



Next stop: integrated and future-proof mobility hubs in Eindhoven

Understanding the implementation of
integrated and future-proof mobility hubs
through *Multi-Level* dynamics

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Colophon

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Preface

Dear reader,

I hereby present to you my Master's Thesis. This thesis has been conducted and written to finalize my Master's degree in Spatial Planning at the Radboud University in Nijmegen (specialization in Urban & Regional Mobility). The thesis is called '*Next stop: integrated and future-proof mobility hubs in Eindhoven*'. Mobility hubs have been a concept for a while now, combining different modes of transportation with each other and enabling users to switch almost effortlessly between them. But with the future on the horizon and different technologies arising, how can these mobility hubs be implemented or adapted to accommodate the technologies and user needs of the future in the city of Eindhoven? By examining and using multi-level dynamics with the framework developed by Geels (2006), this thesis aims to understand the process of bringing together new technologies, user needs, involved governments, and the broader sustainability and technology trends.

During the making of this Master's Thesis I received help from several people I would firstly like to thank. First of all, my supervisor dr. Iulian Barba-Lata from the Radboud University. The feedback received from him and the comments on my progress helped me managing and structuring my thesis a lot better, especially after struggling with my thesis at the start of the process. I also want to thank all the other students who followed the Spatial Planning study alongside me, sharing ideas and discussing with them throughout the different courses have led to me gaining a lot more different insights on certain topics.

Last but not least I want to thank all my family and friends for their unconditional support. I have received extra lessons from a close friend so I could finally obtain my Bachelor's degree at Wageningen University, and I have received a lot of help from other friends and my family to support me complete courses and write papers. Going through more difficult times when COVID-19 hit and throughout my Bachelor, I always felt their support and their belief in me.

Hopefully you will enjoy reading my Master's thesis.

Jesper van Leeuwen



Summary

This thesis has investigated and explored the implementation of integrated and future-proof mobility hubs in the city of Eindhoven. It is investigated how this implementation is shaped by multi-level dynamics based on the MLP framework by Geels (2006). This MLP framework consists of three levels: landscape, regime and niche. Combining both interviews with experts, an extensive document analysis, and a survey which was conducted amongst 142 inhabitants of Eindhoven, the thesis aimed to answer the main research question: *Which challenges and opportunities shape the transition towards the implementation of integrated and future-proof mobility hubs in Eindhoven through an understanding of Multi-Level dynamics?*

At the landscape level, dynamics such as climate change, digitalisation and overarching societal challenges have been studied. These serve as crucial external pressures which influence the implementations of mobility hubs. Stakeholders and experts emphasize the urgency to battle the climate change which the city experiences. Together with digitalisation and societal challenges, the interviewed expert feel like these are the most crucial landscape pressures.

The regime level has investigated the interactions and cooperation between different governmental levels involved in the implementation of mobility hubs. These different governmental levels are national, provincial and municipal. The national government is mainly responsible for handing out subsidies. The provincial government own most of the mobility and public transportation and the municipality is responsible for the public space on which the plans have to be realised. The users and inhabitants are also part of the regime level. They are influenced by the dominant top-down planning which is mostly present right now and a change in their behaviour and needs is necessary to make mobility hubs successful in the city.


At the niche level of the MLP framework, technologies such as the further electrification of vehicles in the city as well as the implementation of shared mobility options will contribute to the future-proofness of mobility hubs. Technologies such as AI and autonomous vehicles are still too speculative, and experts mention that it is too early to draw conclusions for it.

This analysis has revealed that Eindhoven is very well positioned when it comes to their ambitions and openness to experimentation. However, the mentioned governmental barriers and the needs and behaviour of users and inhabitants remain big obstacles in the implementation process.



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1. Introduction


In these times of rapid urbanization and evolving transportation technologies, cities are seeking innovative solutions to address the faced mobility challenges (Medina-Molina et al., 2022), including the city of Eindhoven. Mobility hubs, being transportation centres integrating different modes of transportation (Arnold et al., 2023), can offer a promising approach to improve connectivity by promoting sustainable travel and improving accessibility. This thesis will therefore aim to better understand how the city of Eindhoven can streamline the implementation of ‘Mobility Hubs of the Future’ which go further than the traditional transportation hubs. The focus will be on researching the *niche* innovations which influence the design of mobility hubs, the transportation *regime* in Eindhoven which influences the integration of mobility hubs and the overarching *landscape* developments and broader trends which influence the transition towards integrated and future-proof mobility hubs. To conduct this research, the MLP (Multi-Level Perspective) framework developed by Geels (2006) will be used.

1.1 Problem Statement

The mobility systems of urban regions across several different countries in Europe are facing substantial transformations to comply with the rising environmental concerns, the changing user needs, upcoming technological innovations and pressure from designed policies (Banister, 2008; Marsden & Reardon, 2017). Investing in intermodal transport and accessible areas in which multiple modes of transportation come together (think for example of public transportation, car-sharing, cycling and other forms of micromobility services) has led to the city of Eindhoven and the Netherlands as a whole to be frontrunners in investing and developing mobility hubs (KiM, 2021).

These investments and developments can be found in the ‘Masterplan Mobiliteit 2050’ which was created by the Gemeente Eindhoven (2024). In this vision document, the municipality talks about their goal to implement new mobility hubs and improve the already existing mobility hubs in the city. According to the municipality, the hubs should have three functions: offering shared mobility options, facilitating the transfer between different modes of transportation and lastly reducing the usage of private cars by (remotely) parking these cars (Gemeente Eindhoven, 2024). The municipality also plans to distinguish different sizes of mobility hubs in the city. The largest mobility hub is located at Eindhoven Airport, where the city wants to create an important international node. Train station ‘Eindhoven Centraal’ is seen as the central mobility hub for the city as this is the place where local, regional and national travel is concentrated. Lastly, the city aims to develop smaller neighbourhood mobility hubs in which users can use bikes, scooters and shared cars to travel in the city or in the nearby region (Gemeente Eindhoven, 2024).

Mobility hubs often have the goal to contribute to a more sustainable urban environment. Not only that, but these hubs also aim to reduce private car usage and promote shifting between transportation modes. Eindhoven shares these ambitions (Gemeente Eindhoven, 2024). There is another clear distinction present in the envisioned mobility hubs and the current mobility hubs in the city. The existing mobility hubs are mainly focused on the physical infrastructure and are limited in scope and integration. The envisioned mobility hubs aim to be integrated (physical, digital, social, institutional). This will be further explored in this thesis to see if current practices are in line with the envisioned mobility hubs. However, even though the ambitions of these mobility hubs are clear, the actual implementation of mobility hubs are often fragmented and inconsistent. This can best be seen when looking at the integration and long-term viability of modern mobility hubs (Canzler & Knie, 2016; De Boer, 2022). Development of mobility hubs often experience systemic hinderances. Frameworks for spatial planning, non aligning innovations and regulations, together with isolated institutional responsibilities are examples of what some of these hinderances for development could be (Smith et al., 2010). Modern day implementations of mobility hubs are questioned on whether these are ‘integrated’. This because current mobility hub projects emphasize their physical



infrastructure over digital, behavioural and institutional integration (Van den Berg, 2022). The flexibility to emerging technologies together with changing societal needs such as climate resilience often lack in the development of mobility hubs, even though these hubs are often framed as adaptable (Giourka et al., 2020).

Because of this complexity, it is important to understand how innovations in the mobility infrastructure works through socio-technical processes which includes several different actors and interests. To do this, this thesis uses the 'Multi-Level Perspective (MLP)' on socio-technical developments (Geels, 2006). Understanding the dynamic interactions between niche innovations (MaaS platforms, hydrogen, solar charging, etc.), the socio-technical regime (municipality, national policy, transit providers, etc.) and the landscape level (overarching climate goals, demography, digitalization, etc.) through the MLP framework will help this thesis to understand these interactions.


With the 'Toekomstbeeld OV 2040' (Ministerie van Infrastructuur en Waterstaat, 2021) and the 'Klimaatakkoord' (Ministerie van Economische Zaken en Klimaat, 2021), the Dutch government has developed national strategies. However, between these national policies and plans, and municipal spatial planning and development, the alignment is often lacking, and they often lack coherence. As can be read in the 'Masterplan Mobiliteit 2050' (Gemeente Eindhoven, 2024), the municipality speaks out their ambition of implementing and adapting mobility hubs. Yet, concrete plans on how these mobility hubs are developed, governed, and made integrated and future-proof are not fully described or mentioned. This thesis will therefore aim to not only address the technical and infrastructural characteristics of mobility hubs, but will also address the governmental, institutional, and planning characteristics in the city of Eindhoven.

1.2 Research Aim & Research Questions

The aim of this thesis is to understand the implementation of integrated and future-proof mobility hubs in the city of Eindhoven. This is done through investigating Multi-Level dynamics. Using the Multi-Level Perspective (MLP) developed by Geels (2006) will help this thesis to do so. Cities like Eindhoven are constantly transitioning towards more sustainable and digital mobility systems. These mobility hubs often have the goal to facilitate the switch between different modes of transportation, reduce the usage of private cars, and promoting more last-mile mobility options. However, these mobility hubs often fail to accommodate a full integration and future-proofing.

This thesis aims to investigate the current situation of mobility hub development and implementation in the city of Eindhoven by looking at the governance dynamics, barriers and identifying the opportunities. Investigating what the user needs in Eindhoven are, together with investigating stakeholder perspectives and institutional frameworks will enlighten how the mobility hubs in Eindhoven are developed and realized. This in combination with spatial and technical innovations, the mobility hubs' adaptability to future needs and integration as well as overarching developments such as electrification and automation will help to answer the research questions which can be found below.

By using the MLP framework, this thesis covers how *niche* innovations in combination with *regime* structures and *landscape* developments interact and ultimately shape the path of the implementation of mobility hubs in Eindhoven. Ultimately, the goal of this thesis is to provide insights for policymakers and spatial planners (and possibly mobility providers) to develop and implement mobility hubs which are not only functional but also integrated and future-proof.



This aim of the thesis had led to the following intervention question (IQ):

How can integrated and future-proof mobility hubs be implemented to meet the current and emerging mobility needs in Eindhoven?

This intervention question will be answered in the 'recommendations' chapter of this research. In order to be able to answer this intervention question, the following main research question (MRQ) has been constructed:

Which challenges and opportunities shape the transition towards the implementation of integrated and future-proof mobility hubs in Eindhoven?

To help answer this main research question, multiple sub-questions have been formulated and will be answered. These questions are:

1. *How do overarching landscape developments and broader trends shape the transition towards integrated and future-proof mobility hubs?*
2. *What are key characteristics and practices that shape Eindhoven's transport regime and influence the integration of mobility hubs?*
3. *What niche innovations can influence the design of mobility hubs to be integrated and future-proof?*

1.3 Reading Guide

In **Chapter 2**, both the societal relevance as well as the scientific relevance of this thesis will be discussed. After that chapter is completed, this thesis will address relevant literature and theories from scientific articles in **Chapter 3**. These scientific articles will be critically reviewed and are used to base the rest of this research upon. In this chapter, a theoretical framework is presented which is used to investigate the main research question. Subsequently, **Chapter 4** discusses which the methodology of this thesis is discussed. This includes the research strategy, the data collection methods and the analysis methodology. In the following **Chapter 5**, the results of this thesis will be presented. This is done by presenting the findings along the main themes of this thesis. In **Chapter 6** this thesis will present the discussion, giving a broad answer and interpretation on each of the sub-questions, as well as presenting recommendations for future research. In the final chapter, **Chapter 7**, the overall conclusion will be given by providing a closing answer the sub- and main research question(s). This chapter will also present the limitations of this research and ends with recommendations for praxis of this thesis.

2. Societal & Scientific Relevance

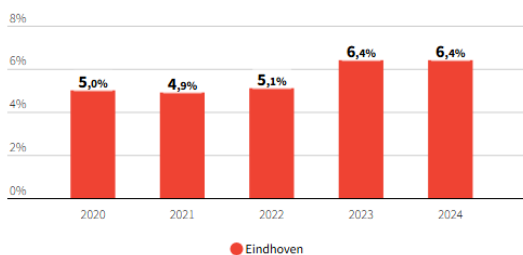
2.1 Societal Relevance

Nowadays, the world has to cope with an acceleration of climate change, the rapid growth of cities and social inequalities. Cities therefore experience pressure when it comes to creating and implementing more sustainable, inclusive and adaptable transportation systems. The Netherlands has placed itself on the map as an innovator for integrated mobility planning, these plans however often fail to effectively be transferred from national policies to locally integrated and future-proof infrastructure (Pojani & Stead, 2015). These newer mobility hubs are often promoted as being enablers for smart city developments, as well as being sustainable, enhancing last-mile connectivity and providing options for shifting modes of transportation. In practice however, these mobility hubs often fail to achieve full integration and future-proofing when it comes to technology, spatial property and governmental cooperation (Canzler & Knie, 2016; Bertolini et al., 2005).

This thesis will explore what the challenges are in the city of Eindhoven. The city of Eindhoven is often seen as high-tech, and the municipality actively uses urban experimentation. As cities, including Eindhoven, keep moving forwards towards carbon neutrality and sustainability, it is socially important to understand how the users of these mobility hubs interact with them and how these mobility hubs are shaped by institutional structures (Banister, 2008). Designs or institutional coordination which lack user-centric design can lead to fragmented services and an underutilization of the implemented infrastructure. Not only that, but this lack of user-centric design can also lead to negatively impact vulnerable groups within a society and further increase the mobility inequalities in a city (Sheller, 2018; Curtis et al., 2019). At more local levels, the urban accessibility, travel behaviour of everyday life and the inclusivity are influenced by the design and implementation of mobility hubs. In mobility hubs in Dutch cities the different needs of the users, especially when it comes to spatial distribution, long-term adaptability and the integration of digital services are often lacking despite growing investments (Sochor et al., 2018; Bertolini et al., 2005). When these mobility hubs are not planned with the needs and preferences of the users in mind, the mobility infrastructure risks being underutilized and can create a larger gap between different socio-economic groups within society. This also happens when travel patterns and socio-demographic contexts are insufficiently considered in the design process. The coordination and cooperation between authorities such as the municipality, province, mobility providers etcetera is also important. The absence of the coordination and cooperation can lead to a fragmentation of services and missed opportunities to achieve multimodal connectivity in the city (Marsden & Reardon, 2017).

As the city of Eindhoven keeps growing (figure 1 & 2), the implementation of new mobility hubs in combination with new technologies and innovations are inevitable. The societal relevance of this thesis therefore lies in not only the creation of sustainable and efficient mobility hubs, but also in creating more user-friendly/centric designs, hubs that can adapt to future needs and dynamics, and more inclusive mobility hubs.

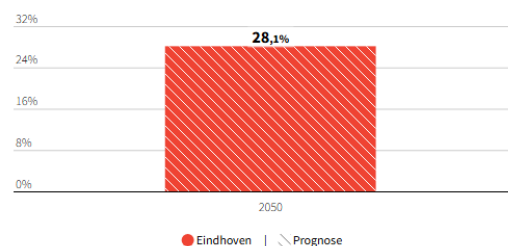
Groei bevolking afgelopen 5 jaar



CBS | 2020 - 2024

Figure 1: Population growth in last 5 year (Gemeente Eindhoven, n.d.).

Bevolkingsgroei (cijfers t.o.v. 2024)



ABF - Primos 2024 | 2050

Figure 2: Population growth in 2050 compared to 2024 (Gemeente Eindhoven, n.d.).





2.2 Scientific Relevance

Regarding the scientific relevance of this Master's Thesis, it can be said that it is mainly due to the contribution to a lesser investigated area in the research to urban mobility. This lesser investigated area is that of the analysis of complex governmental structures in the planning process of mobility hubs (Hansel, 2025). Frameworks regarding the policy, such as the earlier mentioned 'Toekomstbeeld OV 2040' (Ministerie van Infrastructuur en Waterstaat, 2021), do exist and encourages the integration of multiple modes of transportation and digital services like apps and real-time data. However, academic literature study uncovers that the translation of these ambitions to the build environment often lack empirical insights, especially when investigating cities with a regional innovation impact like Eindhoven (Van den Berg, 2022; Jansen et al., 2021).

Through case studies in larger metropolitan areas around the world, the existing research has examined and mentioned smart mobility in relation to multi-modal mobility at more conceptual levels (Angelidou et al., 2025). The specific processes of the involved governmental bodies, the spatial integration of these mobility hubs, and the coordination between the relevant stakeholders are however still fragmented in existing literature (Noori, 2021). Some studies explain that numerous projects disregard the institutional dimensions as well as the social aspects of mobility hubs. Especially when it comes to long-term adaptability and usability, even though the technical integration into the mobility hubs is upcoming (Borsboom-van Beurden et al., 2023).

This thesis aims to investigate the research gaps by researching mobility hubs in the city of Eindhoven. How this will be done is by examining the different dimensions of the integration of mobility hubs. These dimensions are spatial, social, technological and institutional. Furthermore, this thesis will investigate how these dimensions are coordinated with each other and eventually implemented. The research of this thesis therefore contributes to understanding urban transitions. Researching what the links are between the implementation of the infrastructure and the necessary governance and policy practices, which is often lacking in transport planning sources (Poels, 2022), will help us to do so. With that, the investigation into what the user needs and wishes are when designing mobility hubs will contribute to gaining a better understanding of how mobility hubs can be implemented to be more inclusive and serving everyday travelling needs. This is also an aspect which is often lacking in existing literature (Eijnden, 2017).

Not only that, researching the future-proofing of the infrastructure of mobility hubs and understanding how this can best be done is another aim of this thesis. Doing research into this aspect of the thesis will include the investigation into resilience, the flexibility and also the adaptability to unpredictable and uncertain technological and societal developments and challenges. This is important to examine when aiming to understand the future-proofing of mobility hubs (Neef, 2025). Because mobility hubs are more and more implemented and positioned as nodes for smart and more sustainable transportation, this thesis will help to better understand how that future-proofing should look like and what needs to be done to realise those ambitions.



3. Literature Review & Theoretical Framework

To further investigate the case of Eindhoven and the development of integrated and future-proof mobility hubs, it is important to dive deeper into scientific literature. The coming section will discuss the most important aspects of integrated and future-proof mobility hubs, as well as further elaborating the usage of the MLP (Multi-Level Perspective) framework constructed by [Geels \(2006\)](#). The following section will firstly discuss the role of overarching urban mobility transitions and the mobility paradigms. After that, this thesis will dive deeper into the explanation of what a mobility hub is and what their function should be. Next, this thesis will investigate how full integration and the concept of future-proof mobility/infrastructure are defined. After analysing literature on the concept of integrated and future-proof mobility hubs, the MLP framework will be further analysed in relation to socio-technical transitions. The thesis will then have a look at the positioning of mobility hubs within the MLP framework. In the following section, an analytical framework and an operationalisation will be developed where the rest of the thesis will be built upon. Lastly, this chapter will conclude why the mentioned theory contributes to this research and the design of the thesis.

3.1 Urban Mobility Transitions & Emerging Paradigms

Rapid transformations are happening when it comes to the development of urban mobility systems. These transformations are formed by an increasing pressure of the changing climate, the increasing urbanisation and the technological innovations in combination with digitalisation. Car-centric infrastructure and transportation models are more and more being replaced with more sustainable systems which also take multimodal transportation and integration into account. These newer mobility infrastructures prioritise to minimize environmental impact, the efficiency and lastly the accessibility of modern transportation ([Banister, 2008](#)). These transitions regarding the mobility infrastructure are not only technological changes but also include socio-institutional transitions. Changes in governmental procedures, models for funding, public needs/wishes, and the behaviour of the users of modern-day mobility ([Marsden & Reardon, 2017](#)).

This mobility transition shows that a systematic shift is happening from a dependency on fossil-fuels to more shared mobility options focussing on a reduction of emissions and more sustainable modes of transportation. This transition is further emphasized when looking at the boost of alternative modes of transportation. Modes such as micromobility (scooters, segways, etc.), public transportation and the usage of e-mobility are increasingly combined with digital services to ease the usage of these different transportation modes ([Smeds & Jones, 2021](#)). The mobility hubs are designed as an important urban node where different modes of transportation come together, change of mode is facilitated and where last-mile transportation is provided.

Looking at the European context of the mobility transition, the [European Commissions'](#) (2020) 'Sustainable and Smart Mobility Strategy' reveals that they encourage the trend of promoting more integrated and sustainable urban mobility. With the Dutch policy of the 'Toekomstbeeld OV 2040' from the '[Ministerie van Infrastructuur en Waterstaat](#)' (2021), the Netherlands can be seen as a frontrunner when it comes to developing integrated, user-centric and sustainable urban transportation.

These mobility transitions can be seen as non-linear and happen on multiple different scales. This demands a good coordination across several governmental levels, as well as coordination between other involved stakeholders. However, the concept of Mobility-as-a-Service (MaaS) is often cited and mentioned as a critical aspect of the integration of multiple services into singular user connectivity ([Hensher et al., 2020](#)).

The table (table 1) below shows us what the main characteristics are of both traditional mobility trends and paradigms, as well as the emerging trends and paradigms. The table highlights the transition towards more integrated, digital and lastly sustainable modes of mobility.

ASPECT	TRADITIONAL MOBILITY	EMERGING MOBILITY
MODE OF TRANSPORTATION FOCUS	Private car usage	Multimodal usage (cycling, public transportation, shared, etc.)
PLANNING OF INFRASTRUCTURE	Driven by infrastructure supply	Driven by user-centric design and demands
USAGE OF TECHNOLOGY	Non-connected systems	Integrated digital platforms such as MaaS
IMPACT ON THE ENVIRONMENT	Higher emissions	Low to zero-emission goals
GOVERNMENTAL	Top-down and more isolated governmental bodies	Coordination and cooperation between multiple governmental levels

Table 1: Differences between traditional & emerging mobility (Authors' own, 2025).

Researching and investigating why these mobility transitions are important is useful for understanding the design and implementation process of mobility hubs in Eindhoven. The new mobility hubs are not only a product of technological advancements but are also shaped by a changing societal view of the worlds which shapes the ideas of new urban mobility.

3.2 The Concept of Mobility Hubs

As mentioned before, mobility hubs are a rising aspect when it comes to modern day urban mobility. Especially when keeping sustainability and integration in mind. Mobility hubs can be defined as a strategically chosen sites where different modes of transportation and services come together, typically connecting public transportation with micromobility and shared mobility options with a digital information infrastructure (Casady, 2020). This concept of a mobility hub is not only to function as a node for transportation but also aims to change the behaviour of users by providing seamless transfers and inter modality, therefore promoting more sustainable ways of mobility in the city (Pangbourne et al., 2020).

Mobility hubs can vary in different forms and scales. Weustenenk & Mingardo (2023) have developed a typology for this. They classify mobility hubs according to their functionality and spatial properties. The classification also includes the scale of the operation and the integration of services (figure 3). Their typology enables a comparison between different hubs in urban contexts and enables us to better understand their strategic value.

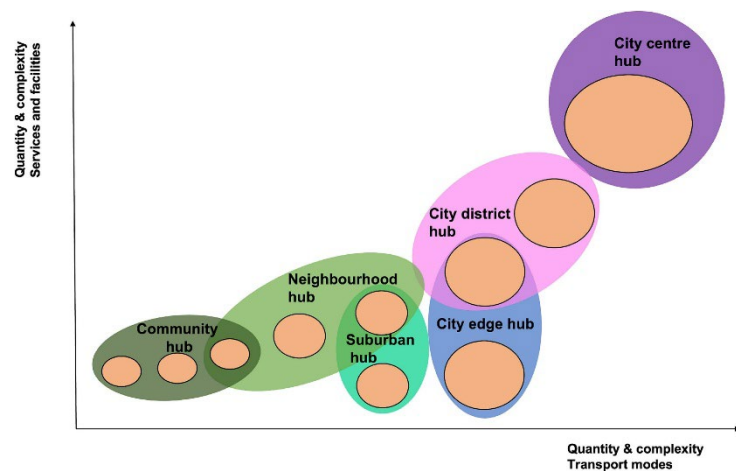


Figure 3: Typology of mobility hubs (Weustenenk & Mingardo, 2023).

Furthermore, the design of modern-day mobility hubs is guided by context specific properties which supports the compact development of urban spaces (Givoni & Banister, 2010), examples of this can be the reduction of car dependency in the city or supporting the last-mile connectivity. Further mentioned is that mobility hubs can also benefit from realizing value-added services like parcel collection points, meaning that the packages people order online can be retrieved at the desired mobility hub (Dorner et al., 2020).

To determine whether a mobility hub can be regarded as successful or not depends on many factors which need to be integrated. These factors can be physical, technological, institutional and more. The physical dimension can, for example, be seen as the determination of the location and the availability of smooth transitions between modes. As mentioned before, the digital integration and the rise of the MaaS concept will become a more important dimension in the future (Sochor et al., 2018), being an example of the technological dimension.

Researching the complex components and dimensions of mobility hubs is important to gain insights on their effectiveness in the real-world. Mobility hubs are not just physical objects but do also serve as spaces that reflect the changing view on urban transportation and user behaviour. The city of Eindhoven and its innovative nature can therefore serve as a great experimental city to enable the development of integrated and future-proof mobility hubs.

3.3 Integration in Urban Mobility

When aiming to develop sustainable, effective and user-friendly mobility hubs, the integration is a crucial aspect in the development stage of mobility hubs. Integration within the broader subject of mobility hubs refers to the level of interconnectivity between modes, available services and governmental structures, all to enhance the experience for the users (Curtis & Scheurer, 2010). This concept of integration in the design of mobility hubs involves the inclusivity in the design, the institutional collaboration, and lastly the interoperability of digital services. The integration can therefore serve as an aspect on which the performance of mobility hubs can be evaluated, which is especially important given that urban mobility is becoming increasingly multimodal and more service-based.

Integration can be defined by multiple properties. These properties can for example be spatial, institutional, digital and socio-economical. The spatial integration of mobility hubs refers to the way multiple mobility options are physically distributed within certain easily accessible site (examples of this are bus terminals, pedestrian pathways, etc.). According to Papa & Bertolini (2015), this spatial integration leads to the reduction of time loss when changing modes of transportation and also enhances the convenience of mobility hubs. When talking about the institutional integration with mobility hubs, Mukhtar-Landgren et al. (2016)

mention that it refers to the collaborative planning and coordination between different involved stakeholders such as the municipality, the province, the mobility providers and private service providers. Their study has led to the chart at the right (figure 4), visualizing the interplay between different stakeholders.

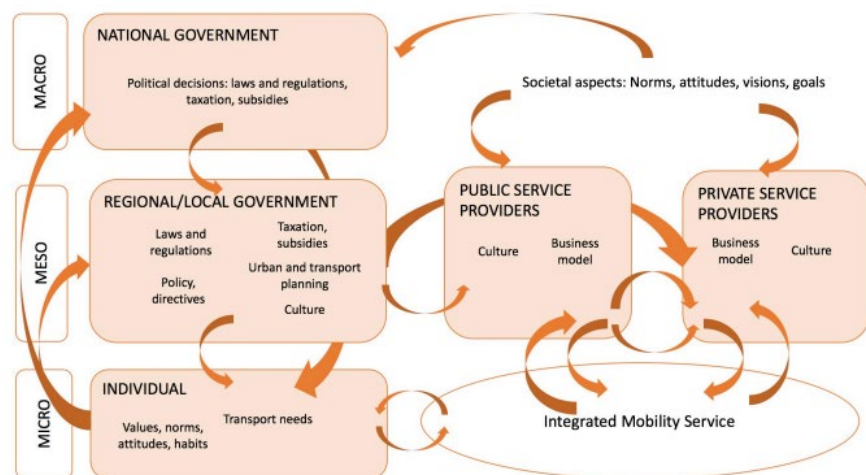


Figure 4: Web of interactions (Mukhtar-Landgren et al., 2016).

Furthermore, the digital integration when designing mobility hubs will play a more important role in the future. With the rising concept of MaaS, the digital integration has significantly increased in relevance. The MaaS concept involves digital integration when it comes to payment systems, platforms to book tickets and real-time information about the desired mode of transportation (Sochor et al., 2018). Here, a distinction can also be made between different levels of digital integration. Sochor et al. (2018) have made a scheme (figure 5) in which these distinctions are visualised, and where examples of these services can be seen. We can see that the distinction is



Figure 5: Proposed typology of MaaS (Sochor et al., 2018).

made between 4 different levels of the MaaS concept. Level 0 means that there is no integration at all and that services operate separately from each other. Level 1 indicates that there is integration of information. Ticket information and a travel planner are available. Level 2 indicates that tickets can be booked and purchased through the digital service. Level 3 shows us a complete coverage of the mobility needs of the users, from morning to evening and from door to door. This can be done through subscriptions

and/or contracts. Here, the responsibilities are shared between the providers and the users. Level 4 indicates that the national and local policies can be combined with the digital services which are provided. Incentives can therefore be implemented into the MaaS service (Sochor et al., 2018). When speaking about the socio-economic integration part of mobility hubs, the integration means that the hub is accessible for all user groups (including disabled people, elderly or financially less wealthy) and are designed with inclusivity and equitability in mind (Lucas, 2012).

While achieving full integration in practice is often not achieved, due to fragmented institutions and governmental bodies and technological standards for example, understanding that the concept of integration is significant in the development of resilient and future-proof mobility hubs remains important.

3.4 Future-proofing Mobility Hubs

Talking about the rapid evolution and innovation of technology, the increasing attention for climate change and the world view of how society should behave, the term 'future-proof' when talking about mobility and transportation has had an increase as a critical aspect of designing urban spaces and transportation planning. The term 'future-proof' can best be described as a term capturing infrastructure which is not only designed to meet the current needs of mobility and society but also designed to be resilient and adaptable for uncertain future developments (Pollalis et al., 2013; Georgiadou, 2014). This term is becoming more crucial in urban mobility planning. The new infrastructure should accommodate advanced and emerging technologies, be prepared for the shifting travel behaviour of the users and tackle the most important climate challenges we face nowadays.

Future-proofing in the context of designing and implementing mobility hubs is more than just accommodating new technological innovations. According to Neef (2025), the concept of future-proofing mobility and its infrastructure also encapsulates the integration of flexibility regarding spatial design, system design and flexible governmental bodies which can accommodate future retrofits or the extension of services which are possibly needed in the future. Examples of flexibility which can make mobility hubs more future-proof are scalable layouts, an infrastructure with smart energy consumptions, mobility hubs with multiple different uses (workplaces, package retrieval) and the ability to integrate digital services like the before mentioned MaaS services. The 'Ministerie van Infrastructuur en Waterstaat' (2021) have also mentioned these ambitions in their 'Toekomstbeeld

OV 2040) document. In that document, the government calls for mobility hubs and transportation which are connected, sustainable and reliable.

More academic literature teaches us that the main challenges for implementing future-proof mobility hubs and infrastructure are the lack of common shared standards or metrics which are used for the evaluation of resilience and the adaptability of mobility hubs (Georgiadou, 2014). When talking about future-proofing, it is better to talk about it more as a process rather than being a fixed and tangible state. According to Walker et al. (2013), future-proofing does not mean that we should predict the future, the concept of future-proof should be more about designing and implementing systems that are robust and are open to retrofitting whenever the situation calls for change. The focus should be on resilience and flexibility, which are fitting concepts when talking about the fast-changing urban environments.

3.5 The Multi-level Perspective (MLP) on Transitions

To help with understanding how bigger-scale transformations happen within or socio-technical system such as mobility and infrastructure, the so called 'Multi-level Perspective (MLP) developed by Geels (2006) will help us to do so. This framework provides a lens through which these transitions can be evaluated. The MLP framework explains the transition on larger scales as a result of dynamic interactions between three levels which can be analysed (figure 6). As can be seen in the figure, the levels which are distinguished are *niches*, *regimes* and the *landscape* level. The levels each represent a varying layer of both structure and the influence each level has. These influences in the bigger system help us to understand how technological innovations together with institutional changes and habits combined with the overarching pressure of the landscape level shape the transition over time.

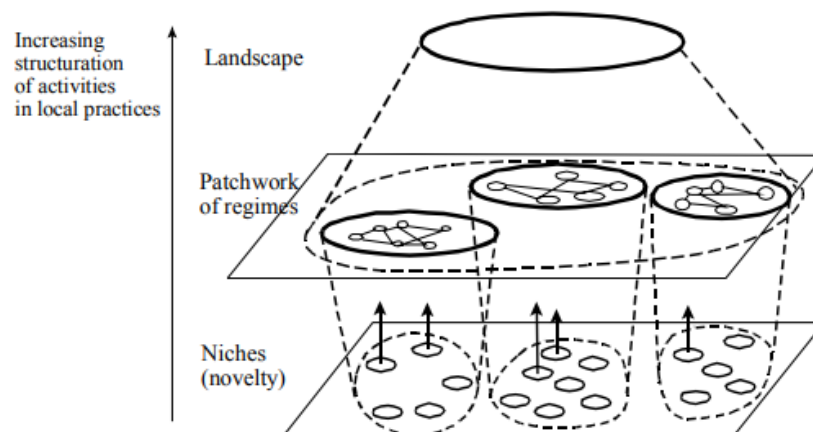


Figure 6: Multiple levels as a nested hierarchy (Geels, 2006).

At the *niche* level of the MLP framework, breakthrough innovations and inventions are born and emerge in what are called experimental environments (Geels, 2006). This niche level is important for the long-term transition towards more integrated and future-proof mobility hubs. This because the niche level is open for new technologies, innovations, ideas and practices which are helpful in the development stage of mobility hubs. The niche level also does not experience external pressure such as market competition or regulatory compliances (Smith & Raven, 2012). Speaking about mobility hubs, niche innovations can include the extension of and more integrated MaaS digital services, the implementation and increased usage of autonomous vehicles, the usage of different types of fuel (such as hydrogen and the increasing electrification of vehicles), and the overall design of mobility hubs to be more compliant with overarching climate goals.

The *regime* level of the framework contains more dominant factors in the mobility transition. This level refers to, for example, institutions, infrastructural practices, policies and lastly regulations. These factors are there to stabilise the already existing system. According to [Fuenfschilling & Truffer \(2014\)](#), the regime level can be regarded as a resistant level. This because the regime is often not affected by external forces, this is due to the regime level dealing with path dependencies, sunken costs and the overall passivity of institutions. Talking about the transition in the urban mobility spheres, it can be said that the regime level includes aspects such as user behaviour, investment cycles in infrastructure and planning authorities. The regime level can however change, although it being very gradually. The regime level usually only changes or experiences a disruption whenever there is enough pressure from external forces or a disruptive niche innovation ([Geels, 2006](#)).

At the largest scale of the MLP framework we can find the *landscape* level. This landscape level entails the macro scale of the framework. This level usually includes broader societal, economical and environmental trends. These trends influence both the regime as well as the niche level of the framework. When talking about the landscape level in the MLP framework, we can talk about trends such as climate change, demographical shifts and the overall digitalisation of the world. [Geels \(2006\)](#) mentions that these trends are not controllable by the actors involved in the other levels of the framework, however, these trends do create windows of opportunities or challenges which can require a change in the system. Therefore, actors on the lower levels of the MLP framework are affected by the landscape level ([Geels, 2006](#)).

What makes this MLP framework good to use for this thesis is that it has the ability to frame these larger scale transitions as non-linear and operational on multiple different scales ([figure 7](#)). Bottom-up initiatives as well as top-down pressure and incentives are captured in the framework. There is however some critique regarding the MLP framework. [Coenen et al. \(2012\)](#) mention that the framework lacks the attention for the spatial perspective. They argue that the MLP framework should be narrowed down and include specific spatial contexts, stepping away from the spatial context being a 'passive background variable'. Secondly, [Coenen et al. \(2012\)](#) question the problematic usage or the lack of scaling in the current frameworks. The framework should explain transitions as independent processes between different territories, including local networks. Therefore, stepping away from the assumption that such transitions are happening anywhere. These critiques are good to keep in mind when further using the MLP framework throughout this thesis.

The usage of the MLP framework will help in identifying the niche innovations, the regime structures and institutions as well as the overarching landscape developments. All of these levels interact with each other and shape the future of mobility in cities like Eindhoven. Using the MLP framework will enable us to analyse transitions through a multi-dimensional lens and helps us capturing the stability of the system and the disruptive factors which enable change to the system.

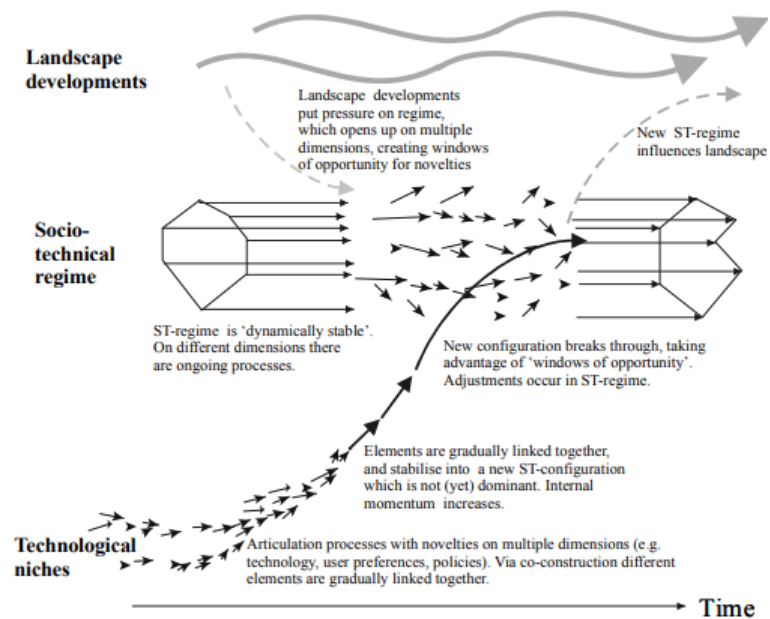


Figure 7: Multi-level perspective on system innovation ([Geels, 2006](#)).



3.6 Mobility Hubs in the MLP framework

The MLP framework is a very relevant framework to apply to the transition and the emergence of mobility hubs and their infrastructure. Using the MLP framework, it will provide us with a tool to analyse how the mobility hubs are realised by investigating interactions between niche innovations, the institutional regime systems and the overarching landscape developments. Eindhoven, being a city known for its technological innovations and being open for urban experimentation, is a very relevant and useful city to explore how these niche, regime and landscape levels interact with each other and influence the implementation of integrated and future-proof mobility hubs.

Analysing mobility hubs in the city of Eindhoven at the niche level, we can see that the development of mobility hubs is closely linked to pilot projects and innovation initiatives which aim to spark a new movement of implementing urban transportation (XTNT, n.d.). The experimentation of mobility hubs is mainly experimentation with shared micromobility options and the extensive integration of digital services such as MaaS. Innovation and experiments like these are often funded by EU or national programmes, as well as receiving public funds (Rongen et al., 2022). These experimentations are especially important in challenging the already existing norms and provide us with real-life data and feedback for further improvements and for possible expanding the network.

The regime level for analysing mobility hubs in the city of Eindhoven involves the dominant practices and user behaviour, the existing policies and institutions together with the already existing infrastructure in the city. The public transportation providers such as 'Hermes' and 'Bravo', the provincial and local planning frameworks are included as well. These actors often have to comply to legislations, investments and funding, and path dependency in the design process (Bertolini, 2012). While the regime level is open to change and disruption, the systems which can be found in the regime level often change very incrementally, meaning that a sudden radical change barely happens on this level (Fuenfschilling & Truffer, 2016).

At the landscape level, which is not only specific for the case of Eindhoven, we find trends such as climate change, changes in the demography and the overall digitalisation of the world. EU directives and national visions apply pressure to the local regimes and force them to adapt. These higher-level landscape developments can cause windows of opportunities for niche innovations, especially when the regime level is properly aligned too (Geels, 2006).

Combining the three levels to the case of Eindhoven, we can see that the interplay is present and can be observed. The EU and national directives ('Toekomstbeeld OV 2040' (Ministerie van Infrastructuur en Waterstaat, 2021)) for a more sustainable urban mobility transition align with the cities municipality wish to invest time and money into smart and sustainable urban mobility ('Masterplan Mobiliteit 2050' (Gemeente Eindhoven, 2024)). These ambitions in their turn open up space for niche innovations to be tested and experimented when designing and implementing mobility hubs. The challenges however do still remain, even in Eindhoven. The regime level such as the municipality may not always possess the ability to gather the right resources or the policies do not combine with national or EU policies. Niche innovations in their turn can become stuck in their own 'space' due to the lack of demonstration opportunities and real-life legitimacy (Geels, 2006).

The MLP framework is however still a very useful tool for this thesis in investigating the implementation of integrated and future-proof mobility hubs. It shows that innovative technologies alone are not enough to disrupt higher levels and cause changes. An interplay between all three levels is needed for an overarching transition to occur.

3.7 Concluding Theoretical Framework

Having discussed the relevant literature and useful theories and research done by other researchers, together with the constructed research questions for this thesis, we can construct the following conceptual framework (figure 8). This conceptual framework is based upon the theoretical MLP framework of Geels (2006).

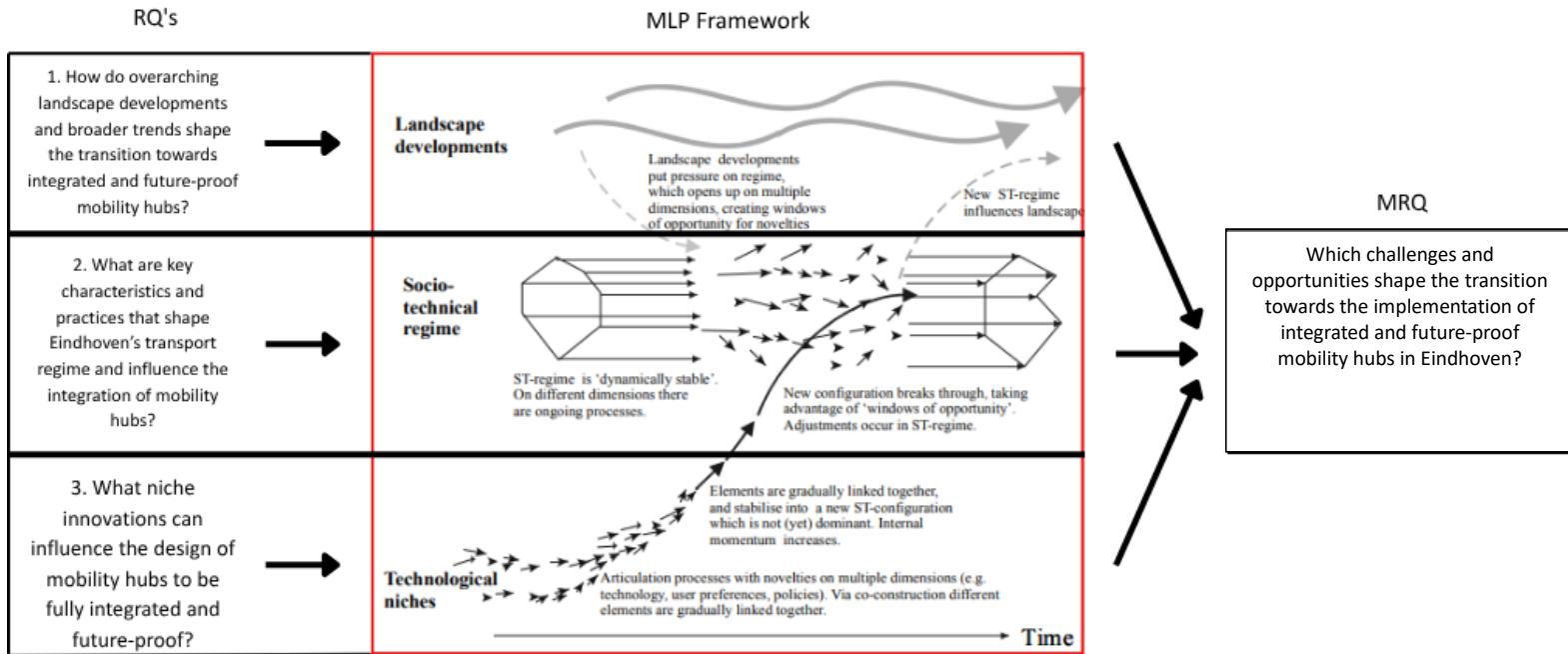


Figure 8: Conceptual framework based on MLP (Author's own, 2025).

This conceptual framework which is largely based on the MLP framework made by Geels (2006) explains how this thesis will be structured. Firstly, the three sub- research questions which have been constructed in chapter 1.2 will be answered from data collected from the conducted interviews and surveys. These sub-questions will be answered separately. Afterwards, the answers to these sub-questions will be placed into the MLP framework to see where on the transition timeline they are. From this, we can conclude which landscape developments currently shape the regime level, which institutional systems currently shape the urban mobility planning in the city and lastly which niche innovations can (in the near future) cause a disruption in the regime level. This will be done by keeping the context of the city of Eindhoven in mind. After the placement into the MLP framework is done, we can finally answer the main research question of this thesis and draw a conclusion on how the implementation of integrated and future-proof mobility hubs in Eindhoven can be understood through multi-level dynamics.

This chapter of the theoretical framework has now discussed a conceptual framework to further investigate the design and implementation of integrated and future-proof mobility hubs in Eindhoven. The concepts of integration, future-proofness and the 'Multi-level perspective' have been individually discussed and conceptualised in a framework to show what the structure of the analysis of this thesis will be. By integrating the before mentioned concepts of this thesis, (integration, future-proof, MLP) it is ensured that this research has a solid foundation in academic and scientific literature. It also allows us to apply the found literature to the real-life case of the city of Eindhoven. Overall, this chapter has shown us that the principle of mobility hubs is not solely to be infrastructural objects but also serve as socio-technical entities within a wider urban mobility transition.

4. Methodology

In the coming chapter, the methodology of this thesis will be discussed. This will include discussing what decisions have been made and why, regarding the completion of this research. The chapter will firstly discuss the research philosophy of these decisions according to the 'Handbook of Qualitative Research' (Guba & Lincoln, 1994). Afterward, this chapter will dive deeper into the research approach and strategy. The chapter will also include the reasoning behind the expert interviews and inhabitant surveys. The final part of this methodology chapter will discuss what the reliability, validity and the ethical considerations of this thesis were.

4.1 Paradigm of the Research

A paradigm can be viewed as “basic belief systems based on ontological, epistemological, and methodological assumptions” (Guba & Lincoln, 1994). Ontology refers to the nature of reality, epistemology refers to the nature of knowledge, while the methodological part refers to the ways the research has been conducted. To put it in other words, a paradigm explains the basic beliefs of the researcher or the worldview which guides how the researcher sees reality, how knowledge will be generated, and which methods are used.


4.1.1 Ontology

Ontology refers to the concept that explores the nature of what is existent, the study of what exists. It aims to investigate abstract entities and what the relationship between these entities are. Ontology therefore is about what we believe is real and knowable in the real world we live in (Guba & Lincoln, 1994).

A distinction is made between four different ontological and epistemological paradigms constructed by Guba & Lincoln (1994). The four different paradigms that have been identified are positivism, post-positivism, critical theory and constructivism (figure 9).

<i>Item</i>	<i>Positivism</i>	<i>Postpositivism</i>	<i>Critical Theory et al.</i>	<i>Constructivism</i>
Ontology	naive realism— “real” reality but apprehendable	critical realism— “real” reality but only imperfectly and probabilistically apprehendable	historical realism— virtual reality shaped by social, political, cultural, economic, ethnic, and gender values; crystallized over time	relativism—local and specific constructed realities
Epistemology	dualist/objectivist; findings true	modified dualist/ objectivist; critical tradition/community; findings probably true	transactional/ subjectivist; value- mediated findings	transactional/ subjectivist; created findings
Methodology	experimental/ manipulative; verification of hypotheses; chiefly quantitative methods	modified experi- mental/manipulative; critical multiplism; falsification of hypotheses; may include qualitative methods	dialogic/dialectical	hermeneutical/dialectical

Figure 9: Basic beliefs (metaphysics) of alternative inquiry paradigms (Guba & Lincoln, 1994).



Given these four different ontological paradigms, it can be said that the constructivist ontology fitted best for this thesis. The constructivist ontology entails that the reality we know is socially constructed through different interactions and interpretations (Guba & Lincoln, 1994). The reality is shaped by individual behaviour and perspectives, therefore leading to the conversation that multiple realities exist. Regarding this thesis about mobility hubs in the city of Eindhoven, the aspects of 'future-proofing' and 'full integration' are not objective aspects. These aspects are context-dependent, and the understanding of these aspects vary between planners, users and the government for example.

This constructivist ontology helped us to identify and explore how the different identified actors interact with the mobility transition in the city of Eindhoven. The constructivism also aligns with qualitative data methods such as interviews, these data collection methods aimed to gather more data with 'meaning' rather than data that can be measured (Creswell & Poth, 2016). Besides conducting interviews, this thesis made use of a survey amongst the inhabitants of the city of Eindhoven. The data from this survey was measured and therefore served as a quantitative data collection method. Because of the usage of the MLP framework and therefore aiming to understand the different interactions between the identified levels of the framework, the constructivist ontology is also most relevant for this research.

4.1.2 Epistemology

The constructivism also applies to the epistemology of this research. Since this study aimed to understand how different identified stakeholders interact with and interpret the concept of integration and future-proofness, the constructivist epistemology fitted best (figure 9). According to Guba & Lincoln (1994), the constructivist epistemology means that the knowledge is co-constructed between the participants of the research and the researcher himself. This is shaped by different interactions and the context of the research. The aim is not to identify one objective 'truth', the focus is understanding subjective experiences and constructed social meanings.

This constructivist epistemology enabled the researcher to investigate and explore context-specific knowledge (such as mobility hubs in the city of Eindhoven), especially when making use of the earlier mentioned qualitative data methods such as interviews and surveys (Creswell & Poth, 2016). The epistemology also aligned with the MLP framework which is used in this thesis. The socio-technical transition is embedded into institutions, landscape developments and other discourses.

Since this thesis did not have the aim to identify one single truth, the positivism and the post-positivism are not applicable for this thesis. Arguments could be made to use the critical theory paradigm, but the aim of this thesis was not to challenge dominant practices or discourses (Guba & Lincoln, 1994). The aim of this research was purely to understand different interactions and transitions. Therefore, the constructivist paradigm fitted best for the conducted research of this thesis.



4.2 Research Approach

As established in [chapter 4.1](#), this research will be grounded into the constructivist research paradigm ([Guba & Lincoln, 1994](#)). This paradigm enabled the research to make use of a qualitative and interpretive case study approach. The interpretive case study fitted best since it allows us to further investigate the contextual factors as well as actor perspectives and institutional dynamics when it comes to implementing integrated and future-proof mobility hubs. This paradigm assumes that the reality is socially constructed and that the understanding of this reality comes from interpreting how the involved actors make sense of their experiences ([Guba & Lincoln, 1994](#)). This paradigm including the constructivist ontology and epistemology was in line with the aim of this thesis to understand the various different interpretations and experiences, as well as understanding the actions of the involved actors in urban mobility transitions.

Furthermore, this thesis used an inductive reasoning process to develop theory from the gathered empirical data, rather than testing a defined hypothesis. According to [Saunders et al. \(2009\)](#), this is also reflected in the aim of the thesis to conduct an exploratory research which is suitable to understand context-specific phenomena. The choice to conduct a single-case study was driven by the need for a good in-depth and holistic research into the question of how integration and future-proof mobility hubs are implemented at a local level such as the city of Eindhoven. Furthermore, Eindhoven was chosen due to being a city in the Netherlands known for its innovative nature and one of the fastest growing cities in the country ([Gemeente Eindhoven, n.d.](#)).

Since this thesis did not aim to test a hypothesis but rather aimed to understand certain dynamics and how the actors involved interact and navigate with the urban mobility transition in Eindhoven, this paradigm was especially relevant. The definitions of both 'integration' and the 'future-proofness' of mobility hubs is not something that is universally the same. The interpretive case study therefore provided this thesis with more flexibility to understand different viewing points of stakeholders and challenge the different definitions of before mentioned aspects. Not only that, but the usage of this paradigm also allowed us to further investigate the interactions between the niche innovations, the regime level and the landscape pressure in the MLP framework ([Geels, 2006](#)).

This research paradigm and approach allowed this thesis to use multiple different data sources, which some of them have been mentioned in [chapter 4.1](#). Data collection methods such as expert interviews, surveys amongst the users of mobility hubs and the analysis of documents were all relevant data collection methods for this thesis. Not only that, but the usage of all three of the data collection methods resulted in a triangulation which can be trustworthy ([Creswell & Poth, 2016](#)). One of the data collection methods was semi-structured interviews with relevant stakeholders. These expert-interviews were further supported by a user survey which investigated the experiences and perspectives of users on mobility hubs. This allowed for the before mentioned triangulation and improved the trustworthiness of the different perspectives while investigating the different levels of the MLP framework.

The interpretive case study ensured that my role as the researcher is interactive rather than being detached from the subject of this thesis. Both the conducted interviews and the filled in surveys were analysed and coded by using both deductive as well as inductive coding strategies. This enabled the theory to come forward from the gathered data while still being grounded into the conceptual categories which have been established before ([Creswell & Poth, 2016](#)).

This research approach and the fitting paradigm enabled this research to link the research questions with the theoretical framework and eventually to empirical data. This further supported the investigation of how and why mobility hubs are shaped by the socio-technical transition rather than just identifying what is existent in the current urban mobility phenomenon. This approach led to a context-dependent research which was relevant to further understand the transition towards more integrated and future-proof mobility hubs in the city of Eindhoven.



4.3 Research Strategy

The methodology of this thesis included a mixed methods approach (using qualitative, quantitative and document analysis data collection methods). Together with that approach, this thesis had a single-case study design which used an interpretive and a more exploratory approach to the investigated case. The main objective of this thesis was to understand the implementation of integrated and future-proof mobility hubs in the city of Eindhoven, the implementation being shaped by the socio-technical transition which is understood through multi-level dynamics. This methodological design of this research ensured that the research is contextualised, used data from multiple different perspectives, is in line with the earlier mentioned interpretive paradigm and investigated the multi-layered urban mobility transition.

4.3.1 Alignment with Theoretical Framework

Firstly, it was important to align the methodology of this thesis with the identified theoretical framework which is used. This framework is the 'Multi-level Perspective (MLP)' framework developed by Geels (2006). As has been mentioned before in this thesis, this framework distinguishes three different levels of the socio-technical transition. These levels are niche innovations, regime structures and overarching landscape developments. To better operationalize this theoretical framework, a distinction was made between the three different levels and the main actors or phenomena which influences that level, this can be found in the table below (table 2).

MLP LEVEL	IDENTIFIED ACTORS
NICHE	Experimental pilots, MaaS, Micro-mobility options
REGIME	Municipality of Eindhoven, Province of Noord-Brabant, Brainport Bereikbaar, Haskoning, inhabitants of Eindhoven
LANDSCAPE	Climate change, digitalisation, EU regulations, behaviour of people

Table 2: Actors in the MLP framework (Author's own, 2025).

By investigating and designing this research to identify the interactions between these three levels and actors in the framework, the study aimed to both capture what the structural dynamics are as well as capturing what actors and phenomena are mostly involved in the urban mobility transition in Eindhoven. Aligning the theoretical framework further with the design of this research ensured that the research is conceptually coherent and it supports analytical insights.

4.3.2 Triangulation of Methodology & Data Collection

This thesis has furthermore used the triangulation principle designed by Vennix (2016). In his view, triangulation is the approach where multiple different sources of information are combined and used in the data collection phase of the research. In the case of this thesis, the different methods of data collection included document analysis, the usage of expert interviews and lastly a survey amongst the inhabitants of the city of Eindhoven. This mix of multiple sources eventually improved the reliability of the thesis and provided for a more holistic understanding of the investigated case. A further look into which methods were used for the different constructed research questions can be found on the next page.

As constructed in **chapter 1** of this thesis, the main research question is as follows:

Which challenges and opportunities shape the transition towards the implementation of integrated and future-proof mobility hubs in Eindhoven?

To help answering this main research question, the following sub-questions have been constructed:

1. *How do overarching landscape developments and broader trends shape the transition towards integrated and future-proof mobility hubs?*
2. *What are key characteristics and practices that shape Eindhoven's transport regime and influence the integration of mobility hubs?*
3. *What niche innovations can influence the design of mobility hubs to be integrated and future-proof?*

Now that we have resurfaced the research questions of this thesis, we can have a look at how each of the three research questions were answered. We will start at sub-question 1.



Figure 10: Research question 1 (Author's own, 2025).

The first research question for this thesis aimed to investigate the landscape developments and broader trends that shape the transition towards a new urban mobility paradigm. To do so, the choice is made to make use of document analysis for this question. By reviewing scientific reports, governmental documents and studying what other landscape developments shape the transition of urban mobility, we then concluded which of the identified landscape developments play a role in the implementation of integrated and future-proof mobility hubs in the city of Eindhoven. Using sources which have been identified in **chapter 2**, such as the reports of **Banister (2008)** and **Smeds & Jones (2021)** helped us to do so. Combining the relevant found literature with answers of the experts given in the semi-structured interviews provided us with an answer to how the regime level in the city of Eindhoven is influenced by the landscape developments in the MLP framework. Interviews have been conducted with employees of both the province of Noord-Brabant and the municipality of Eindhoven. Besides these interviews, experts have been interviewed who work at Haskoning and Brainport Bereikbaar to provide us with more answers and information that supports the document analysis in order to answer this first research question. This primary data gathered through the interviews, together with the secondary data gathered through the analysis of relevant scientific literature ensured the construction of a valid and reliable answer to this first research question of the thesis. This because secondary data sources are often permanently available through uploaded scientific literature and can therefore easily be checked by other scientists or involved stakeholders (**Denscombe, 2021**).

We will now discuss how the 2nd research question has been answered.

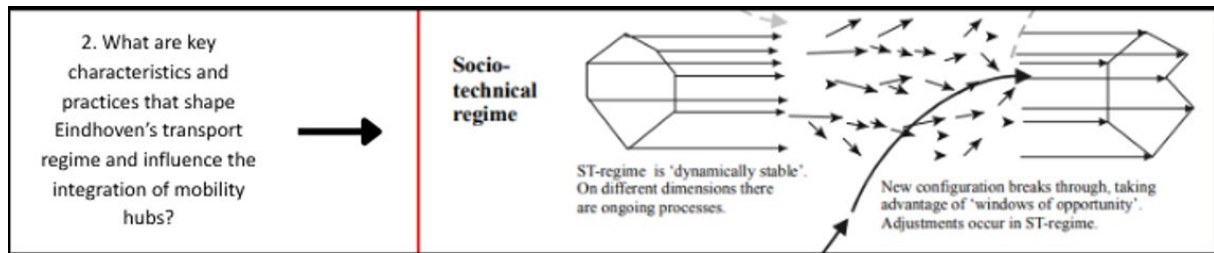


Figure 11: Research question 2 (Author's own, 2025).

The second research question for this thesis aimed to investigate the regime level developments and structures which further shapes the transition towards a new urban mobility paradigm. To answer this second research question, the choice was made to mainly make use of expert interviews and a survey amongst inhabitants of the city of Eindhoven. By using both the interviews and the survey, this thesis investigated what the current actors in the regime level experience and view the current happenings regarding the urban mobility transition. We then concluded which structures, interactions, and user behaviours and wishes mostly would influence how the regime level of the MLP framework operates. These primary data sources were further supported by relevant scientific literature.

The choice has been made to conduct interviews through semi-structured interviews. These semi-structured interviews therefore served as a primary qualitative data collection method in this thesis. Semi-structured interviews were chosen because of their flexibility which allow the participants to further elaborate on their answers and experiences while still providing a structure outline which aligns with the research questions (Brinkmann & Kvale, 2014). In total, 5 expert interviews have been conducted with; an employee of the province of Noord-Brabant, an employee of the municipality of Eindhoven, an employee of 'Brainport Bereikbaar' and two employees of 'Haskoning'. All 5 of the experts are involved in urban mobility planning in Eindhoven.

The interview guide (together with the consent form and the constructed interview questions) can be found in **Appendix: A**. The questions have been constructed keeping the theme of the theoretical framework in mind. This is done in order to be able to translate the answers into the MLP framework. Furthermore, the interview questions touch upon the concept of integration and future-proofing, giving us a better view of how the involved experts experience and understand these concepts. The interviews which were held had a duration between 45 and 60 minutes and were conducted in person or via Microsoft Teams. All except for one interview, due to a technical error in the recording, have been recorded with their consent and transcribed. The data which was recovered from the expert interviews have then been coded using both inductive and deductive approaches. This was done to identify certain intersecting patterns and specific institutional frameworks (Braun & Clarke, 2006).

Besides the expert interviews, a survey (**Appendix: B**) amongst the inhabitants of Eindhoven was also conducted. This was done to investigate whether the plans and wishes of the municipality are in line with the wishes and behaviour of the inhabitants of the city. The survey was distributed digitally. Given the standard error margin of 5%, a standard confidence level of 95%, a research population of 243.721 (as of the 1st of January 2023 (Gemeente Eindhoven, n.d.)), the sample size for the survey was estimated on about 150 respondents (Steekproefcalculator, n.d.). The survey included both closed and open-ended questions which aimed at capturing the experiences and behaviours of inhabitants regarding mobility hubs in Eindhoven. The questions are based on the questions constructed in the expert interviews, this so that the answers between the expert interviews and the survey were comparable. The answers to the closed questions have been transformed into statistics. This survey therefore provides us with a broader insight into the more practical impacts of mobility hubs.

Lastly, we will now discuss how the 3rd research question has been answered.

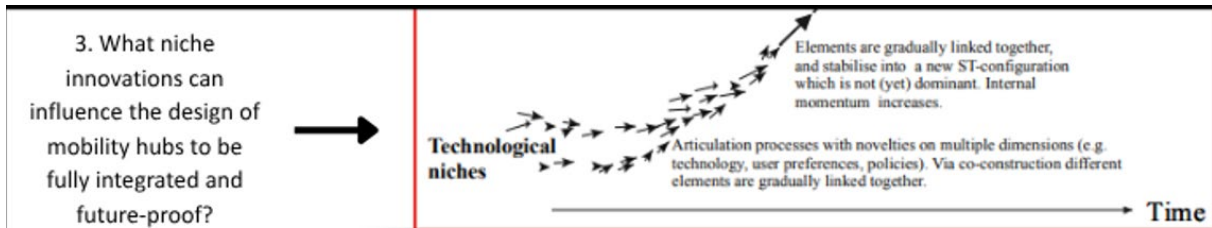


Figure 12: Research question 3 (Author's own, 2025).

The third and last research question for this thesis aimed to investigate the niche innovations and technological developments which can cause disruptions and breakthroughs in the regime level of the MLP framework. To do so, the choice was made to make use of document analysis through desk research. By reviewing scientific reports on what the current upcoming relevant technological advancements and innovations are, it was then concluded which of these upcoming technologies can cause a disruption in the regime level of the MLP framework. The desk research into pilot projects helped us to identify which implementations have been proven successful or as a failure. Using sources which have been identified in **chapter 2**, together with new sources helped this thesis to identify what the relevant niche innovations are. The literature which has been found, together with the studied pilot projects were combined with the answers from the semi-structured expert interviews which have been constructed. The respondents from these expert interviews have been mentioned above. The answers from these expert interviews further supported the findings from the documents analysis. This resulted in a valid and reliable answer to the 3rd research question. As **Denscombe (2021)** mentioned, this combination of primary and secondary data resulted in a checkable answer since secondary data can be found in other databases.

4.4 Data Analysis

To data analysis part of this thesis is constructed so that it fits the earlier determined constructivist paradigm and the interpretive orientation of the carried-out research. Since the aim of this research was to investigate and understand how various different actor are influenced, experience and perceive multiple different pressures from the niche, regime and landscape level, the data analysis mainly includes thematic data analysis methods from the conducted expert interviews. This thematic data analysis was complemented by a descriptive statistical analysis resulting from the answers given in the inhabitant survey. This mix of strategy resulted in a comprehensive and multi-perspective understanding of the transition in the urban mobility world.

4.4.1 Thematic Analysis

The thematic analysis was mainly used to analyse the semi-structured interviews of this thesis. This was done by applying the six-phase approach which is created by **Braun & Clarke (2006)** (**figure 13**). The first phase of the thematic analysis included familiarisation, basically meaning to immerse myself into the data I have collected. Actively reading the gathered data, as well as transcribing the recorded interviews and taking notes from the gathered data helped to familiarize myself with the data which was found. The second phase was generating initial codes, in this phase some general initial codes have been constructed based on the ideas about what is in the data and what makes the data interesting. These codes helped in identifying features in the data which can be interesting to the researcher. In this phase, the first step of organising data into meaningful groups has been made (**Braun & Clarke, 2006**).

The third phase of the thematic coding included the searching for themes in the gathered data. In phase 2, many different codes have been identified, these codes can however be categorized into broader levels of themes. This happened in phase 3 of the analysis. The codes constructed in phase 2 were further analysed and they were reconsidered whether they can be combined to form an overarching theme. At this phase, I also started to think about potential relationships between codes, themes and even between the different levels and themes of the codes. At the end of phase 3, I had a collection of themes and sub-themes, as well as relevant data which can be related to each of these themes (Braun & Clarke, 2006). In phase 4, the identified themes were reviewed. This further analysed the themes and potentially resulted in the conclusion that some themes are not relevant or not really themes due to a lack of data. Other themes have collapsed into each other if it became apparent that the two different themes could be one theme. Furthermore, this phase included a more extensive reviewing of the collected data to see whether patterns could be identified, extra data needed to be coded and reviewed the themes on whether they were valid in relation to the data sets (Braun & Clarke, 2006). The fifth phase of the analysis was about defining and naming the identified themes. In this phase, the codes have been defined and refined meaning that the themes should be clear about what they are about and determining what aspects of the data certain themes are capturing. Each theme got their own name and a brief description of what they meant so that it became clear what part of the constructed research questions they were answering. At the end of phase 5 we had a clear definition of each theme. The last phase, phase 6, was about the final analysis of the data. The data needed to be told in the thesis. Choosing relevant examples from the data in certain paragraphs of the results chapter and making sure that the codes can be easily traced to the written text are important aspects of this last phase (Braun & Clarke, 2006).

Steps of Thematic Analysis (Braun & Clarke, 2006)

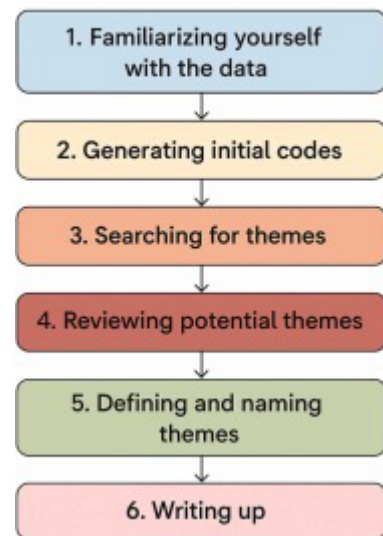


Figure 13: Steps of thematic analysis (Braun & Clarke, 2006).

The coding of the interviews used both inductive, meaning that the themes emerged from the collected data, as well deductive, meaning that the codes were based upon the MLP framework, approaches. This approach of using both inductive and deductive coding resulted in an analysis that is grounded in the theoretical framework while it remains open for the different insight of the participants of the interviews (Nowell et al., 2017). The coding was done by the researcher himself using the 6-phase approach which is explained above.

4.4.2 Survey Data Analysis

The survey which was distributed amongst the inhabitants of Eindhoven was analysed through descriptive statistics which helped to identify certain trends in the answers regarding the travel behaviour, experiences, and the satisfaction of the current mobility in Eindhoven. Using Google Forms to both construct and distribute the survey also massively helped in visualizing and theming the collected data. This because Google Forms automatically categorizes and visualizes the given answers into graphs or tables.

Combining the open-ended answers and the statistical answers to the survey captured a full inhabitant perspective and what they feel about the real-world situation they are currently in. This further enhanced the validity of this thesis and further aligns with the theoretical framework of the MLP.



4.5 Reliability & Validity

The next part of the methodology chapter will be about the discussion to what extent the findings of the data are reliable and valid. This will be done by addressing the internal reliability, the external reliability, the internal validity and lastly the external validity.

4.5.1 Internal Reliability

The internal reliability of this thesis refers to the extent of the consistency and the stability of the whole research progress. It especially addresses how the gathered data is collected and how that data has been analysed (Saunders et al., 2009). As has been mentioned in earlier in the thesis, the data for the qualitative expert interviews have been analysed through a systematic and transparent coding process. This strengthens the internal reliability of the research. Using the coding process developed by Braun & Clarke (2006), the coding methods, the definitions of the codes, and the creation of different themes can be traced back by other researchers. Furthermore, since all interviews have been recorded, the transcription of these interviews are complete and therefore precisely coded. One recording was however not correctly recorded due to a recording error on the researchers' side, the researcher however took notes as answers were given and tried to capture exactly what was said. This interview will therefore not be quoted but will be used in a different way in the results chapter.

4.5.2 External Reliability

The external reliability of this thesis refers to the extent to which this thesis can be replicated and repeated by other students or researchers, this by following the same procedural steps included in this research (Saunders et al., 2009). Since the outcome of this research mainly relies on qualitative data, it can not be said that this thesis can be fully replicated. However, the various different steps that have shaped this research have been transparently and consistently been mentioned. Steps including the interview guide, the framework and process of the coding of the interviews, and the methodology chapter have been fully explained and that allows other researchers to follow the same processes. Since this thesis is mainly build upon results gathered from qualitative interviews, the results will always remain context-dependent. As mentioned, the analysis of data and research approach can be replicated.

4.5.3 Internal Validity

The internal validity of this thesis refers to the extent to which the findings of the research that has been carried out have enough evidence that it supports the claim about certain causes and effects within the studied context. It also includes the extent to which other factors, such as methodological errors for example, explain the outcomes of this study (Saunders et al., 2009). In more qualitative studies this can also be seen as the 'credibility' of the research (Guba & Lincoln, 1985). It entails how believable and credible the answers and interpretations of those who have been interviewed are. For this thesis, the internal validity is present due to the usage of multiple research strategies. The usage of triangulation of the methodology (Vennix, 2016) which combines the semi-structured interviews, the inhabitant survey and the document analysis, enables the researcher to use cross-verification of the multiple different findings coming from different sources. This enhances the credibility of the results of the research. Furthermore, the expert interviews included follow up questions which let the participants fully explain their answers which diminished the chances of misunderstanding the findings. Furthermore, the coding of the interviews has been reviewed multiple times to ensure that the themes are actually grounded in the data which was found. These components of the research all enhance the credibility of this thesis and ensure that the findings propose a valid representation.



4.5.4 External Validity

The external validity of this thesis refers to the extent to which the findings of the research can be transferred and applied to other contexts which might be studied (Saunders et al., 2009). This can also be called the ‘transferability’ of the findings (Guba & Lincoln, 1985). While this thesis focuses on the context and the case of mobility hubs in the city of Eindhoven, the findings of this research can provide meaningful and useful insights for similar cities which are dealing with the urban mobility transition towards more integrated and future-proof mobility hubs. Extensive research has been done in this thesis on the context of Eindhoven, including aspects such as the relevant policies, governmental structures and user behaviours and wishes. The findings of this context can be assessed by other researchers and students on whether these findings are relevant for their own studies and contexts. Of course, case studies result in very specific findings and these findings are often not statistically generalisable. However, since the MLP framework (Geels, 2006) is used, the same theoretical framework can be applied to other contexts and findings can be compared.

4.6 Ethical Considerations

Another important aspect of this thesis are the ethical considerations which have been made during the research. Since the data which is collected relied on human participants through both the semi-structured interviews and the user survey, the ethical considerations need to be addressed. According to guideline of the Radboud University, the thesis has complied with informed consent from participants, confidentiality and making the participants anonymous when the participants have chosen to be anonymised.

First of all, all the participants of the conducted interviews have been sent an interview guide beforehand which included the explanation and the outline of the interview. This interview guide also included a consent form in which their rights had been stated and how their data would later on be integrated into the thesis. All of the five experts who have been interviewed signed their consent form ensuring their voluntary compliance. For the user survey, consent was formed by a statement at the beginning of the survey. This because gathering autographs from each individual who filled in the survey is not possible. The statement at the beginning of the survey stated that their participation was completely voluntary and that their responses were anonymous (no names were asked in the survey). Furthermore, it stated that their answers were solely used for academic purposes.

The participants of both the interviews and the survey were aware of their possibility to withdraw their cooperation. No reason had to be provided for their withdrawal. The audio which was recorded from the interviews and their transcriptions were stored at safe personal storages where other people had no access to. Additionally, data which could be traced to the individual persons were anonymised or excluded from the results if that was the participants’ wish to do so. This was done to protect the participants’ privacy.

These ethical considerations ensured that the participants were respected in their privacy and protected throughout the construction of this thesis. All the participants had full knowledge of the research before actually participating in the interview or survey. Consent forms of the experts have been signed and by filling in the survey, the inhabitants of Eindhoven agreed to participate in this research.



5. Results

In this chapter of the thesis, the findings of this thesis will be presented. These findings result from the expert interviews, as well as the survey conducted amongst inhabitants of Eindhoven and users of the mobility system in the city. These findings will be presented along the broader themes of this thesis.

5.1 Landscape Developments & Broader Trends

As we have discussed in **chapter 3**, rapid transformations are happening when it comes to the development of urban mobility systems in the entire world. These urban mobility transitions are formed by increasing external pressures such as the changing climate, the increasing urbanisation of the world and new upcoming technological developments such as digitalisation. **Banister (2008)** tells us that these newer urban mobility infrastructures, and thus the mobility hubs, prioritise the minimalization of the environmental impact. Furthermore, the new urban mobility infrastructures should focus on efficiency and also the accessibility of modern transportation. This landscape level also includes socio-technical transitions such as changing needs and behaviour of the users of urban mobility (**Marsden & Reardon, 2017**).

5.1.1 Climate Change

A quote from an employee of 'Brainport Bereikbaar' shows us what the importance is of keeping climate change in mind when designing and implementing mobility hubs:

“And if you do travel a lot more with collective transport and shared transport, do you know how much space you will then create in the city? And if you fill that in with greenery, for example, you will suddenly have much less trouble with the heat stress or the major climate consequences of the enormous mass of water that falls, so that continues with what my personal drive is if you are going to free up that space in the city. [...] but if you add just 10% extra to greenery, boy, that has such an effect on the well-being of people and on the climate target. It is also science that has been proven at Wageningen University. They have done a lot of research, the 'Green City', that is a bit of a code word that you have to look for. If you link that to shared mobility, yes then you can really make the most fantastic calculations, and yes then you have to call that an emergency reason.”

(Employee of 'Brainport Bereikbaar', 2025)


What is interesting about this quote is that the employee of 'Brainport Bereikbaar' not only talks about adding a new urban mobility infrastructure, he also emphasizes the importance of adding greenery at the places where mobility hubs are being implemented. The adding of greenery at mobility hubs will help battling the urban heat stress and diminishes the impact of the larger masses of water that falls in the city during big rainfalls. Starting with adding more greenery to mobility hubs will also enable researchers and other stakeholders to make more calculations for the future based on the effects of adding greenery (**Employee of 'Brainport Bereikbaar', 2025**). This statement is further supported by an employee of 'Haskoning' who stated:

“By making the city more sustainable. Or making the city liveable. You need space for climate adaptation. For green.”

(Employee (2) of 'Haskoning', 2025)

This quote further emphasizes the importance of not purely adding mobility hubs to improve the current mobility systems in the city, but also think about how to integrate these mobility hubs with greenery in order to tackle more climate challenges which the city of Eindhoven is facing currently.





According to these answers from the interview experts, it becomes clear that involved stakeholders are influenced and experience external pressure regarding climate change. The shift towards more sustainable energy sources has also been mentioned during the interviews. A large part of the current urban mobility transition is based upon the energy transition which is needed in the world. A shift away from the traditional dependency on fossil-fuels can be seen as electrification becomes a larger aspect in urban mobility. Since the recording of this interview has failed, the source can not be quoted. However, an **employee of the 'Noord-Brabant' province (2025)** mentioned that electric vehicles will become the standard in the future. This also fits within the larger urban mobility transition, where alternative electric modes of transportation are prioritized. **Smeds & Jones (2021)** state that transportation modes such as micromobility, including e-scooters and e-bikes, combined with the electrification of public transport are increasingly implemented. The concept of mobility hubs which has been addressed in this thesis aims to be implemented as an important node in the city where these different modes of transportation come together and where the transfer between modes is facilitated.

The implementation of mobility hubs and combining them with adding greenery to the hubs are in line with the overarching European context of the urban mobility transition. The 'Sustainable and Smart Mobility Strategy' (**European Commission, 2020**) states that they encourage the promotion of more integrated and sustainable urban mobility. Dutch policies such as the 'Toekomstbeeld OV 2040' (**Ministerie van Infrastructuur en Waterstaat, 2021**) have to comply within the European context. The European context can therefore also be seen as an aspect of the landscape level in the MLP framework.

5.1.2 Digitalisation

A further transition which can be identified is that of the digitalisation of the world. This digitalisation is something that urban mobility planners have to keep in mind when designing and implementing mobility hubs. The digital aspect of the landscape level mainly refers to the digital integration of different mobility hubs. When talking about the digitalisation on the landscape level of urban mobility, we mainly refer to the concept of 'Mobility-as-a-Service' (MaaS). This concept involves the digital integration when it comes to payment systems, platforms to book certain tickets and real-time information about the desired mode of transportation (**Sochor et al., 2018**). What is interesting is that the **employee of the 'Noord-Brabant' province (2025)** has stated that the digital aspect of mobility hubs should not be the overarching theme of the hub. The digital aspect should always serve the bigger mobility hub goals such as the reduction of climate impacts. However, the scale of which the digitalisation will play a significant role in the design and implementation of mobility is unclear and will remain uncertain, this can be derived from this quote from an **employee of the municipality of Eindhoven (2025)**:

“So if it turns out that in ten years, [...], digitalization or suddenly another step is in use in the Netherlands, [I] can't be completely for or against. But maybe that will really be something in the future. Maybe that will happen but it's something we haven't thought of now.”
(**Employee of the municipality of Eindhoven, 2025**)

To further address this quote, we can see that the municipality of Eindhoven does keep in mind that digitalisation will play a larger role in the design and implementation of mobility hubs. However, to them it stays unclear to what extent this digital integration will play a role.



5.1.3 Societal Challenges

However, what was mentioned most by the interviewed experts is that the main challenge and external pressure they experience is about the overarching societal challenges and the wishes of most urban mobility users. To quote the **employee of the municipality of Eindhoven (2025)**:

“If you look at photos of Eindhoven 30, 40 years ago. Then there are cars everywhere. 18 Septemberplein is a large roundabout with two lanes. So people are not used to anything other than the car the past thirty years.

A lot of people have just lived in the same house for thirty years. Nothing has ever changed, actually. Now it is changing. And for quite a few people that is more difficult.”

(**Employee of the municipality of Eindhoven, 2025**)

This further shows us that most the worldview has not changed yet in the way we want to see urban mobility. As a society we are used to driving our car, even when it means using our car for very small distances. This worldview has not changed much since then and people have not really been exposed to newer urban mobility structures. Trying to implement mobility hubs or proposing ideas of lowering the number of parking spaces in a certain area therefore causes a lot of backlash from the inhabitants. Even though they do not own the space where their car is parked or the area in front of their house, many inhabitants of Eindhoven feel like ‘their’ space is taken and replaced by something they do not want.

“You also notice it with colleagues. Everything up to and including, very roughly, age 35 - 40. They all think like... ‘That’s not your parking space at all. That’s just municipal land. That you can often park your car there for free or super cheap that’s actually very special, that’s actually very strange.’ But if you’re over 45. They think completely differently about that. ‘But I have to drive. That’s my car. I have to park it there.’”

(**Employee of the municipality of Eindhoven, 2025**)

The **employee of the municipality of Eindhoven (2025)** further stresses that the usage of the private car needs to be lowered. He stressed that the city has no choice but to hinder the usage of the car in the city. ASML keeps growing, which means the city of Eindhoven will keep expanding. But the city does not want more asphalt for cars, does not want to further expand the number of lanes on the highway. Nor do they want more streets in the city centre. What they do want is to build more houses, but they do realize that the usage of a car is mostly the first choice of many inhabitants. They want to enable these inhabitants to drive a car, but just not their own car, which has to be done through shared cars. This bigger societal challenge is not only experienced by the municipality of Eindhoven but also at ‘Brainport Bereikbaar’, a consulting firm.

“Because these are quite drastic choices if you as an individual say, throw out a car and go for a shared car. Then you also want to be sure that shared mobility will be there in the next five years, so you should not do a pilot of six months because then nothing will change in behaviour. [...] because I do mention the government and the employers, but it is also mainly ultimately the behavioural change of you and me, that is the real crux, we have to get out of the regular pattern that is very easy of ‘I get in the car that is in front of my things’, to a much more flexible system, that is the real challenge.”

(**Employee of ‘Brainport Bereikbaar’, 2025**)

Not only that, but he further emphasizes the societal challenges later on in the interview.

“This is a bit of the Achilles heel of the whole system. Look, if I go out on the street and interview people and ask them ‘what do you want?’, everyone says ‘I just want to be able to continue driving to my workplace in my own car because that is the most comfortable and the most pleasant solution’. So on an individual level that is the wish, at the same time you see that on a societal level, yes, that is simply not possible and we are not going to be able to sustain that. The system that we have all built, and even if you were to make all electric cars, you still have the spatial challenge that is going to be the problem.”

(Employee of ‘Brainport Bereikbaar’, 2025)

From both the interviews with an employee of the municipality of Eindhoven and an employee of ‘Brainport Bereikbaar’, we learn that the societal challenges are what is keeping most inhabitants of Eindhoven from using shared mobility options and mobility hubs. The people are too used to having their own car and being able to have it at their disposal at any given time, even when a car is completely useless for 90% of the time (Employee of the municipality of Eindhoven, 2025). This is because of the amount of time the car is not used and the amount of time the car is not used for the amount of people it is built for.

Together with the earlier mentioned of climate change and the overarching digitalisation of the entire world, the societal challenges also shape what the landscape level of the MLP framework is in regard to implementing integrated and future-proof mobility hubs in Eindhoven.

5.2 Key Characteristics & Practices of the Regime

This part is also based on the ‘Multi-level Perspective’ framework which was developed by Geels (2006). It specifically focuses on the regime level of the framework. Using that framework in combination with the ‘Web of Interactions’ constructed by Mukhtar-Landgren et al. (2016) as the theoretical basis for the coming answer, the findings will also be based upon the five expert interviews. The findings will address what factors and interactions shape the transportation regime in the city of Eindhoven. Dynamics between the national, provincial and municipal level will be presented. As well as the impact of the users and their needs and behaviour will be mentioned.

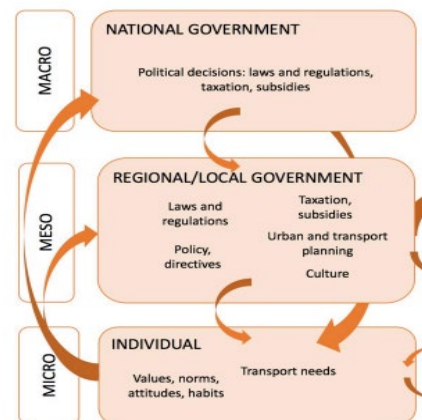


Figure 14: Modified web of interactions (Mukhtar-Landgren et al., 2016).

5.2.1 National Government

We will firstly discuss how the national government works in the regime level regarding mobility hubs in the city of Eindhoven. According to the employee of the municipality of Eindhoven (2025), the national government is mostly there to facilitate projects by giving out subsidies. The national government in the Netherlands is very interested in the transition towards more integrated and future-proof mobility hubs. However, they do not own that much ground to implement these changes themselves. They therefore offer subsidies to municipalities which are willing to investigate what the effect of certain pilot projects are. The results of these pilot projects are then communicated back to the national government so that they can draw conclusions about what or what not to implement into national policy (Employee of the municipality of Eindhoven, 2025). It can be said that the national government does not actively initiate the changes in the urban mobility environment. This is also said by the employee of ‘Brainport Bereikbaar’ (2025):



“The government has a kind of point of view regarding shared mobility and hubs, but not a very active policy.”

(Employee of ‘Brainport Bereikbaar’, 2025)

Both the interviewed experts at Haskoning also mention that the national government often ‘indirectly’ influences the direction in which the provinces or municipalities go. Programme’s such as ‘living deals’ and whole housing projects often have an effect on what provinces and municipalities do with their urban mobility. At places where new and large housing projects need to be realised, municipalities often rethink the current mobility system in that area and think about how they can adjust that system to fit with the new housing (Employees of Haskoning, 2025).

Based on the interviewed experts, who are all involved in the designing and/or implementation phase of mobility hubs not only in Eindhoven but in other places in the Netherlands as well, we can see that the national government is not actively involved in regulation and implementing mobility hubs in Eindhoven. Although the national government has to comply with European legislation and policies, and have their own interests regarding new urban mobility, the national government does not own much ground themselves to actively implement and regulate those changes. What they do though is giving subsidies to enable the province and/or the municipalities to implement changes themselves. In exchange, the national government expects to be updated on the results so that they can draw conclusions on what works and what does not work in the future.


5.2.2 Provincial Government

In this part of the chapter, we will discuss how the provincial government works within the regime level regarding mobility hubs in Eindhoven. According to the **employee of the province of ‘Noord-Brabant’ (2025)**, the province is working with concessions. The provincial government tries to replace the current public transportation with shared mobility options in some cases. The **employee working at ‘Brainport Bereikbaar’ (2025)** further mentions that the province is mostly responsible for the bus transportation within the province. However, the province often outsources this responsibility to public transportation suppliers like ‘Hermes’ or ‘Bravo’. He also mentions the concessions which the province is doing:

“[...] the province of Noord-Brabant is responsible for public transport, they have three large concession areas in West-Brabant, Oost-Brabant, so that is Den Bosch, Tilburg and Zuidoost-Brabant that is the Eindhoven region, they are now applying BRAVOflex in all three concessions[...] In order to roll out that BRAVOflex concept, the province has made resources available to create transfer stops on the one hand, so an existing bus stop is expanded with, for example, a digital information board and a number of bicycle racks and parking spaces and they have boarding stops, which are really completely in the capillaries so then in the Someren-Eind there is an extra sign saying ‘here you can get on the BRAVOflex.’ The province has made money available for this in West Brabant, and it has been agreed with municipalities that this is where the stop will be, this is where the facilities should be located.”

(Employee of ‘Brainport Bereikbaar’, 2025)

What is interesting is that both employees of both the province and ‘Brainport Bereikbaar’ mention that the province is trying more concessions to replace or enhance the current public transportation system in the region of Eindhoven. Implementing mobility hubs can therefore also serve as an enhancement for the current mobility system. This will increase the movability of people in more remote areas in the city, the parts in which public transportation is lacking compared to other areas of Eindhoven. This was also said about the province of ‘Noord-Brabant’:



“...And I see that the province of North Brabant is taking a really great step in that direction, I think they laid down a vision for future public transport or future shared mobility about eight years ago or so, I'm not precise, but they have drawn up a pretty good vision document and they are now slowly but surely rolling it out and they are doing that from west to east.

...
and then the province is really a partner for us.”
(Employee of ‘Brainport Bereikbaar’, 2025)

As we have established in the subchapter about the national governmental regulation regarding mobility hubs in Eindhoven, we can see in contrary that the province takes on a much more active role in the planning and realisation of mobility infrastructure. While the national government make the overarching policies and regulations, the actual realisation of the public transportation and mobility systems in the province, and therefore the cities within that province, is done through the provincial government. The province of ‘Noord-Brabant’ in this case can therefore really be see as the owner of the public transportation in the province. In the case of urban mobility, the province takes on a clear role (Employee (1) of Haskoning, 2025).


5.2.3 Municipal Government

In this part of the chapter, we will discuss how the municipal government works within the regime level regarding mobility hubs in Eindhoven. The employee of the municipality of Eindhoven (2025) states that some projects in the municipality of Eindhoven are completely designed and implemented by the municipality themselves. However, he also mentions that some plans are completely out of their hands. Regarding shared bicycles at the train station, he says:

“Actually, ProRail is always the owner of all stations. And the NS is then the buyer. So if you look at the ‘Toekomstbeeld’ [...] What the NS and ProRail want, they are such big parties, then you can say as a municipality ‘just do a small bicycle shed and then we will do everything with shared bicycles.’ But actually you do not have full control over that. No, you do not have full control over that.”
(Employee of the municipality of Eindhoven, 2025)

As mentioned before in this chapter, the national government does not play an active role in the implementation of integrated and future-proof mobility hubs in Eindhoven. However, and this is also mentioned before, not only do they give subsidies to the provinces, they also give out subsidies to municipalities. This is for the same reason as they do for the provinces, they enable the municipality to implement a pilot project regarding mobility hubs and in exchange they want the information regarding the location of the hub and the travel data (Employee of the municipality of Eindhoven, 2025). He also mentions that since the municipality is closest to the actual users and inhabitant of the city, the municipality can contribute the most in the earlier mentioned landscape development of societal challenges. The municipality is the first actor which can directly influence the inhabitants by nudging the people or speaking to the people. As mentioned in the subchapter about provincial government, the province can be seen as the owner of the public transportation in the province. However, everything surrounding the public transportation, such as bus stops, bus lanes, maintenance, is all the responsibility of the municipality of Eindhoven (Employee of ‘Brainport Bereikbaar’, 2025). This means that the municipality is responsible for the public space around the public transportation. He also mentions that the municipality has a moral responsibility to the inhabitants to also comply with their own plans before ‘forcing’ them on to the population:

“As employers, municipalities simply have an exemplary function and can adjust their own employment conditions for their staff and thus really give substance to those mobility issues.”
(Employee of ‘Brainport Bereikbaar’, 2025)



It is also said that it is difficult to come up with one uniform definition of what the municipal government is regarding the implementation of integrated and future-proof mobility hubs. This because the municipal government is highly contextual and can therefore barely be compared to other municipalities. While larger policies and ambition exists, each individual municipality has their own challenges and therefore interprets the urban mobility transition in a different way (**Employee (2) of Haskoning, 2025**). What is also said by his colleague (**Employee (1) of Haskoning, 2025**), is that many municipalities face difficulties with their implementation capacity. This because the national budget has been cut back on municipal levels, which is remarkable given the pressure that the national government puts on the smaller governmental bodies.

What is interesting about the municipal level in within the regime level of the MLP framework is that they have far more responsibilities when compared to the provincial government or the national government. Not only does the municipal government have more responsibilities, since these responsibilities are highly dependent on the contexts of the city, the responsibilities sometimes become too much are too specific which draws attention away from what really needs to be done. More on this misalignment will be discussed in a later chapter about the coordination between levels.

5.2.4 User Needs & Behaviour

In this part of the chapter, we will discuss how the users and inhabitants of the city of Eindhoven are perceived by the regime but also how the users and inhabitants of Eindhoven perceive the mobility infrastructure and transition themselves. The **employee of the 'Noord-Brabant' province (2025)** has said in the interview that it remains a societal question whether the inhabitants and users of new mobility infrastructures are actually willing to actively use the infrastructure. He also mentions that inhabitants will only use new mobility infrastructures when using the car is not beneficial anymore. The usage of a mobility hub should therefore be more practical than the usage of a private car. Not only that, but he also mentions that people are more willing to travel whenever the transfer between different modes is effortless. Social safety is an aspect which is not regarded enough and should be more thought about as well (**Employee of the 'Noord-Brabant' province, 2025**). What is also interesting in what he said is that the province can not and often does not want to listen too much to what inhabitants want. This because inhabitants have a lot of wishes and desires and the province often can not keep up with all of them.

The **employee of the city of Eindhoven (2025)** further stresses that the inhabitants need to realise that a change is needed in the travelling behaviour:

“You always say ‘make room’, but it actually just means that those parking spaces have to go. We have to get the ‘can’ (‘Blik’ in Dutch) off the street. I think a car is stationary 90% of the time. It’s actually crazy that we all drive a car. Driving a car isn’t that bad, but owning a car is. I think that’s the main [...], that you can limit those cars. At the same time, it means that you can always choose the right means of transport for the journeys you want to make.”

(**Employee of the city of Eindhoven, 2025**)

Later in the interview he stated that Eindhoven has a lot of opportunities to initiate this change of behaviour of the inhabitants. He stresses that, because of the cycling nature of the Netherlands, Eindhoven really needs to boost bike usage in the city. This will create space in the city for the implementation of mobility hubs and reduces the usage of private cars. What is also mentioned is that there will always be socio-demographic groups which will feel left out in certain mobility aspects.

“...Say less able-bodied or disabled. That is quite difficult. We notice that. Because it is a very specific target group. So.. Actually, the starting point of a shared bike is that everyone can use it. Because if it becomes something specific, then you can no longer share it.”

(**Employee of the city of Eindhoven, 2025**)

While this quote only mentions less able-bodied or disabled people, it also applies to other specific socio-demographic groups in the city. Mobility hubs are often facilitated with shared mobility modalities, such as scooters, bikes, and cars, and once you want to include very specific socio-demographic groups in the city these mobility option can not be regarded as 'shared' anymore.

What is furthermore interesting is that he also states that he acknowledges that the planning and implementation of mobility hubs in the city is often done via a top-down approach. He shares the idea of including more inhabitants and users and ask them what they really want, keeping the overarching goal of diminishing the private car usage in mind.

What is further mentioned about how the regime level thinks of the needs and behaviour of the inhabitants of Eindhoven and the users of mobility hubs is that the social aspect of mobility hubs plays an important role in the behavioural change.

This is seen from a statement from the **employee of the 'Noord-Brabant' province (2025)** in which he says that presence of a small kiosk can function as a moment of social contact and therefore contribute to the social safety. This is supported by the following quote:

“Yes, you can put a parcel machine there or something. And hope that the residents will chat more.

But your staffing is just incredibly expensive. It is already difficult to make guarded bicycle sheds. Where there is security fifteen hours a day. That is already difficult to achieve. So I can hardly imagine that you will immediately get a manager at a hub. But if you make a hub, you make it near one of the community centres. Or where all the facilities are already there. I agree with that.”

(Employee of the municipality of Eindhoven, 2025)

Both the **employees of Haskoning (2025)** agreed that social safety plays a major role in the behavioural change. Indirect effects of implementing mobility hubs are that more space becomes available for greenery or safer streets. These changes will make it easier for kids to play outside or to walk to certain destinations. This also contributes to the social safety aspects of mobility hubs.

Now that we have discussed how the regime actors in the regime level of the MLP framework think about the needs and behaviour of users and inhabitants, we will now discuss how these users and inhabitants actually feel about the current situation and what their thoughts are regarding current mobility hubs and/or mobility hubs in the future. While the estimated saturation number for the inhabitants of Eindhoven was estimated around 150 inhabitants, the survey sadly fell short of that number and gathered 142 responses amongst the inhabitants (the survey was conducted and answered in Dutch). While this means that the results are not fully representable for the whole city of Eindhoven, it does come very close and thus might say something about the overarching population.

AGE	COUNT OF RESPONDENTS_ID
18-24	28
25-34	41
35-44	37
45-54	22
55+	14
GRAND TOTAL	142

Table 3: Age distribution of survey (Author's own, 2025).

In the table above (**table 3**) we can see the total number of interviewed people and in what age group they were situated. It is important to note that the largest group of surveyed people were between the ages of 25 and 44. This group often have full-time jobs and may travel more on a daily basis than the other groups. What is interesting however, is that out of these 142 respondents, a total of 57 people have indicated that they barely or never use the public transportation system in the city. The other 85 respondent have indicated that they do use public transportation in the city of

Eindhoven, varying from daily to weekly. The respondents have been explained about the concept of a mobility hub and asked whether they use a mobility hub in the city, this was their response:

LABELS	COUNT OF GEBRUIK MOBILITEIT HUB
JA, AF EN TOE	72
JA, VAAK	13
NEE, IK HEB ER NOOIT EEN GEBRUIKT	14
NEE, MAAR IK OVERWEEG HET WEL	43
GRAND TOTAL	142

Table 4: Usage of mobility hubs in Eindhoven (Author's own, 2025).

85 people have said that they use mobility hubs on a more regular basis in Eindhoven. They mostly refer to 'Eindhoven Centraal' whenever it was indicated that they used a mobility hub in the city. Out of the 142 respondents, 43 are willing to ever try one when it is implemented nearby in the neighbourhood while only 14 have never tried one and indicated that they do not want to try one.

68 people out of the 142 respondents have stated that the existence of mobility hubs (again, mostly referring to Eindhoven Centraal) is particularly important when it comes to more sustainable and accessible mobility in the city, while 27 of them see it as somewhat important. The challenge however is whether they all feel the same way when smaller mobility hubs are proposed which directly affects their neighbourhood. 33 people were neutral when talking about the importance of mobility hubs while 14 people believed that mobility hubs are not important at all.

The survey also asked what the biggest hinderances were for people to use mobility hubs and what they perceive as a negative influence.

LABELS	COUNT OF RESPONDENT_ID
GELIMITEERDE AANWEZIGHEID VAN SERVICES (DEELFIETS, DEELAUTO, MICROMOBILITEIT)	33
LANGE WACHTTIJDEN	47
SLECHTE SIGNALERING EN BEWEGWIJZERING	23
SLECHTE TOEGANKELIJKHEID (VOOR BIJVOORBEELD MENSEN DIE MINDER VALIDE ZIJN)	2
SLECHTE VERBINDING TUSSEN VERSCHILLENDE SOORTEN TRANSPORT	37
GRAND TOTAL	142

Table 5: Hinderances of mobility hubs (Author's own, 2025).

What is interesting is that most people see the long waiting times as the biggest hinderance to use a mobility hub or they experience that as the most negative factor. This refers to the way people perceive the time it takes between different modes of transportation in the city. This is apparently not up to the standards of the users and inhabitants. 33 people stated that there is a lack of available services (such as scooter, bikes, etc.). 37 people stated that the overall transferability between modes is not up to their standards. This can refer to modes not being present or that multiple different apps are needed to switch between modes. 23 people have indicated that the available information is not up to their standards, and they would like to see a change in that. Only 2 people have indicated that the mobility hubs are not accessible for certain groups in the society of Eindhoven.

The survey not only asked what the negative sides of mobility hubs were in Eindhoven, it also asked what the users and inhabitants' thought was the most useful when speaking about mobility hubs. They were asked to select 2 answers, so that is why some answers appear multiple times.

LABELS	COUNT OF VOORDELEN MOBILITEIT HUBS
MAKKELIJKERE OPTIES OM TE REIZEN, VERMINDEREN VAN VERKEERSOPSTOPPINGEN	25
MAKKELIJKERE TOEGANKELIJKHEID TOT VERSCHILLENDE SOORTEN TRANSPORT, MAKKELIJKERE OPTIES OM TE REIZEN	1
MAKKELIJKERE TOEGANKELIJKHEID TOT VERSCHILLENDE SOORTEN TRANSPORT, MEER VEILIGHEID EN ZEKERHEID	34
MAKKELIJKERE TOEGANKELIJKHEID TOT VERSCHILLENDE SOORTEN TRANSPORT, VERBETEREN VAN MILIEU IMPACT (MINDER UITSTOOT)	36
MAKKELIJKERE TOEGANKELIJKHEID TOT VERSCHILLENDE SOORTEN TRANSPORT, VERMINDEREN VAN VERKEERSOPSTOPPINGEN	44
VERBETEREN VAN MILIEU IMPACT (MINDER UITSTOOT), MAKKELIJKERE OPTIES OM TE REIZEN	1
VERMINDEREN VAN VERKEERSOPSTOPPINGEN, MEER VEILIGHEID EN ZEKERHEID	1
GRAND TOTAL	142

Table 6: Positive effects of mobility hubs (Author's own, 2025).

5.2.5 Cooperation in Regime Level

Now that this thesis has discussed each actor in the regime level of the MLP framework, it will now address how these different actors interact with each other to see where the biggest misalignments are and where opportunities are. The **employee of the 'Noord-Brabant' province (2025)** has stated that the regional cooperation for implementing mobility hubs is crucial. This regulation would then involve multiple municipalities and the province themselves. This is important to reduce the risks of misalignment between different governmental bodies. He also states that the plans for the urban mobility transition are often indirectly translated between governmental bodies. It often remains unclear of what exactly is provincial and what is municipal policy. A different quote further emphasizes this confusion about the different responsibilities that come with the implementation of mobility hubs:

“What you notice now, and especially with those larger hubs, is that, I call it ‘governance’, who is going to manage something like that? Whose cars are the shared cars? What agreements are you going to make then? Who gets the profit? If you make that building, and maybe three different sharing providers come in, who is going to pay for, manage, maintain that building? I think that is the biggest barrier.”

(Employee of the municipality of Eindhoven, 2025)

He further stresses this problem by adding that almost every governmental level does want the same outcome, but the road to that outcome and who is then responsible for what implementations remains very unclear. As he mentioned before, the national government is often more a stimulating factor by handing out subsidies since they do not own much ground to implement changes themselves. However, what is hopeful is that he also mentions that once in 2 or 3 months, the municipality (together with people from Utrecht and Rotterdam) sits together with the INW (Ministerie van Infrastructuur en Waterstaat) to discuss the progression about new mobility hubs and infrastructure. So, on that front we can conclude that some cooperation and interchange of information is present in the regime level.

“The third part is organizational, which is also quite complicated because the responsibilities for the different system components are assigned to different places, a complicated sentence.”

(Employee of 'Brainport Bereikbaar', 2025)

This employee of the 'Brainport Bereikbaar' advisory bureau goes further on the aspect of the unclear responsibilities amongst the involved governmental bodies. As has been mentioned before, the province owns the public transportation while the municipality own everything around public transportation such as the space and surroundings. The indirect translation of the urban mobility plans is also a reoccurring theme amongst the interviewed experts.

"So yes, you notice that this translation has to take place from national policy to municipal level. And I think, in many places that goes well. Especially if they are large municipalities. But I think that there are sometimes capacity shortages at municipal level. Especially because there have been a lot of cutbacks at municipal level in the last ten years. And there is a lot of pressure from the central government to make certain developments. So I think that there is still a gap between what is asked at the central government[...]. And what can be done at municipal level. Because sometimes there is a lack in the capacity or the knowledge. Or the financial level."

(Employee (1) of Haskoning, 2025)

Not only does this employee mention the indirect translation of the plans, he also mentions that municipalities often deal with a lack of capacity and monetary means to actually make meaningful changes in the city. His colleague further mentions another example of where good cooperation can be seen. The 'Hub Design Academy', which is sponsored by the 'INW' is a program in which the 'INW' hands out subsidies. Some 30 municipalities are involved and in meetings which are held these municipalities communicate to learn from each other. This is a completely voluntary initiative, but it shows that the national government is involved and communicates with the municipal level. What is further mentioned, and it is something which can not be underestimated is this:

"There is also of course some differentiation in the different levels. Because you also notice that, if you look at politics. At a national level, we have been more centre-right. In the past twenty years. And some cities are more centre-left. So then you actually notice that certain cities, they then focus very much on public transport. Or a kind of mobility. While from the national government, perhaps the focus is more on accessibility by car. More of a different focus in that. So yes. It is also difficult to give a conclusion about that."


(Employee (1) of Haskoning, 2025)

Now that we have discussed how the different governmental bodies cooperate with each other, we also have to discuss how the users and inhabitants are involved in this process. What is interesting is that amongst the respondents of the survey, the differences are almost 50/50 regarding the question if they feel involved in the planning process of mobility hubs.

ROW LABELS	COUNT OF BETROKKENHEID BIJ ONTWERPEN
JA, GOED BETROKKEN	62
JA, MAAR KAN BETER	3
NEE, HOOR ER WEINIG OVER	42
NEE, WORDT HELEMAAL NIET BETROKKEN	35
GRAND TOTAL	142

Table 7: Involvement of users and inhabitants (Author's own, 2025).

We can see that 65 people feel that they are involved, whether it being fully involved or they feel like it could be better. 77 people feel that they are not involved at all in the planning process. 42 people of these 77 indicate that they are not involved but they have heard of the plans of the municipality. The other 35 people have said that they did not even hear anything about the desired changes of the municipality. This almost 50/50 difference can have a couple of explanations. Since the survey did not ask from which part of Eindhoven people come from, it can be that people from different parts of Eindhoven experience different involvement. Areas and neighbourhoods



undergoing big transitions or new housing projects are more likely to be involved in the projects than areas or neighbourhoods where nothing is being changed. Another explanation could be the involvement through online means. Elder people are often more prone to missing out on online sent invitations than younger generations. While this 50/50 difference could have multiple explanations, this thesis can not draw one specific conclusion on why people feel involved or not.

5.2.6 Influence of Market

Besides the different governmental levels and the needs and behaviour of the inhabitants and users, the regime level is also influenced by the market. This is also mentioned by the interviewed experts. The **employee of the 'Noord-Brabant' province (2025)** mentioned that the market regulates the demand for mobility hubs and shared mobility options. Companies providing these services determine whether municipalities can implement these mobility options.

This is also mentioned by the **employee of the municipality of Eindhoven (2025)**, where he states that the municipality has to work together with real estate developers to see whether they are open to implement newer mobility options in the desired plans. This way, the municipality is influenced by the real estate developers on the implementation of mobility options. But with this cooperation also comes conflicts.

“And as I just said, a developer benefits from fewer parking spaces if they want it to be cheaper. We benefit from that, because then there will be fewer cars in the city. So everyone will probably be moving in the same direction. But a developer also wants to make as much profit as possible, you know? As a municipality, we can't say that we're going to pay for all that.”
(**Employee of Eindhoven, 2025**)

Furthermore, it is mentioned that train stations are owned by ProRail and operated by NS. The **employee of Eindhoven (2025)** mentions that both these actors are so big in the decision-making process that the municipality has relatively not much to say when it comes to changing or implementing mobility options at these stations.

The **employee of 'Brainport Bereikbaar' (2025)** said the following about the market in the regime level.

“The municipality is currently in the process of issuing a concession for shared bicycles, which will also involve a supplier. It's highly likely that this will be a different supplier. So, you have two competing suppliers of shared bicycles, while ideally, you'd have a single system and a single supplier that can maximize its performance, especially since margins in shared mobility are still extremely slim. On the other hand, there are always advantages to having two suppliers, because then you still have some competition, so to speak, and as a government, you don't have the lock-in of being completely dependent on that one party. So, I'm always in favor of an oligopoly, ... However, if you have two or three parties that are good at it, that's always the healthiest market dynamic in my experience.”
(**Employee of 'Brainport Bereikbaar', 2025**)

What is interesting about how the market influences the implementation of mobility hubs is that the market is often seen as unstable or immature. This because the concept of integrated and future-proof mobility hubs is relatively new. Being a newer concept, it brings uncertainties and therefore the markets are not stable markets yet. Further implementation of mobility hubs and shared mobility options will lead to a market which is stabilized with more budget and more established providers which have proven their worth.



5.3 Niche Innovations

The **employee of the 'Noord-Brabant' province (2025)** states that he sees that more shared mobility options will play a bigger role in the future of urban mobility. As he further states, he does not see hydrogen working in the future, the reason for hydrogen not working is not mentioned. However, he does acknowledge that the further electrification of vehicles will become increasingly more important. Questions however can be asked whether electrification can still be regarded as a niche innovation regarding urban mobility, especially given the fact that many mobility options in the city of Eindhoven are already electrified. He further states that the upcoming AI technology should only be implemented as a supporting factor (for example to enhance MaaS services).

The aspect of shared mobility is further shared by the **employee of the municipality of Eindhoven (2025)**:

“But if you create a mobility hub, you can have a car, maybe a cargo bike, maybe a big cargo bike if you need to go to the hardware store. That means you have so many different things. The thing is, you might have a van once, whereas if you have a car, you can't transport big things. But if you have a mobility hub there, you might have a van once if you want to transport a couch. So a mobility hub makes sure that you always have the right transport that fits your journey. I think that's the most important thing. In order to share that, you don't have to own all that.”

(**Employee of the municipality of Eindhoven, 2025**)

The implementation of shared mobility options will enable the municipality to diminish the number of cars on the roads. This innovation of shared mobility and implementing them into current mobility infrastructures and future plans will play a bigger role in the future. He further mentions that the municipality raises questions regarding autonomous vehicles. He refers to the many traffic signs in the city, and the temporary traffic signs which are put up during construction. How can we really rely on these autonomous vehicles to read every specific traffic sign correctly and therefore adjust their speeds accordingly? That is one of the reasons why the municipality of Eindhoven is not convinced on the concept of autonomous vehicles. Regarding AI, that is referred to as a 'slippery' concept by the municipality, meaning that they do not yet know how and when AI will become a big player in the urban mobility.

“AI may change algorithms so that you can book things faster and easier or something, but I've been working on self-driving traffic for the past 10 years, I really don't see that happening for a while, so it will remain with the trends that you see now, so more electric vehicles, so you may need a bit more electricity at your hub, I can imagine that. I can also imagine that those hubs that are now being experimented with, that such a hub will also become an energy place, a place where you can use a shared cars very well as a neighbourhood battery. You then have a huge battery, there are also some pilots with that in Eindhoven, but that is also still quite experimental and will take another 10 years. I expect that it will really become more large-scale, namely that at that time you have to see how you can embed that in the hubs that are then emerging.”

(**Employee of 'Brainport Bereikbaar', 2025**)

This quote further supports that the electrification of vehicles will become a more important factor in urban mobility. Also mentioning that they can serve as batteries for neighbourhoods.



6. Discussion

In this chapter of this thesis, the sub-research questions which have been constructed will broadly be interpreted and answered by presenting the main themes and findings gathered from the collected data from the previous chapter. This is done by individually addressing these sub-questions and answering them in the way it was described in the methodology chapter. Answers from the expert interviews, in combination with scientific literature and the thoughts of the inhabitants of Eindhoven will enable us to construct a relevant and grounded answers for each of the sub-questions. To make clear what the structure of this chapter will be, the sub-question will be resurfaced:

1. *How do overarching landscape developments and broader trends shape the transition towards integrated and future-proof mobility hubs?*
2. *What are key characteristics and practices that shape Eindhoven's transport regime and influence the integration of mobility hubs?*
3. *What niche innovations can influence the design of mobility hubs to be integrated and future-proof?*


This chapter will address these questions in the same order as stated above, starting with the landscape level, secondly answering the regime level and lastly addressing the niche level of the framework. This chapter will end with addressing the recommendations for future research on the same topic.

6.1 How do overarching landscape developments and broader trends shape the transition towards integrated and future-proof mobility hubs?

This first section of the chapter will address the first sub-research question: *How do overarching landscape developments and broader trends shape the transition towards integrated and future-proof mobility hubs?* This question is based on the 'Multi-level Perspective' framework which was developed by Geels (2006). It specifically focusses on the landscape level of the framework. Using that framework as the theoretical basis for the coming answer, the answer will also be based upon the five expert interviews and a document analysis. The answer will address larger landscape transition dynamics such as climate change, digitalisation and a shift in what users need and how they behave in urban mobility.

Firstly, the most important and therefore central landscape development were the climate change challenges. What was particularly interesting is that the experts did not only regard mobility hubs as an enabler for more sustainable and flexible modalities of transportation, they also regarded mobility hubs as spaces which enables planners to integrate more green in the city. This would help the city in the battle against heat stress and the larger rain falls it is experiencing. Not only that, but this greening also helps actors to better align with other landscape developments such as European policies. Mobility hubs therefore serve not only mobility goals but also climate adaptation goals set by larger governmental bodies.

Secondly, digitalisation was mentioned as an important factor in the landscape level. Although it being more as an enabler rather than an end goal itself. The mentioning of MaaS services tells us that it is a concept which keeps the actors aware of the fact that it is a necessity for integrated mobility hubs. That being said, all interviewed expert mentioned that the digital tools should only be used as a supporting tool to broader urban mobility goals and not as a goal itself.



Lastly, all interviewed experts said that a big challenge lies within the societal world view the inhabitants and users have regarding urban mobility in Eindhoven. Dealing with car dependency, cultural expectations and a certain 'unwillingness' to changes to their 'personal' space are the biggest challenges the actors face. While they identify a difference in generations regarding their worldview on car ownership, the experts tell us that long-term behavioural change is necessary and that solid policy frameworks will help users and inhabitants to do so.

Concluding, the landscape level in regard to Eindhoven does enable the city with both external pressures but also with possibilities. Raising concerns regarding climate change and the upcoming digitalisation of the world will demand a change and creates space for the implementation of integrated and future-proof mobility hubs. However, the worldview of the society in the city and their large dependence on the private car can cause some barriers to implementing these mobility hubs.

6.2 What are key characteristics and practices that shape Eindhoven's transport regime and influence the integration of mobility hubs?

The second section of the chapter will address the second sub-research question: *What are key characteristics and practices that shape Eindhoven's transport regime and influence the integration of mobility hubs?*


Firstly, addressing the national governmental level, it can be said that the national government mainly operates as an enabler and facilitator. The national government is mostly involved by handing out subsidies and formulating national ambitions regarding urban mobility. But because of them not owning much land, they do not have much implementation power.

The provincial government in the regime level often fulfils a more active role when it comes to designing and implementing more integrated and future-proof mobility hubs. They are actively involved in making public transportation concessions with the implementation of the likes of BRAVOflex. It is also often mentioned that the province is seen as the owner of mobility in the province and public transportation, therefore portraying a major role in the implementation of mobility hubs. This way, the province can be seen as not only a policy maker but also as a partner to both the national government and the municipal government.

The municipal government which is involved in the regime level of the MLP framework and is specifically relevant to the municipality of Eindhoven. It can be concluded that the municipality of Eindhoven has a high responsibility when it comes to the public space on which these integrated and future-proof mobility hubs should be realised. This because the municipality owns that public space. Since the municipal government is closest to the inhabitants and the users of the urban mobility, they are trying to balance top-down procedures with bottom-up initiatives.

Regarding the users and inhabitants within this regime level of the MLP, it can be said that they are both still stuck in a more traditional worldview but that there are people in the city who are willing to change their travelling behaviour. The big reliance on private car usage is not helping in the transition towards more sustainable travelling options. However, data from the survey shows us that inhabitants and users are willing to change their behaviour if the negative effects of it are diminished. A large part of the society does however experience a lack of involvement in the mobility plans of the municipality. This can further hinder the implementation of mobility hubs since some people are not even informed at all. This further emphasizes the need to a more participatory governance in the city and the allowance of more bottom-up initiatives.

The coordination between these different levels and actors of the regime level is still a crucial barrier when it comes to the implementation of mobility hubs. The misalignment of different responsibilities, the confusion of who governs what and the inconsistencies regarding the allocation of resources all hinder an efficient and effective implementation. While there are programmes and



platforms which enable communication and collaboration, more could and should be done to further streamline the whole process.

To conclude, the regime level in Eindhoven shows that the involved actors all share the same ambitions and wishes regarding the future of urban mobility. However, in order to effectively and efficiently do so, institutional fragmentation and a change in user and inhabitant behaviour is needed to successfully implement integrated and future-proof mobility hubs.

The behaviour of both the users and inhabitants of Eindhoven plays a crucial role within the regime level of the MLP framework. Many people are still using their private cars on a regular basis, and that behaviour remains very difficult to change. Geels (2006) also mentions this. He states that the transition of regimes does not only function on infrastructural changes but also needs a cultural change. The conducted survey showed that there is a big portion of people who are willing to change and make more use of mobility hubs should they be implemented.

6.3 What niche innovations can influence the design of mobility hubs to be integrated and future-proof?

This third and last section of the chapter will address the third sub-research question: *What niche innovations can influence the design of mobility hubs to be integrated and future-proof?* This question is based on the 'Multi-level Perspective' framework which was developed by Geels (2006). It specifically focusses on the niche level of the framework. Using that framework as the theoretical basis for the coming answer, the answer will also be based upon the five expert interviews.

First of all, the shared mobility options in the city of Eindhoven. According to most interviewed experts, this is the most instantaneous and most viable innovation which the city faces. The desires of the city to diminish the usage of private cars are directly aligned with the implementation of shared mobility options. Mobility hubs with shared mobility options offer flexibility when multiple modes of transportation are provided (bikes, cars, vans, etc.).

Secondly, although it can be argued whether it is still a niche innovation, is the further electrification of urban mobility. All experts address electrification in the way that it will keep being very relevant, if not more relevant in the near future. Pilot projects of shared mobility often include electric cars and bikes, and it was even mentioned that electric vehicles can possibly serve as neighbourhood batteries in the future.

Lastly, the AI and autonomous vehicles have also been addressed. While AI can serve as an upgrade to current MaaS services such as booking apps or information apps, all the experts are unsure of what role AI will really play in the future. Autonomous vehicles are something which experts from the municipality and the province do not see happening. While pilot projects are implemented in different parts of the world, and while research on autonomous vehicles is done, it remains the question of if the city really wants this. Especially given the abundance of different traffic signs and ultimately the moral question about how it affects the safety of inhabitants and users.

Concluding, niche innovations, and in Eindhoven especially talking about electrification and shared mobility options, have potential to completely reshape how mobility hubs are designed and implemented. Although it can be questioned on whether electrification and shared mobility hubs are still niche innovations, they both are concepts which can be applied more to the current mobility system in the city and therefore transform that system.



6.4 Recommendations for Further Research

While this thesis aimed to provide a holistic view and exploration of the transition towards integrated and future-proof mobility hubs, more academic research will be needed.

Further research would benefit from a longer research period, investigating what the effects and interactions are along a longer period of time. This will lead to better insights into how the systems of urban mobility evolve and how behaviours and usages of users and inhabitants change over time. It can then also be studied how governmental structures adapt themselves over a longer period of time. Furthermore, it can be seen whether the pilot projects which exist today or are planned to start have a meaningful impact of the urban mobility and the way users see that.

Secondly, the research could benefit from a more comparative case study. This can be helpful to better identify what the challenges or opportunities are when more cities are investigated and to see whether these challenges or opportunities are also applicable to other cases. This can be done both in the Netherlands itself or internationally. This will lead to results which are more generalisable. Studying different urban contexts, demographics and governmental structures will help in identifying which factors are universally applicable and which factors are context-specific.

Even more research on the interactions and cooperation between multiple governmental levels will provide more insights into the interplay between these levels. Combining these governmental levels with more research into how the users behave and what their needs are will further enhance the academic relevance of the research. Diving deeper into what users and inhabitants want can potentially enhance the acceptance of users and inhabitants when it comes to future implementations.



7. Conclusion

In this chapter of the thesis, the conclusion will be given. The goal was to better understand the implementation of integrated and future-proof mobility hubs in Eindhoven through an understanding of Multi-level dynamics. Since the sub-questions have been addressed in an earlier chapter, this chapter will briefly address and conclude these findings (referencing the landscape, regime and niche level of the MLP framework) before answering the main research question of this thesis. Not only that, this chapter will also address the limitations of this research and provide recommendations for praxis.

7.1 Answer to Main Research Question

Main research question: *Which challenges and opportunities shape the transition towards the implementation of integrated and future-proof mobility hubs in Eindhoven?*


To conclude in advance, by answering the main research question of this thesis, we can say that the transition towards integrated and future-proof is shaped by complex interactions and interpretations of many challenges and opportunities in the discussed landscape, regime, and niche level of the used MLP framework.

At the landscape level, bigger trends and changes such as rising climate challenges, digitalization and the more traditional societal worldview result in external pressures for the actors in the regime level. These trends cause many actors to think about more green in the city, think about the usage of more efficient and effective mobility systems and think about how they can change the behaviour of both the inhabitant of Eindhoven as well as the users of mobility in the city. While these are all challenges which have to be faced, they are also big opportunities whenever successfully implemented in Eindhoven. If these landscape challenges will be considered more in the regime level, they can become part of the regime level and therefore reshape that level.

At the regime level however, we see that the fragmentation of responsibilities between the national, provincial and municipal level cause misalignments and coordination challenges. As discussed before, the national government often facilitates through handing out subsidies. The province is seen as the owner of mobility and public transportation and can therefore be seen as the main facilitator for actual implementation of mobility hubs. The municipality is often seen as the owner of public space in the city and therefore have a say about what goes where. However, the municipality can sometimes struggle with implementation capacity. Furthermore, the users and inhabitants are still 'stuck' in more traditional urban mobility. However, a large portion of the interviewed people have stated that they are willing to adjust their travelling behaviour. Challenges occur in the coordination and the indirect translation of mobility plans in the city, where responsibilities are unclear and confusion arises. Challenge is also to include more users and inhabitants in the making of plans, since they can also provide useful insights in how they see and experience the urban mobility infrastructure. Opportunities arise when the coordination and inclusion of all levels is enhanced. This will mean that the future implementation of mobility hubs can be done in a faster rate and that all governmental levels know what to do and what other need to do. This will further streamline the whole implementation process of mobility hubs.

For the niche level of the MLP framework, we can conclude that technologies such as the further electrification of vehicles and the implementation of shared mobility options create big opportunities for the city of Eindhoven. These technologies already have 'proven their worth' and are less risky than other technologies such as AI and autonomous vehicles. The further implementation of electric vehicles and shared mobility options are in line with the desires of the municipality, and once they are implemented on a more regular basis, they can disrupt the regime level and cause the regime level to reshape and include these technologies as standard.

To draw an overall conclusion, the transition towards integrated and future-proof mobility hubs is both enabled and hindered by different interactions between all levels. The landscape level puts



urgency on the matter, while the regime level show what path policies and regulations have to take before implementation, and the niche innovations nudge actors in a certain direction of how to shape the urban mobility in Eindhoven. Further aligning these levels with each other, by better aligning the governmental levels, allowing the engagement of users and inhabitants, and also the further experimentation of niche innovations will eventually result to the smoother realisation of integrated and future-proof mobility hubs in Eindhoven.

7.2 Reflection & Limitations

A contribution of this research is that it has a strong empirical grounded since it is based on both expert interviews as well as a public survey. This methodology of using both the interviews and the survey provides us with a better understanding of both sides of the regime level. This offers a complete and holistic view on the mobility transition in the city of Eindhoven. The study provides a valuable insight for both scientific and policy reasons regarding mobility transitions. It stresses that a more coordinated and streamlined governance is needed across all three levels, it shows that the engagement with the public should be used more and that a continuation of experimental niche innovations can contribute to the implementation of integrated and future-proof mobility hubs. If Eindhoven does this, the city can serve as a model for other European cities (and maybe cities worldwide).

However, this research also has its limitations. To start, there is an absence of interview data with an expert working on the national level of governance. This causes caution regarding the perspective of fully top-down policy making regarding mobility hubs. Furthermore, since relying on five interviewed experts, it can be questioned whether their views and experiences are fully representable across all relevant actors involved in mobility planning in Eindhoven. While the experts did provide many and diverse perspectives and answers, it can not be fully said that this is how all involved actors feel and think.


What is also important to note is that the estimated saturation number to draw conclusions for the whole demography of the city of Eindhoven was 150 respondents. Unfortunately, this research has fallen short of 8 respondents and therefore reached 142 answers to the survey. Although this is very near to the saturation number, it can not be said that it is fully representative of the whole diverse demography of the city of Eindhoven.

Thirdly, the coding of the found data in the expert interviews was done by using both deductive and inductive methods. This coding was however limited due to a time limit, and it can therefore be argued that it could have been done more extensively. Furthermore, future changes in policy or technological innovations after this data was collected may alter the outcome of future studies on the same subject. A risk is also present in the coding process where confirmation bias could have played a role. This because the entire process of interviewing and coding was done by one singular researcher. If in the future more studies are carried out, it should benefit from more triangulation of the findings, meaning that more data, more experts and more researchers increase the robustness of the findings.

7.3 Recommendations for Praxis

In this section, the intervention question will be answered by given some recommendations about the implementation of integrated and future-proof mobility hubs: *How can integrated and future-proof mobility hubs be implemented to meet the current and emerging mobility needs in Eindhoven?*

First of all, the landscape level. What can be recommended is that climate adaptation implementations should be prioritized. The provincial and municipal governments should include climate resilience and adaptation measures into the designs of mobility hubs. This means that mobility hubs should have greenery to mitigate the heat stress in the city and diminish the flood risks whenever big rainfalls are happening. Furthermore, the involved actors should embrace the idea of



further digitalization in the world. Investing in more smart mobility options while keeping in mind that digital services should always be supportive will help in mobility hubs being up to date. Emphasizing the importance of MaaS services will also serve societal needs and wishes, not only technological aspects.

In the regime level, it can be said that the multi-level governance can be much improved. Better communication and cooperation between the different governmental levels will be crucial to streamline the process of the implementation of mobility hubs. Policies should include more regular meetings between the different levels, and clearer frameworks should simplify which governmental level has what responsibility, where fundings need to go and who does the maintenance and operational side. Furthermore, public participation should be included more in the design and implementation phases. This so that public acceptance will be enhanced and to travelling behaviour of users and inhabitants can be changed. Bottom-up initiatives will come from this and further improves the inclusivity amongst the people.

Addressing the niche level, this thesis recommends to start with longer pilot projects. Extending the duration of pilot projects will allow users and inhabitants to adjust to the new situation, also leading to more behavioural changes. Not only that, but extending the duration will also enlarge the amount of data which can be gathered and therefore learned from. Additionally, keeping up the further electrification will also address the climate goals of the city. Shared mobility options should be sufficiently present in new mobility hubs, especially in lower-accessible areas (by means of public transportation). Making shared mobility options accessible and consistent will be crucial for the future implementation of integrated and future-proof mobility hubs.



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Appendix A: Interview Guide (in Dutch)

Jesper van Leeuwen

Afstudeeronderzoek Master's Thesis

Radboud University Nijmegen

Master Spatial Planning, specialisatie in Urban & Regional Mobility

Introductie: U bent uitgenodigd om deel te nemen aan mijn academisch onderzoek aan de Radboud Universiteit. Voordat u besluit (niet) mee te doen aan dit onderzoek zal ik u eerst uitleggen waar het onderzoek over gaat. Ik zou u willen vragen dit goed door te lezen.

Betreft onderzoek naar: *Inzicht in de implementatie van geïntegreerde en toekomstbestendige mobiliteitshubs door middel van Multi-Level-dynamiek in Eindhoven (raamwerk van Geels (2006)).* Het gaat in dit onderzoek over hoe het samenbrengen van niche technologische innovaties, het huidige mobiliteitsbeleid in Eindhoven en de wensen van gebruikers, samen met de overkoepelende ontwikkelingen wat betreft duurzaamheid en het verminderen van uitstoot beter gecombineerd kunnen worden zodat het proces van implementatie van deze geïntegreerde en toekomstbestendige mobiliteitshubs soepeler kan verlopen.

Proces: U zal geïnterviewd worden door mijzelf (Jesper van Leeuwen). Dit kan gedaan worden op een manier die u het fijnst vindt, denk hierbij aan Microsoft Teams/1-op-1 of iets dergelijks. Als u hier toestemming voor geeft zal het interview door middel van audio opgenomen worden samen met het maken van snelle notities tussendoor, dit zodat het onderzoek accurater zal worden. Deze opname zal gebruikt worden om het interview later verder uit te werken. Het interview zal om en nabij de 45-60 minuten duren. De vragen die in het interview gesteld zullen worden kunt u hieronder vinden.

Privacy: De audio-opname en notities zullen eerst gebruikt worden om uitgewerkt te worden en het onderzoek uit te schrijven. Daarna zullen de opname en de notities verwijderd worden. Het interview zal geanonimiseerd worden waardoor de data niet tot u persoonlijk te herleiden is. Dit wordt gedaan door alle persoonlijke informatie uit de data te halen en deze te vervangen door een pseudoniem. De onderzoeker is de enige die met deze data werkt, data die in het verslag en/of presentatie gebruikt zal worden. Deze data zullen daarom ook niet gebruikt worden voor andere onderzoeken of publicaties.

Mocht u nog vragen hebben kunt u mij hier bereiken:

Jesper van Leeuwen

Jesper.vanleeuwen@ru.nl

06-48053469





Toestemmingsformulier

Geïnterviewde

Hierbij verklaar ik te zijn ingelicht over de aard, methode en doel van het onderzoek en is het mij duidelijk waar ik aan meewerk. Ik heb vragen over het onderzoek kunnen stellen en die zijn naar tevredenheid beantwoord.

Ik begrijp dat:

- Ik mijn medewerking aan dit onderzoek kan stoppen op ieder moment en zonder opgave van reden
- Gegevens anoniem worden verwerkt
- Dit toestemmingsformulier vernietigd wordt na uitwerking van het interview

Ik verklaar dat:

- Ik geheel vrijwillig bereid ben mee te doen aan dit onderzoek
- De uitkomsten van dit interview verwerkt mogen worden in een verslag of wetenschappelijke publicatie
- Ik toestemming geef om het interview op te nemen door middel van audio-opname

Handtekening:

Datum:

Onderzoeker:

Ik heb mondeling toelichting verstrekt over de aard, methode en doel van het onderzoek en naar vermogen uitleg gegeven over waar de geïnterviewde mee instemt.

Handtekening:

Naam:

Datum:



Interview vragen:

Introductie

1. Zou u kort kunnen beschrijven wat uw rol en betrokkenheid is wat betreft de mobiliteit en/of ruimtelijke planning in Nederland/Eindhoven?

Visie en relevantie van Mobiliteit Hubs – Waarom zijn deze hubs belangrijk?

1. In uw perspectief, wat is de rol van mobiliteit hubs in het creëren van duurzame en toekomstbestendige stedelijke mobiliteit?
FOLLOW UP: Hoe ziet u dit met betrekking tot steden zoals Eindhoven?
2. Wat is volgens u een ‘volledig geïntegreerde’ mobiliteit hub in de praktijk?
FOLLOW UP: Op welke manier denkt u dat integratie een rol speelt in het succes van mobiliteitshubs? En hoe zou u de balans tussen fysieke infrastructuur, samenwerking tussen belanghebbenden en digitale diensten omschrijven?
3. Wat betekent ‘toekomstbestendig’ in de context van stedelijk mobiliteit infrastructuur volgens u?
FOLLOW UP: Hoe realistisch is dit concept gegeven de snelheid van technologieën in de mobiliteit?

Implementatie in Eindhoven – Hoe worden deze hubs geïmplementeerd?


1. Wat zijn volgens u de belangrijkste kansen en/of barrières voor de implementatie van mobiliteit hubs in Eindhoven?
FOLLOW UP: Welke uitdagingen ziet u als meest invloedrijk bij het vormgeven van de implementatie van mobiliteitshubs, en hoe zou u deze omschrijven?
2. Hoe effectief is de collaboratie tussen belanghebbenden in Eindhoven's mobiliteit planning?
FOLLOW UP: Zijn er duidelijke rollen tussen de gemeente, uitvoerenden en private actoren?
3. Kunt u een voorbeeld noemen van een mobiliteit hub project waarin successen en/of barrières naar voren kwamen?
FOLLOW UP: Welke lessen kunnen hieruit geleerd worden?

Politiek, beleid en strategie – Hoe beïnvloeden nationale/provinciale visies de lokale plannen?

1. Hoe worden de nationale plannen (Toekomstbeeld OV 2040/NL Klimaat Akkoord) vertaald naar lokale mobiliteit planning in Eindhoven?
FOLLOW UP: Hoe zijn deze verschillende plannen/niveaus afgestemd op lokale mobiliteit in Eindhoven? Wat werkt goed en wat niet?
2. Welke invloed hebben financieringsmechanismen of institutionele structuren op het vermogen om mobiliteitshubs op te schalen en te onderhouden?
FOLLOW UP: Is er genoeg flexibiliteit in de overheden om hubs aan te passen in de toekomst?

Gebruikers wensen, sociale waarden – Hoe rekening te houden met gebruikers wensen?

1. Zijn volgens u de gebruikers wensen en gedragingen adequaat overwogen in het design van mobiliteit hubs in Eindhoven?
FOLLOW UP: Hoe ziet u de inclusiviteit van de huidige mobiliteit hubs als we het hebben over de gebruikers? Zijn er groepen die volgens u over het hoofd gezien worden?

- 
2. Hoe kunnen volgens u mobiliteit hubs beter worden ontworpen zodat deze meer demografische en socio-economische groepen omvat?
FOLLOW UP: Welke rol spelen betaalbaarheid, toegankelijkheid of digitalisering hierin?
 3. Welke services of functies worden het meest gewaardeerd door gebruikers – en zijn deze present in huidige hub ontwikkelingen?
FOLLOW UP: Krijgen we genoeg feedback en commentaar van gebruikers om onszelf te informeren over het huidige ontwerp?

Afsluiting en Reflectie

1. Als u naar de toekomst kijkt, welke verandering zou uw prioriteit hebben om mobiliteit hubs in Eindhoven meer geïntegreerd en toekomstbestendig te maken?
2. Zijn er belangrijke aspecten die onderbelicht zijn volgens u, (milieu, sociaal, technologisch) die u cruciaal vindt voor het succesvol ontwikkelen van mobiliteit hubs?

We zijn nu aangekomen bij het eind van dit interview.

Zijn er volgens u nog aspecten die we niet besproken hebben maar volgens u wel belangrijk zijn voor de ontwikkeling van mobiliteit hubs in Eindhoven?

Ik wil u bij deze hartelijk bedanken voor uw tijd en expertise die u gedeeld heeft vandaag. Uw inzichten en kennis zijn erg belangrijk om de praktische, strategische en sociale aspecten van mobiliteit hubs in Nederlands te kunnen begrijpen.

Zoals ik eerder vermeld heb zal dit interview gebruikt worden voor mijn afstudeerscriptie aan de Radboud Universiteit in Nijmegen. Tenzij u anders heeft aangegeven zullen uw antwoorden anoniem gemaakt worden in het uiteindelijke verslag. Als u het transcript en de bevindingen van het interview wilt inzien ben ik meer dan bereid om u een samenvatting of het volledige interview op te sturen in de komende tijd.

Zou ik u eventueel op een later moment mogen contacteren mocht ik nog een dringende vraag hebben over het interview?

Nogmaals hartelijk dank voor uw tijd en bijdrage. Uw hulp wordt zeer gewaardeerd.



Appendix B: Survey Guide (in Dutch)

Toestemmingsformulier

Jesper van Leeuwen
Afstudeeronderzoek Master's Thesis
Radboud University Nijmegen
Master Spatial Planning, specialisatie in Urban & Regional Mobility

Introductie: U bent uitgenodigd om deel te nemen aan mijn academisch onderzoek aan de Radboud Universiteit. Voordat u besluit (niet) mee te doen aan dit onderzoek zal ik u eerst uitleggen waar het onderzoek over gaat. Ik zou u willen vragen dit goed door te lezen.

Betreft onderzoek naar: *Inzicht in de implementatie van geïntegreerde en toekomstbestendige mobiliteitshubs door middel van Multi-Level-dynamiek (raamwerk van Geels (2006)).* Het gaat in dit onderzoek over hoe het samenbrengen van niche technologische innovaties, het huidige mobiliteitsbeleid in Eindhoven en de wensen van gebruikers, samen met de overkoepelende ontwikkelingen wat betreft duurzaamheid en het verminderen van uitstoot, beter gecombineerd kunnen worden zodat het proces van implementatie van deze geïntegreerde en toekomstbestendige mobiliteitshubs soepeler kan verlopen. In deze vragenlijst zal u voornamelijk gevraagd worden over wat uw wensen en verwachtingen zijn bij de ontwikkeling van deze geïntegreerde en toekomstbestendige mobiliteitshubs.

Met een mobiliteit hub wordt een plek bedoeld waar meerdere vormen van transport samenkomen en het overstappen van vervoersmiddel makkelijk wordt gemaakt. (denk aan Eindhoven Centraal bijvoorbeeld).

Proces: Voor dit onderzoek zal u gevraagd worden om een vragenlijst in te vullen. Deze vragenlijst zal gebruikt worden als data om conclusies uit te trekken. Het invullen van deze vragenlijst duurt 5-10 minuten. De vragen zullen voornamelijk gaan over uw persoonlijke ervaringen.

Privacy: De vragenlijst vult u volledig anoniem in. Dit betekent dat de antwoorden op geen enkele manier te traceren zijn tot u als persoon. Dit wordt gedaan door alle persoonlijke informatie uit de data te halen. De antwoorden van deze vragenlijst zullen geanalyseerd en gebruikt worden voor het schrijven van mijn afstudeerscriptie.

Door de vragenlijst in te vullen geeft u aan genoeg informatie te hebben gekregen betreffende het onderzoek en is de context van het onderzoek duidelijk voor u. U gaat door het invullen van de vragenlijst ook akkoord met het gebruiken van uw antwoorden en de waarborging van uw privacy.


Mocht u nog vragen hebben kunt u mij hier bereiken:

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Survey vragen:

1. Onder welke leeftijdscategorie valt u?
 - Onder 18
 - 18-24
 - 25-34
 - 35-44
 - 45-54
 - 55+
2. Wat is uw geslacht?
 - Man
 - Vrouw
 - Anders
3. Hoe vaak gebruikt u het openbaar vervoer (bus, trein) in Eindhoven?
 - Dagelijks
 - Paar keer per week
 - Wekelijks
 - Bijna niet
 - Nooit
4. Gebruikt u ooit een mobiliteit hub (overstapplekken, deelfiets station, deelauto station, openbaarvervoer hubs) in Eindhoven?
 - Ja, vaak
 - Ja, af en toe
 - Nee, maar ik overweeg het wel
 - Nee, ik heb er nooit een gebruikt
5. Hoe belangrijk zijn deze mobiliteit hubs in het verduurzamen en het toegankelijk maken van stedelijke mobiliteit volgens u?
 - Heel belangrijk
 - Belangrijk
 - Neutraal
 - Onbelangrijk
 - Heel onbelangrijk
6. Hoe goed zijn verschillende soorten transport (bussen, fietsen, deelauto's) met elkaar verbonden in deze mobiliteit hubs in Eindhoven volgens u?
 - Heel goed verbonden
 - Goed verbonden
 - Neutraal
 - Niet goed verbonden
 - Heel slecht verbonden
7. Wat denkt u dat de grootste voordelen zijn van mobiliteit hubs in Eindhoven? (selecteer er twee)
 - Makkelijkere toegankelijkheid tot verschillende soorten transport
 - Verminderen van verkeersopstoppingen
 - Verbeteren van milieu impact (minder uitstoot)
 - Makkelijkere opties om te reizen
 - Meer veiligheid en zekerheid
 - Anders, namelijk...

- 
8. Heeft u ooit barrières ondervonden bij het gebruik van mobiliteit hubs in Eindhoven?
(selecteer wat van toepassing is)
 - Slechte toegankelijkheid (voor bijvoorbeeld mensen die mindervalide zijn)
 - Slechte signalering en bewegwijzering
 - Lange wachttijden
 - Slechte verbinding tussen verschillende soorten transport
 - Gelimiteerde aanwezigheid van services (deelfiets, deelauto, micromobiliteit)
 - Anders, namelijk...
 9. Vindt u dat de gemeente genoeg doet om mobiliteit hubs te ondersteunen?
 - Ja, ze doen genoeg
 - Ja, maar ze kunnen meer doen
 - Neutraal
 - Nee, ze doen niet genoeg
 - Weet ik niet
 10. Zou u meer mobiliteit hubs willen zien in Eindhoven?
 - Ja, zeker
 - Ja, maar wel maar in bepaalde gebieden
 - Neutraal
 - Nee, we hebben genoeg
 - Nee, ik denk niet dat ze nodig zijn
 11. Welk aspect van een mobiliteit hub zou volgens u de prioriteit moeten hebben in de toekomst?
 - Toegankelijkheid voor alle gebruikers
 - Verbondenheid van verschillende soorten transport
 - Beschikbaarheid van services (deelfiets, deelauto)
 - Betaalbaarheid voor de gebruikers
 - Verduurzaming van het milieu
 - Anders, namelijk...
 12. Voelt u zich gehoord en betrokken bij het ontwerpen en implementeren van mobiliteit hubs in Eindhoven?
 - Ja, goed betrokken
 - Ja, maar kan beter
 - Neutraal
 - Nee, hoor er weinig over
 - Nee, wordt helemaal niet betrokken

Hartelijk bedankt voor het invullen van deze vragenlijst! Uw antwoorden en feedback is belangrijk voor het afronden van mijn studie en kan in potentie bijdragen aan de toekomst van mobiliteit hubs in Eindhoven.

Jesper van Leeuwen