect that cannot yet be measured, the influence of opponents. While a handful of potential opponents to this measure have been analysed (e.g., emergency services, bus companies (Dijkstra & van Petegem, 2020)), the true number of opponents to the transition are still relatively unknown, as no municipality has officially announced its implementation as of yet. A survey conducted by I&O Research (2019) revealed that from a sample of 278 cyclists and drivers, 37% voted against the new speed limit of 30 km / h, with 14% voting neutral and 49% voting in favor. Looking only at the results by drivers, this reveals an even sharper contrast with a split of 48% against 14% neutral and 39% in favour. This shows that as of now there seems to be a large group of people opposed to the idea, which will need to be persuaded to the idea, as it will prove to be very difficult to implement a transition in which almost half the population does not support it. For comparison, the implementation of car-free zones in Brussel with a reduced speed limit to 30 km/h had 71% of the population (sample of 8000) being a proponent to the transition (Bruzz.be).

Coherence between policy design, public opinion, and policy direction should aim to legitimate the policy support needed for new technologies and innovations. This means that public engagement at the right time in the right context will prove to be vital in achieving policy support (Upham et al., 2015).

Further analysis on the effects/approach of governance in this transition will be described in the next chapter with the help of in-depth interviews with municipal employees. However, the conclusions from this analysis of governance effects will be used in these in-depth interviews to fully paint a picture of potential transition governance challenges within this transition.