URBAN EUROPE

SmartHubs

Smart Mobility Hubs as Game Changers in Transport

WP2 Review of the state of the practice

T2.4. Policy and governance frameworks

Deliverable D 2.3

GOVERNANCE FRAMEWORKS FOR MOBILITY HUBS IN THE SMARTHUBS LIVING LAB AREAS

Version: 1.0

Date: 24.04.2023

Responsible partner: Westfälische Wilhelms-Universität (WWU)

Authors: Graf, Antonia (WWU), Hansel, Julia (WWU)

Supporting Partners: Dörrzapf, Linda (TU Wien); Durán Rodas, David (TUM); Geurs, Karst (UT); Martinez, Lluis (VUB);

WWU MÜNSTER

The project is supported by

SPONSORED BY THE

Federal Ministry of Education and Research

This project is supported by the European Commission and funded under the Horizon 2020 ERA-NET Cofund scheme under grant agreement N° 875022

DOCUMENT CHANGE RECORD

Version	Date	Status	Author	Description
0.1	19/10/2022	Draft	Julia Hansel (WWU)	
0.2	09/01/2023	Draft for review	Antonia Graf (WWU), Julia Hansel (WWU), Paula Schüder, Tomma Wagner	Antonia Graf (Conception, Review), Julia Hansel (Conception, Data Collection, Coding, Analysis, Writing, Review), Paula Schüder (Background Research, Coding), Tomma Wagner (Background Research, Review)
0.3	06/02/2023	Draft for review	Antonia Graf (WWU), Julia Hansel (WWU) Reviewers: Lluis Martinez (VUB), Linda Dörrzapf (TUW), David Durán Rodas (TUM)	Lluis Martinez (review), Linda Dörrzapf (review section 8), David Durán Rodas (review section 9)
0.4	24/03/2023	Revised Version	Antonia Graf (WWU), Julia Hansel (WWU) Reviewers: Lluis Martinez (VUB), Linda Dörrzapf (TUW), David Durán Rodas (TUM)	Julia Hansel (revision), Tomma Wagner (Background Research)
0.5	20/04/2023	Revised Version	Antonia Graf (WWU), Julia Hansel (WWU) Reviewers: Karst Geurs (UT), Lluis Martinez (VUB), Linda Dörrzapf (TUW), David Durán Rodas (TUM)	Karst Geurs (review)
1.0	24/04/2023	Final version	Antonia Graf (WWU), Julia Hansel (WWU) Reviewers: Karst Geurs (UT), Lluis Martinez (VUB), Linda Dörrzapf (TUW), David Durán Rodas (TUM)	Julia Hansel (revisions)

ABSTRACT

English

The sustainable and smart transformation of the mobility sector affects governance on local, national, and supranational levels. Thus, the governance of smart mobility is assumed to be at a critical stage, with a wide range of intervention options available to policymakers to pave the way for a more sustainable mobility system. Multimodality and the implementation of mobility hubs are increasingly perceived as part of the shift. With the *governance arrangement*, we developed a theoretical framework that considers organizational and ideational factors. To answer the question of how mobility hubs shape a specific governance outcome and vice versa, we analyzed expert interviews and policy documents. The analysis of the four cases (living labs in Munich, Rotterdam, Brussels, and Vienna) uncover various factors that influence mobility hub planning, implementation, and operation. Organizational factors limiting the processes are undefined responsibilities, fragmentation of governance structures, and interdependencies of administration departments, mobility providers, and regional transport associations. Ideational factors i.a., include discursive disagreements regarding priorities and space allocation. We conclude that knowledge integration for these obstacles should be expanded to equip practitioners with appropriate skills and resources.

Deutsch

Die nachhaltige und smarte Transformation des Mobilitätssektors beeinflusst die Governance auf lokaler, nationaler und supranationaler Ebene. Die Entwicklung smarter Mobilität befindet sich in einer kritischen Phase. Politischen Entscheidungsträgern steht eine breite Palette von Interventionsmöglichkeiten zur Verfügung, um den Weg für ein nachhaltigeres Mobilitätssystem zu ebnen. Multimodalität und die Einrichtung von Mobility Hubs werden zunehmend als Teil dieses Wandels betrachtet. Mit dem Governance-Arrangement haben wir einen theoretischen Rahmen entwickelt, der organisatorische und ideelle Faktoren berücksichtigt. Durch die Analyse von Experteninterviews und Policy Dokumenten kann die Frage beantwortet werden, welche Einflüsse Mobility Hubs und das Governance-Arrangement aufeinander nehmen. Die vier analysierten Fälle (Living Labs in München, Rotterdam/Den Haag, Brüssel und Wien) zeigen verschiedene Faktoren auf, die die Planung, Umsetzung und den Betrieb von Mobility Hubs beeinflussen. Hindernde organisatorische Faktoren, , sind unklare Zuständigkeiten, die Fragmentierung der Governance-Strukturen und die gegenseitigen Abhängigkeiten von Verwaltung, Mobilitätsanbietenden und regionalen Verkehrsverbünden. Zu den ideellen Faktoren gehören u.a. diskursive Unstimmigkeiten über Prioritäten und Raumaufteilung. Wir kommen zu dem Schluss, dass die Wissensvernetzung in Bezug auf diese Hindernisse ausgeweitet werden sollte, um die praktischen Akteur:innen mit entsprechenden Fähigkeiten und Ressourcen auszustatten.

Français

La transformation vers des mobilités durables et intelligentes affecte la gouvernance aux niveaux local, national et supranational. Ainsi, la gouvernance de *smart mobility* est considérée comme étant à un stade décisif, les décideurs politiques disposant d'un large éventail d'options d'intervention pour paver la voie à un système de mobilité plus durable. Des plus en plus, la multimodalité et la mise en place de pôles d'échange de mobilité (*mobility hubs*) sont perçues comme partie intégrante de ce changement. Avec le *governance arrangement*, nous avons développé un cadre théorique qui prend en compte les facteurs organisationnels et idéationnels. Pour répondre à la question de savoir comment les *mobility hubs* façonnent le résultat d'une gouvernance particulière et vice versa, nous avons analysé des entretiens avec des experts et des dossiers politiques. L'analyse des quatre exemples (living labs à Munich, Rotterdam/la Haye, Bruxelles et Vienne) met en évidence divers facteurs qui influencent la planification, la mise en œuvre et le fonctionnement des *mobility hubs*. Les facteurs organisationnels qui limitent le processus sont les responsabilités floues, la fragmentation des structures de gouvernance et les interdépendances entre les services administratifs, les fournisseurs de mobilité et les associations régionales de transport. Les facteurs idéationnels, entre autres, comprennent les désaccords discursifs concernant les priorités et l'allocation de l'espace. Nous concluons que des connaissances concernant ces obstacles devraient être mieux integrées afin de doter les praticiens des compétences et des ressources appropriées.

Nederlands

De duurzame en smart transformatie van de mobiliteitssector is van invloed op governance op lokaal, nationaal en supranationaal niveau. De governance van smart mobiliteit wordt daarom beschouwd als in een kritieke fase, met een breed scala aan interventiemogelijkheden voor beleidsmakers om de weg vrij te maken voor een duurzamer mobiliteitssysteem. Multimodaliteit en de realisatie van mobiliteitshubs worden steeds meer gezien als onderdeel van deze verandering. Met het governance arrangement hebben we een theoretisch kader ontwikkeld dat rekening houdt met organisatorische en ideële factoren. Door interviews met deskundigen en beleidsdocumenten te analyseren, kunnen we de vraag beantwoorden welke invloeden mobiliteitshubs en governance op elkaar hebben. De analyse van de vier cases (Living Labs in München, Rotterdam/Den Haag, Brussel en Wenen) laat diverse factoren zien die de planning, implementatie en werking van mobiliteitshubs beïnvloeden. Organisatorische factoren die de processen belemmeren zijn onduidelijke verantwoordelijkheden, de versnippering van bestuursstructuren en de wederzijdse afhankelijkheid van overheden, mobiliteitsaanbieders en regionale vervoersautoriteiten. Tot de ideologische factoren behoren onder andere discursieve meningsverschillen over prioriteiten en ruimteverdeling. Wij concluderen dat kennisnetwerken met betrekking tot deze belemmeringen moeten worden uitgebreid om de praktische actoren uit te rusten met passende vaardigheden en middelen.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

The SmartHubs project examines mobility hubs as part of intermodal mobility and the shift towards inclusive, sustainable urban mobility and accessibility. The main objective is to assess if a co-designed, user-centric development of hubs is a game changer for the mobility transition towards inclusive and sustainable transport. SmartHubs will examine, develop, and apply research methods and tools in SmartHubs Living Labs in Brussels, Rotterdam/ The Hague, Munich, Vienna, and Istanbul. Smart hubs are "a physical location where different shared transport options are offered at permanent, dedicated and well-visible locations and public or collective transport is available at walking distance" (Geurs & Münzel, 2022, p. 32). Mobility hubs can also provide a range of mobility-related and non-mobility services, such as charging points for electric cars or bicycles or waiting areas, kiosks for coffee, parcel storage, and others.

Mobility hubs can be understood as the physical manifestation of multimodal mobility. They aim to enable a seamless change between different modes of transport. Often, this is related to the so-called last/first-mile mobility, referring to the first or last part of a multimodal journey. Mobility hubs contribute to integrating digital, spatial, and social aspects. The SmartHubs integration ladder (see Geurs & Münzel, 2022) was developed as a heuristic to rank and compare mobility hubs and their development. It is based on three dimensions: physical, digital, and democratic integration. The SmartHubs integration ladder allows comparing different hubs with different services, understanding potential effects, and aiding the integration of societal goals into mobility hub developments. The underlying assumption is that the "smarter" the mobility hubs, "the more user value is created, higher usage and user satisfaction levels are achieved and increased societal impacts can be expected (in terms of reduced car use and ownership levels, accessibility impacts, impact transport emissions, etc.). In other words, smart mobility hubs with high levels of integration are more likely to become a game changer towards inclusive, sustainable urban mobility and accessibility" (Geurs & Münzel, 2022, p. 37).

Multimodal mobility is not an entirely new phenomenon; Park&Ride/ Bike&Ride stations or drop-off zones near train stations are already part of urban mobility planning. Mobility hubs build on this idea and develop these points of exchange in a more strategic and sophisticated way. Relying on already existing infrastructure and the public transport system as a backbone, the planning and implementation of mobility hubs are highly dependent on the built infrastructure, various administrative organizations, institutional competencies, and political support. Consequently, many new and already established actors must find new ways to cooperate. Questions of governance emerge automatically in this dynamic field and shall be addressed in this report. The multitude of actors on different governance levels with partly converging interests, the demands of ecological, social, and economic goals, and limited space in densely built environments create a complex planning landscape that can only develop sustainable urban mobility with tailored governance. Focusing on the multi-level governance of smart mobility clarifies that not only the technological challenges are likely to frustrate its adoption, but socio-economic and political challenges are the ones where the greatest complexity lies (Docherty, 2020).

This Deliverable 2.3 results from task 2.4, "Policy and governance frameworks" of the SmartHubs project. From each Living Lab, one exemplary hub was chosen to be studied in detail. For the Living Lab in the Brussels Capital Region, a public transport stop in Anderlecht called Place du Conseil/Raadsplein was selected. During the Smart Hubs project, surveys and participatory projects (like interviews, focus groups, on-street events) will be conducted in this area. The mobility hub at Bruno-Marek-Allee was examined for the Living Lab in Eastern Austria. It is an established mobility hub in an urban development area and belongs to the public network of mobility hubs organized by the Wiener Linien. For the Living Lab area of Rotterdam / The Hague, a mobility hub in The Hague was chosen. Nearby the Haagse Markt, the urban design of the Hobbemaplein will be redeveloped, with a mobility hub at the center. In the context of the SmartHubs project, participatory elements will be tested, focusing on the area. Finally, in Munich, the area around the Technical University Munich serves as the Living Lab area, and the research is conducted within and around the campus. Since the city of Munich is currently working on a mobility hub network, the overall governance structures regarding mobility hubs in Munich were examined.

(Google Maps/ Street View, 2022; Open Data Platform SmartHubs Project 2022)

Figure 1 Case Overview

Along these cases, this report aims at reconstructing the multi-level governance framework of the four SmartHubs Living Lab Areas[1]. It examines how European, national, regional, and local policies on mobility and transport facilitate smart, sustainable urban transport in the form of mobility hubs. Who is involved in the planning, building, and operating of mobility hubs? What networks of actors emerge? How are mobility hubs integrated into the overall mobility policy and planning of cities? Or, to put it more precisely: *In which way does the governance framework on sustainable and smart urban mobility influence multimodality and mobility hubs in specific?*

This report is structured as follows. Section 2 elaborates on the existing academic literature on governance concerning mobility hubs. Since there is only a little research specifically on mobility hubs, research on (European) sustainable mobility, multimodality, or smart mobility governance will also be included. Next, Section 3 will explain the theoretical background and develops a coherent analytical framework to analyze the multi-level-governance frameworks of the four cases. After describing two approaches originating from environmental policy (3.1 and 3.2), they are combined (3.3) in a four-dimensional governance framework. This framework will be described in the context of mobility policies (3.4). In Section 4, the research design will be elaborated. Section 4.1. explains the general research design, and the following sections describe the data collection and analysis (4.2 and 4.3). The research process will be critically reflected in section 4.4. Section 5 and the following sections present the empirical results. It starts with the European context of the four Living Lab areas (sections 5.1 and 5.2). Afterward, each case will be described and analyzed in its own section (Sections 6-9). First, a graphical overview and a short description will illustrate contextual facts concerning the mobility hubs. Then, each case's organizational and ideational dimensions will be examined in detail. Finally, every case and the most important findings will be recapitulated. The last section 10 summarizes the overall learnings and concludes the empirical results.

2. ACADEMIC LITERATURE ON GOVERNANCE ASPECTS OF MOBILITY HUBS

The transition towards a mobility system compatible with climate mitigation and sustainable development goals proves to be a challenging ongoing process. Despite decades of climate action, the emissions in the European transport sector have increased by about 19% since 1990. Behind the energy sector, the transport sector is the second biggest emitter. It is responsible for 21% of GHG emissions (European Commission, 2020a; European Environmental Agency, 2019). In recent decades, national and European transport governance has been inefficient in reducing congestion and environmental harm (Docherty, 2018, p. 24; Sack, 2014, p. 3). Besides stagnating GHG emissions, noise and light pollution, congestion, unequal distribution of space, environmental harm, financial resources, and safety

[1] The original research proposal included Istanbul as the fifth case. Due to funding changes and difficult research conditions on the local level, the research could not be conducted.

issues remain objects of the political agenda on transport (European Commission, 2020a; Gebhardt, Krajzewicz, & Oostendorp, 2017; Miramontes, Pfertner, Rayaprolu, Schreiner, & Wulfhorst, 2017). Focusing on the socio-cultural dimension of mobility, scholars also pointed to the importance of inclusion, (in)justice and democratic value in the mobility sector (Lucas, 2012; Sheller, 2018; Sonnberger & Graf, 2021)

Regarding urban mobility planning, one central challenge is the reduction of individual motorized transport towards more sustainable alternatives, such as walking, cycling, and public transport. Instead of using a single mode of transportation, the advantages of several modes need to be combined as seamlessly and attractively as possible into an inter- or multimodal transport system (Dacko & Spalteholz, 2014; Deutsch, Beckmann, Klaus, J., Gertz, Gies, Jürgen, Holz-Rau, Christian, & Huber, 2016; Gebhardt et al., 2016; Gebhardt et al., 2017). With the growing importance of the concept of multimodality, the places where different modes of transport come together and offer the possibility to shift from one mode to another need further consideration. In the most basic definition, so-called mobility hubs are places where different modes of transport come together and allow people to switch from one mode to another (Amoroso, Castelluccio, & Santoro, 2012; Miramontes et al., 2017; Rehme, Richter, Temmler, & Götze, 2018).

The (urban) mobility sector is characterized by many different individual and public interests, private and public actors, vertically and horizontally differentiated institutions, dependencies, and competencies. International and national mobility politics can be characterized as a multi-level governance structure with multiple actors in a multi-sector and multi-process field (Bandelow, Lindloff, & Sikatzki, 2016; Docherty, Marsden, & Anable, 2018; Marsden & Reardon, 2018a; Sack, 2014; Tschoerner, 2016). Following Cresswell (2010), physical movement is only one dimension of mobility besides representation and practices. Each of these three dimensions of mobility takes part in the production and reproduction of power relations

There is no common definition of sustainable urban mobility (Holden, Banister, Gössling, Gilpin, & Linnerud, 2020; May, 2013). However, it can be agreed that sustainable mobility

> "must address the three imperatives of sustainable development: satisfying human needs, ensuring social justice, and respecting environmental limits" (Holden et al., 2020, p. 2).

Decarbonizing the transport sector is one of the most important tasks to achieve international climate targets. As part of that development, private car use will need to decrease and shift towards more efficient modes of transport (Lah, 2019). New mobility services available on demand, such as mobility hubs, are increasingly perceived as part of this shift (Storme, Casier, Azadi, & Witlox, 2021). Following this broad understanding of mobility, a governance perspective allows us to reflect on how knowledge and interpretations of sustainable urban mobility are shared by different societal, economic, political, and environmental institutions. Concepts and definitions of sustainable mobility do not neutrally occur but need to be considered in terms of their development, construction, and use (Gudmundsson, 2004). Sustainability as sustainable urban mobility is a concept of inherently normative (e.g. inclusive and resource-efficient) and political (subject to negotiation and power) dynamics of governance (Bache, Bartle, Flinders, & Marsden, 2015; Holden et al., 2020; May, 2013; Ruhrort, 2020; Tschoerner, 2016). This might also apply to the policies on multimodality and mobility hubs. Different actors might define mobility hubs and their purpose in different ways.

The need for sustainable transition in the mobility sector, new mobility services, and technological innovation also imply changes in the dynamics of governance frameworks. The role of the national state is changing. Federal governments are not the only player; new forms of governmental organizations, organized civil society, the private sector, and the media are increasingly meaningful. Following the notion of society-centered research (Karner, London, Rowangould, & Manaugh, 2020; Verlinghieri & Schwanen, 2020), the crucial role of the state is still recognized but supplemented by considering a broader range of actors, practices, and knowledge, such as businesses or NGOs. Also, a changing nature of institutions, including social structures and norms, can be described. This also includes changing processes through which the state interacts with other actors and governs society (Tschoerner, 2016).

In the context of smart mobility governance, Marsden and Reardon (2018b) also point to the dispersed power of states. Spatially and functionally distinct networks composed of public, private, and voluntary

organizations are at the center of interaction. The governance of smart mobility is assumed to be at a 'critical juncture'; a narrow time frame when policy makers will have a relatively broad range of options for intervention open to them to have a significant impact on subsequent outcomes before a new mobility regime becomes established (Docherty et al., 2018, p. 122).

There are some shifts expected with the socio-technical transition regarding smart mobility. First is a shift from ownership to 'usership'. This development also changes power relations and interests amongst actors. For example, some public transport providers incorporate shared bike or car systems in their economic activities. On the other hand, new shared mobility providers have become significant actors in the mobility sector. This influences the governance of mobility hubs accordingly since these shared modes play an essential role in the definition of a SmartHub (see above). Shared mobility takes part in the broader development of the so-called sharing economy. It does not only impact the power relations of economic players but also citizens. Technological innovations also facilitate small-scale or district-based sharing services in local communities (Shaheen & Chan, 2016).

Second, shifting the (sustainable) transition to the 'marketplace' mobility might strengthen a commoditization of individual journeys and the journey time of users. This might reinforce a longstanding trend toward neo-liberalization of the transport sector. For instance, this means emphasizing technological and behavioral changes, individualization and market strategies (Gössling & Cohen, 2014; Schwanen, Banister, & Anable, 2011; Schwedes, 2023). In this context, travel time and costs have been criticized for being unfairly the focus of (sustainable) mobility transitions (Banister, 2008). The strong focus on these two measures ensures that technical-economic rather than sociocultural factors are emphasized (Sonnberger & Graf, 2021).

Third, greater importance of the concept of inter-modality can be expected. As Hietanen (2014, p. 3) puts it:

> "The vision is to see the whole transport sector as a co-operative, interconnected eco-system, providing services reflecting the needs of customers. The boundaries between different transport modes are blurred or disappear completely. The ecosystem consists of transport infrastructure, transportation services, transport information and payment services."

Although smart mobility is often envisaged as a solution enabling mobile societies with limited carbon footprint due to electrified, shared, and more efficient services, these paradigms, fourth, do develop together harmonically (Lyons, 2018; Paulsson & Hedegaard Sørensen, 2020), but lead to open questions regarding data ownership and safety. On the one hand, what is a rich source for research on targeted digital services and their organization is, on the other hand, a challenge for data sovereignty and digital infrastructures (Docherty, 2018; Pangbourne, Mladenović, Stead, & Milakis, 2020). With smart shared mobility services, citizens' role will split even more into a double role as a recipient and a source of information through interfaces with data platforms (e.g., integrated paying or travel planning). One central challenge for governance is to balance risks and opportunities, especially with a long-term perspective when the majority, not the minority, is relying on data-intensive systems and delivering innovation without unwanted adverse outcomes (Docherty et al., 2018).

While mobility policy is subject to political debate, it is also highly dependent on the built environment, such as the general structure of a city or rural area, buildings, parks, the distribution of dwelling areas and workplaces. The existing infrastructure includes immobile parts of transport systems, such as rails, streets, train stations, and airports. With regard to political decision-making, it can be differentiated between planning, financing, building, and maintenance of infrastructures (Bandelow et al., 2016). Road systems are hierarchical, so it is commonplace for different jurisdictions to manage different kinds of routes. Regional or federal governments manage the 'strategic' network of expressways and other major roads. Regional or urban governments administer intermediate routes, and municipalities are responsible for local roads and streets. This means that the effects of the traffic management choices made by each kind of government spill over from one network to another (Docherty, 2020). The municipal institution is essential in implementing mobility hubs since they control the general local roads, streets, and urban space.

Marsden, Docherty, and Dowling (2020) explore how the curbside of the future will be the site of tensions between competing interests not just between different user groups – drivers, passengers,

cyclists, pedestrians – but also the governance entities that traditionally represent them. Even more than for space on the road, the use of space on the curb has long been tightly regulated by municipalities through stopping and waiting for restrictions and charging for different usages. Applied to the governance of mobility hubs, the availability of space to launch a mobility hub can be challenging, especially in dense urban areas. Since mobility hubs aim to connect public transport and sharing options, their distribution needs to follow already existing infrastructures of public transport. At the same time, it requires reallocation of road space, and especially (public) urban space, to places designated for environmentally friendly modes such as walking, cycling, public transport, and shared mobility service (possibly combined at one location at mobility hubs).

Each city has a specific historical, geographical, and sociocultural background, administrative structure, and local stakeholder constellation. This unique inner logic within cities (Berking & Löw, 2008; Kern, 2019; Zimmermann, 2008) influences how the local level reacts to different challenges, such as a sustainable mobility transition. European cities face the same contextual factors regarding the global climate crisis, the effects of 'glocalization' (Swyngedouw, 2004), and sociocultural narratives, like automobility or taboos (Gössling & Cohen, 2014; Manderscheid, 2014). As described, the sustainable and smart transformation of the mobility sector will affect the mobility system and implicate changes in power dynamics and governance. Cities and the local level will play an essential role in these dynamics. Recently, a growing number of research projects have worked on various aspects of mobility hubs (see, for instance, the eHubs project or MoBi-Mix). Some already published reports on their gained knowledge and partly touch upon questions of governance as well. Some refer to these questions (Aono, 2019; COMOUK & SHARE-North project, 2021; GoSEStran, 2020), while others specifically reflect certain aspects of governance. The MobiMix project, for instance, examined different approaches to regulating shared mobility and mobility hubs (Hached & L'Hostis, 2022). This report contributes to a better understanding of mobility hubs from a governance perspective and enriches current scientific knowledge based on empirical cases. The following section will elaborate on the theoretical framework for approaching governance and policies.

3. THEORETICAL EXPLANATION OF THE GOVERNANCE FRAMEWORK

As seen in the overview of current research on the governance of the transport sector, only a few approaches address empirical work from a multi-level perspective, including the implementation on the local level from a governance perspective. On its own, none fits the purpose of this research project of understanding the governance structure behind mobility hubs. Therefore, theoretical considerations of other fields of political science research will be considered to develop a theoretical framework with an applicable heuristic. Although multimodal transport is nothing entirely new, with the need for a sustainable transition, the concept gains or renews its importance to shift towards more environmentally friendly and inclusive services in the transport sector. Mobility hubs bring together different transport modes, operators, and local public authorities on different levels, developing new forms of cooperation and networks. As described above, four cases in four European countries will be studied empirically to understand the governance structures behind mobility hubs. Therefore, this report follows a somewhat exploratory character, which requires a broad theoretical approach to grasp all possible important aspects of the governance framework and see which ones need more detailed analysis. Based on empirical findings in the different cases, this report contributes and further explicates theories in the field and allows generating policy recommendations.

The following sections elaborate on the concepts of the policy arrangement approach, PAA (3.1), and governance architectures (3.2). Afterward, they are combined into a four-dimensional analytical framework (3.3). This analytical framework will be applied to mobility with reference to theoretical considerations of sustainable and smart mobility governance (3.4). This framework will be used in the empirical part to analyze the governance framework in the four case studies.

3.1.Policy Arrangement Approach

Based on empirical observations in the field of environmental policies, political scientists analyzed the institutional dynamics of governance frameworks. Leroy and Arts (2006, pp. 2f.) observed some general changes in environmental policy over the recent decades: The so-called discursive turn has sharpened the understanding of policy frames, representation, and the interconnectedness of (technical and societal) sectors (Durnova, Fischer, & Zittoun, 2016; Fischer, 2003). As a result of hidden political conflict, a problem can be defined in many ways (Hajer, 1995). This leads to problems in understanding and framing policies increasingly linked to multiple fields (multi-sector field). Second, shared political responsibilities of public and private actors amplify the need for cooperation and policy integration (Köhler et al., 2019). New sets of sometimes heterogenic actors appeared, resulting in a renewal of roles, attributions, and responsibilities. Third, various environmental policies and regulatory strategies exist parallel and can be characterized as multi-process or multi-rule policy fields. Additionally, more participatory approaches result in more stakeholder involvement (see also Schmitter, 2002). Lastly, the transnational and transboundary character of policies involve different levels of government and underline the multi-level character of environmental governance.

These shifts also apply to the field of sustainable and smart mobility. The mobility sector is outlined by many different individual and public interests, private and public actors, vertically and horizontally differentiated institutions, dependencies, and (in)formal networks. International and national mobility politics can be characterized as a multi-level governance structure with multiple actors in a multi-sector and multi-process field (Bandelow et al., 2016; Docherty et al., 2018; Marsden & Reardon, 2018a; Sack, 2014; Tschoerner, 2016).

Based on their political science research on institutional dynamics in environmental governance, Arts and Leroy (2006) offered the policy arrangements approach (PAA). The concept of policy arrangements does not seek to explain day-to-day policy processes but focuses on policy changes, continuities, and the emergence of new arrangements. It allows for analyzing the institutional patterns of change and stability in a particular sector and over a certain period. The PAA emphasizes four elements:

> "(1) the institutional embeddedness of multi-actor policy processes; (2) the manifestation of structural developments, such as globalisation, in concrete policy practices; (3) the role of different faces of power in policy-making; and (4) the importance of both substance and organisation, as well as of change and continuity in policy practices" (Arts & van Tatenhove, 2004, pp. 340f.).

As mentioned, the concept of policy arrangements offers the opportunity to analyze substances (principles, objectives, measures, etc.) and organizations (departments, instruments, procedures, divisions of tasks and competencies, etc.) of policies (Arts & van Tatenhove, 2004, pp. 341f.). Policy arrangements are defined as

> "the temporary stabilisation of the content and organisation of a particular policy domain at a certain policy level or over several policy levels -- in case of multi-level governance" (Leroy & Arts, 2006, p. 14).

On the one hand, this definition assumes that day-to-day processes develop a more or less stable pattern, which comprehends ideational (content) and organizational (organization) matters. On the other hand, it assumes that policy arrangements reflect long-term contextual societal and political trends and processes. Therefore, the concepts can only describe temporary fixations of arrangements and are limited to the spatial boundaries of the policy field in question, which might imply specific forms of multi-level governance (Arts & van Tatenhove, 2004).

The substantial and organizational components of policy arrangements include four dimensions: policy coalition, rules of the game, policy discourse, and resources (Arts & van Tatenhove, 2004). Policy coalition describes the actors and their interaction. Several players who share resources and/or perceptions of policy discourse might build policy coalitions. Depending on their interests, they identify similar goals and engage in the policy process. Actors of a policy coalition might support or challenge the current dominant system. Rules of the game can be described as guidelines that set the rules. They guide and constrain the behavior of individual actors despite different interpretations and strains of

theory. These rules can have a formal or informal character. Policy discourse refers to the interpretive dimensions within an arrangement (content). Discourse can be defined as

> "a specific ensemble of ideas, concepts, and categorizations that are produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities" (Hajer, 1995, p. 44).

Finally, resources are linked to the concept of power and can be understood as the ability of actors to achieve certain policy outcomes. Power can be a structural phenomenon regarding the asymmetrical distribution of resources in a society. It can also be a dispositional phenomenon regarding positions of autonomy or dependency between actors (Arts & van Tatenhove, 2004).

With the notion of 'Governance-beyond-the-state' Swyngedouw (2005, p. 1992) defined

> "the socially innovative institutional or quasi-institutional arrangements of governance that are organized as horizontal associational networks of private (market), civil society (usually NGO) and state actors".

The author describes them as horizontally organized and polycentric ensembles with dispersed power distribution and as increasingly prevalent in rule-making, rule-setting, and rule-implementation on different geographical scales. These arrangements occur in an 'institutional void' (Hajer, 2003, p. 175); therefore, no clear rules exist on how politics are agreed on and conducted. Especially the urban scale is a central terrain for the emergence of Governance-beyond-the-state. With liberal-democratic states, new forms of articulation between state-like forms, civil society organizations, and market actors emerged. Participants of such forms of governance hold different 'stakes' based on various attributes such as holders of rights, knowledge, space, interest, and others. It is characterized by a contradictory nature of empowering citizens on the one hand but creating undemocratic and in-transparent order on the other hand. The concept emphasizes the reorganization of the civil society-state relation, which is deeply defined by neo-liberal governance (Swyngedouw, 2005).

The general differentiation between content and organizations drawn from the PAA will be applied to the analytical framework of the mobility hubs. Also, it will take up the spatial boundaries and the definition of a specific time frame again. Governance-beyond-the-state helps to integrate the potentially changing nature of state and non-state actors into the analytical framework.

3.2. Governance Architecture

Building upon the PAA, the term 'governance architecture' can be described as a specific form of governance arrangement. Especially in the field of global environmental governance, the term is used to comprehend and analyze international governance (Biermann, 2014; Biermann & Kim, 2020; Biermann, Pattberg, van Asselt, & Zelli, 2009; see Messner & Nuscheler, 2000). Under the umbrella of Earth System Governance, the governance architectures approach is further developed and differentiated by researchers of different disciplinary backgrounds. Biermann and Rakhzun (2020) define governance architectures:

> "as the overarching system of public and private institutions, principles, norms, regulations, decision-making procedures and organizations that are valid or active in a given area of global governance."

The architecture is understood as the macro-level of governance. It is an overarching system that is bigger than a single institution but narrower than the global system. According to external and internal institutional pressures and governance processes, the architecture constantly evolves and is, therefore, to be seen as a fluid and dynamic entity (ibid. 2020). It refers to institutional settings that shape decisions of actors and institutions which exist and interact in a given policy domain and have an impact on all levels of governance. While the key unit of analysis is the macrostructure at the global level, it is not limited to only looking into these contexts. The notion of regime complexes investigates a meso-level structure. It considers loosely coupled regime complex elements related to the same issue area and often shares some normative principles (Gomez-Mera, Morin, & van de Graaf, 2020).

Borrás and Radaelli (2011, p. 464) apply governance architectures to the European Union and the EU Lisbon Strategy and define them as

> "strategic and long-term political initiatives of international organizations on cross-cutting policy issues locked in commitments about targets and processes. They are specific forms of institutional arrangements, characterized by three main features; namely, they address complex problems in a strategic, holistic, long-term perspective; they set substantive output-oriented goals, and they are implemented through combinations of old and new organizational structures within the international organization in question."

Therefore, governance architecture can have symbolic, normative, and structural implications for an organization and even imply a renewed meaning for its *raison d'être*. It does not offer any assumptions regarding certain architectures' effectiveness, efficiency, or coherence (Biermann et al., 2009, p. 15; Borrás & Radaelli, 2011, p. 464). The notion of architecture should be seen as value-free. Also, there is no a priori existing state of universal order nor a universal trend toward order. Consequently, it also does not assume the existence of an 'architect'. As Biermann (2014, p. 82) notes, "[i]n most empirical cases, international governance architectures result from incremental processes of institutionalization that are decentralized and hardly planned". Referring to the concept of 'pattern language' the notion of governance architecture offers a holistic approach. Coming from contemporary architecture and construction theory, it emphasizes that towns and individual buildings are not built in isolation but surrounded by natural and social contexts (Borrás & Radaelli, 2011). Changes do not occur disruptive but rather evolutionary. Since most policy domains are more or less marked by a patchwork of international institutions differing in their character (organization, regimes, implicit norms), their constitution (public, private), and their subject matter (from specific policy fields to universal concerns) governance architecture can be seen as fragmented (Biermann et al., 2009). More generally, fragmentation is ubiquitous and inherent to any governance architecture (Biermann & Rakhzun, 2020).

The concept of governance architecture can also be distinguished between an ideational and an organizational dimension. First, the ideational repertoires are grand or constitutive concepts that can directly impact the raison d'être of an international policy. Second, they bring an element of novelty to the policy in question. Ideational repertoires can be ideas like 'sustainability' or 'competitiveness', they have no clear-cut meaning, are discursively malleable, and are influenced by norms. Norms, in turn, are changeable, can be contested and purposefully created. Another ideational dimension is discourses. They can discipline, organize, and legitimize the hierarchical relationship between goals and instruments. Discourses are formed by social interaction and can influence the coordination and communication regarding policy choices. In sum, ideas and discourses shape the overall socialization of actors and their understanding of policy problems (Borrás & Radaelli, 2011).

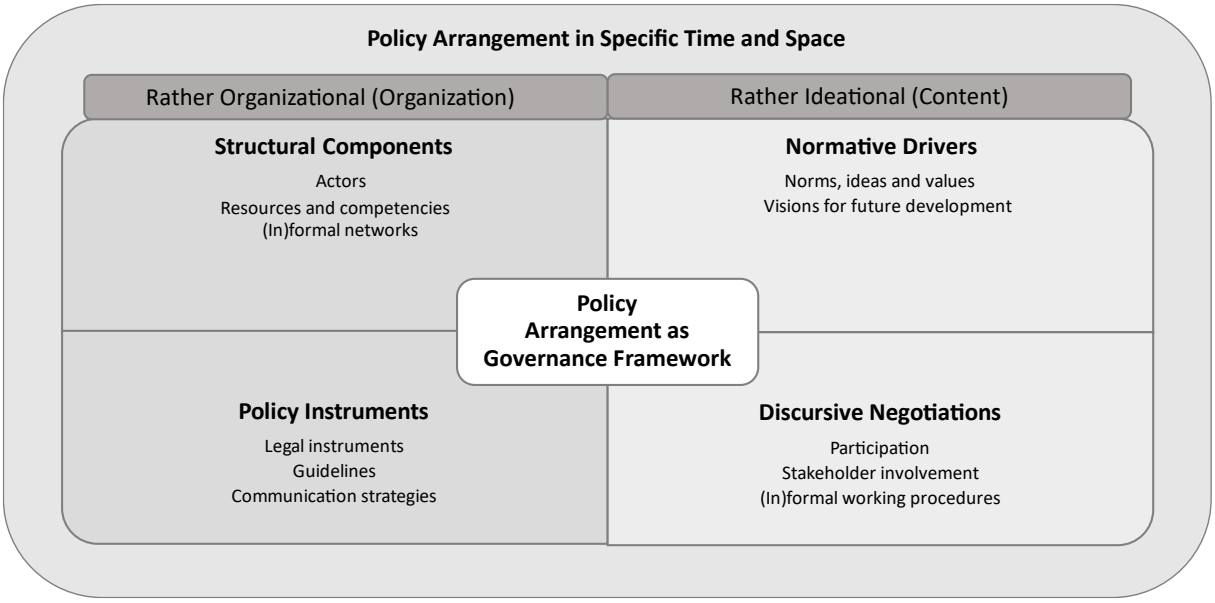
Second, the organizational dimension includes formal and informal organizational arrangements and a selection of policy instruments. Formal and informal arrangements are described as the "explicit politico-organizational machinery" (Borrás & Radaelli, 2011, p. 471). That includes formalized institutions and their specific working procedures, but also informal institutions and cooperation. This implies institutions and their interactions in a horizontally and vertically interlinked multi-level governance system. Finally, policy instruments and their specific requirements are fundamental since they shape political and administrative processes, which is essential in multi-level processes (Borrás & Radaelli, 2011).

3.3.Combined analytical framework

Based on these theoretical considerations and to encompass the empirical cases extensively, the approaches of policy arrangements and governance architecture will be combined into a comprehensive framework (see Figure 2 Governance Framework as Governance Arrangement). The general structural differentiation between content and organization will be drawn from the PAA. Same as the definition of a specific spatial area and a period of time. The four analytical dimensions are drawn from the PAA with some adjustments following the concept of governance architecture. These dimensions build a general framework to analyze and compare different settings and identify determining factors of varying governance arrangements of mobility hubs. Some points might not have clear-cut boundaries; primarily,

they serve as an analytical tool to answer the research question: How does the governance framework on sustainable and smart urban mobility influence multimodality and mobility hubs specifically?

For each of the four dimensions of the governance arrangement presented in figure 2, a sub-question can be formulated: What do structural components/policy instruments/normative drivers/discursive negotiations contribute to the governance arrangement of the mobility hubs in the cities?



(Own figure, based on Arts & van Tatenhove, 2004; Leroy & Arts, 2006; Borrás & Radaelli, 2011)

Figure 2 Governance Framework as Governance Arrangement

3.4.The four-dimensional analytical framework for mobility hubs

This section brings the political science approaches of PAA and governance architectures together with mobility research. This analytical framework encompasses relevant aspects to understand the governance of specific mobility hubs. The following section builds on previous considerations with a particular focus on understanding mobility hubs and their governance arrangement based on figure 2 above. The four dimensions of the analytical framework serve as tool to investigate different aspects of the governance framework. They are highly interlinked with each other and do not always have clear-cut boundaries.

The PAA requires the definition of a specific spatial and time frame (see Arts & van Tatenhove, 2004, p. 341). As the spatial frame of each case, the functional urban area (FUA) appears helpful for studying mobility patterns. The term describes this broader aggregate consisting of a city and its surrounding commuting zone (European Union, 2019). Cities are especially important players in the governance of the mobility sector in general and mobility hubs in specific. Land-use policy is a central element as it sets out the material framework and the possible effects of the other policy instruments: whether they are financial, administrative and/or informational policy instruments (Paulsson & Hedegaard Sørensen, 2020). This consideration already points out the governance struggle. The municipal competencies are limited to the physical boundaries of the municipalities, whereas the commuting zone includes a way more extensive area with additional actors. In this context, the spatial frame offers analytical limitations; they cannot be understood as a fixed material boundary. In terms of the time frame, the definitions seem more complicated. Depending on the dimension, the analytical frame might variate as well as the local context-specific variables. Section 4 on methodological aspects describes the concrete empirical time frame of the data used. For some indicators like the built environment, there is no fixed time scale to be defined since it constantly evolves and results from decades of discursive negotiations and guiding principles like automobility. Others can be defined, like the specific policy documents included in the analysis.

Organizational dimension

The organizational part of the policy arrangements contains structural components and policy instruments. First, structural components include actors, their resources and competencies, and their cooperation. This first dimension combines different aspects of the theoretical approaches above. It refers to the policy coalitions and actors described in the PAA. Also, it covers their resources, cooperation and the question of power relations raised under this point (Arts & Leroy, 2006). Structural components refer to many aspects of the politico-organizational machinery described by Borrás, and Radaelli (2011), mainly the multi-level institutions and their cooperation. Structural components in the specific context of mobility hubs imply municipalities and regional governments including administrative bodies and political decision-makers as well. Formalized networks and cooperation are part of the structural components. Public transport providers and mobility operators are other important stakeholders. For each of these actors, their (human, financial, spatial, etc.) resources and constraints are important indicators.

Studying continuity and change in urban transport policy in Canadian and Australian cities in recent decades, Stone (2014, p. 392) described the influence of "policy networks". These groups of interdependent professional actors can exert strong and persistent control over particular policies and be very successful in opposing policy changes. Studied from an economical perspective, mobility hubs can be organized along different business models. Depending on the functionality and contextual factors given, each local network of hubs might require a different set of stakeholder constellations and task divisions (Coenegrachts, Beckers, Vanelslander, & Verhetsel, 2021) . The entrepreneurial perspective of mobility hubs will not be the focus of this report. Another contributing factor in the analysis of urban transport is the consistency of city governments to support alternatives to car dependence (Bratzel, 1999; Stone, 2014). Following Bratzel (1999) in the analysis of six relatively successful European cities in terms of sustainable mobility, the political dimension appears to explain differences in transport outcomes. The author describes three stages in the way that 'windows of opportunity' emerged and were exploited by skillful political entrepreneurs. The first stage is a severe challenge to the city or regional government due to widespread opposition to its transport and environmental policies. Second, a change in political leadership and critical transport policy positions emerges. And third, institutionalizing operational changes through creating a new policy network happens. Considerable political skill is required to maintain a mandate for new policies among various social actors. Likewise, a recent case study of Dutch municipalities shows a correlation between political parties and mobility policy agenda (Akse, Thomas, & Geurs, 2021). Therefore, analyzing the political landscape, including political leadership and popular opposition, is an essential structural component.

The second part of the organizational part is the policy instruments. These can be legal instruments with obligatory or mandatory character, such as laws, regulations, guidelines or communication strategies. They are strongly connected to the point of competencies and resources since policy instruments could be seen as the output of the former. Instruments might be techniques of governance that utilize state authority or its conscious limitation (Paulsson & Hedegaard Sørensen, 2020). The PAA describes "rules of the game"; formalized rules such as regulation on procedures could be subsumed under this point. Here, informal rules or working procedures will be analyzed as part of the structural components and their (in)formal networks.

Policy instruments are regarded as suitable and relevant for achieving objectives depending on the speed and direction of socio-technological policies they intend to influence. The transport sector includes a range of taxes and fees, as well as legislation on traffic and vehicles like parking restrictions and land-use planning. Often, instruments interact with one another. Paulsson and Hedegaard Sørensen (2020) differentiate four instruments: Financial, administrative, informative instruments, and research.

Financial instruments are based on financial incentives, monetary costs, and benefits. The effects of financial policy instruments are highly differentiated because actors attribute different values to costs and benefits, for example, depending on relative budgetary constraints and priorities. Fees, taxes and subsidies are prominent and common instruments. Administrative instruments are instruments based on the ability of public actors to impose restrictions, requirements, certifications, permits, or formal decisions. They include everything from legislation and regulations to policies and recommendations. Failure to comply with legislation and regulations can result in financial or administrative penalties,

such as suspension of permits and prohibitions. Informative instruments are measures intended to influence behavior and traffic flow through knowledge, communication, and nudging. Mobility management is an example of a policy instrument that incorporates informational elements. Informative instruments are soft measures to potentially influence mobility practices and behavior. Last, research, development, and demonstration projects are ways of 'correcting' market failures to gain knowledge about the effects of new technology and innovations. Since the market produces too little knowledge and innovation when left to its own devices. This justifies using public funds to steer knowledge development in a desirable direction through pilot experiments, test beds, or earmarked research funding to achieve different environmental goals. In this context, the role of experimental governance, especially in smart mobility, can be stressed. It can be understood as an instrument to promote or accelerate innovation by testing and developing new solutions, technologies, and services (Kronsell & Mukhtar-Landgren, 2020). It has to be observed how these instruments are affected due to technological innovations or other future developments in smart mobility (Paulsson & Hedegaard Sørensen, 2020).

Policy instruments can be differentiated by their properties. Instruments can be hard or soft (measures), push or pull (direction), voluntary or mandatory (force). The distinction of push and pull in mobility policies differentiates between measures that create advantages are often referred to as pull measures, whereas measures that reduce advantages are referred to as push measures. These measures are not limited to transportation use alone (Holz-Rau, 2018). Pull measures create positive incentives and are politically more acceptable. However, the greatest effect is achieved by combining both approaches (Gertz, Flämig, Gaffron, & Polzin, 2018). Regarding mobility hubs, a pull factor can be seamless access to a multimodal offer, and a push factor the limited parking space for individually used cars.

Local mobility plans, such as Sustainable Urban Mobility Plans (SUMPs), are a critical part of the policy instruments (Arsenio, Martens, & Di Ciommo, 2016; Ruprecht Consult, 2019). Included in these strategic plans or standing beside them are other public space and traffic regulations as well as long-term visions and plans for the city development, including mobility, for example, climate or smart city strategies. Usually, bigger cities or metropolitan regions have a local mobility plan. They combine different instruments (financial, administrative, informative, or research) over 10-15 years. Depending on national regulation, local urban mobility plans are obligatory or voluntary. Some regional, national or European funding is bound to strategic urban mobility plans or SUMPs according to the European guidelines, which sets strong incentives to create such plans. Therefore, sub-questions on these dimensions are: *What are the relevant structural components of mobility hubs? And what are crucial policy instruments regarding mobility hubs?*

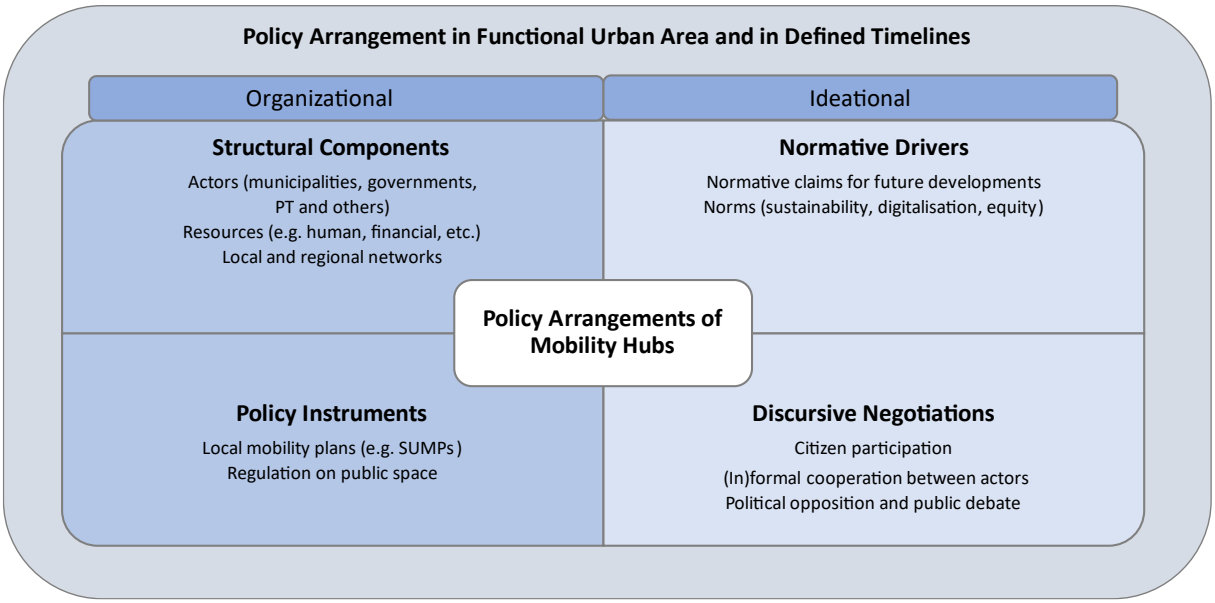
Ideational dimension

The ideational part of the PAA contains normative drivers and discursive negotiations. The indicators on the organizational components are to be characterized in a positivist understanding, whereas the ideational components rely on a stronger interpretive understanding. Normative drivers will be understood as norms, ideas, and values (see above). This dimension is based on the assumption that ideational components can obtain ontological status (Loges, 2021). This relies on norm theory evolved in international relations (IR). Here, norms are defined "as a standard of appropriate behavior for actors with a given identity" (Finnemore & Sikkink, 1998, p. 891). They evolve interactively and can be seen as a social phenomenon that carries specific contextualized meaning (Wiener, 2009). Regulative norms order or constrain behavior, whereas constitutive norms create new actors, interests, or categories of action (Finnemore & Sikkink, 1998). In the context of governance, the literature points to the importance of framing, story-telling, support, and facilitation of networks as essential tools for meta-governance over and above more traditional hierarchical, top-down mechanisms (Marsden & Reardon, 2018b). For future mobility planning based on new modes and technological innovation, Pangbourne et al. (2018) stress the importance of envisioning instead of forecasting approaches due to a lack of evidence on how new services might influence mobility practices. Some norms already appear in existing literature as normative drivers, such as sustainability, technological innovation, or equity. Still, there might be other drivers or specific focuses in local contexts.

The discursive negotiations are closely related to normative drivers. Ideational components, their meaning-in-use, and rules of appropriate action are (re)produced in social interaction. Here, the dimension of discursive negotiations will primarily focus on stakeholder involvement, public debate,

and informal and formal working procedures in which participation occurs. Change in transport policy requires successful interactions between social action groups, which can give legitimacy to new ways of framing policy problems and solutions. Also, the 'public entrepreneurs' can reframe issues and build coalitions to support a change within government institutions (Stone, 2014, p. 393). Applied to the specific context of mobility hubs, discursive negotiations comprise different forms of informal networks and communicative exchanges among stakeholders. Also, the critical aspect of citizen participation and co-creation methods are included here. The built infrastructure can be understood in two ways. On the one hand, it is a material 'hard' factor and, therefore, part of the structural components. On the other hand, it can be understood as the physical manifestation resulting from the historically hegemonic discourse. For the ideational components of the governance arrangement, the following sub-questions can be asked: *What are the relevant normative drivers of mobility hubs? And how do discursive negotiations work in mobility hubs?*

OBJ3 illustrates the analytical framework and the four dimensions to be applied to the SmartHubs cases.



Own illustration, based on section 3

Figure 3 Policy Arrangement in Functional Urban Area and in Defined Timelines

4. METHODOLOGY AND RESEARCH DESIGN

4.1.Research Approach

This report is based on an exploratory qualitative research design. As described above, the academic literature on governance aspects of mobility hubs is relatively small. Therefore, the theoretical approach was drawn from related fields of research. The SmartHubs project has four LivingLab areas (see footnote 1) which included one to three mobility hubs. For each governance case study one mobility hub and its specific multi-level context was chosen. The case selection of four cases enabled this research to investigate the governance arrangement in depth. Researchers use case studies to develop and evaluate theories, as well as to formulate hypotheses or explain particular phenomena by using theories and causal mechanisms (Flyvbjerg, 2006; George & Bennett, 2005; Nullmeier & Kuhlmann, 2022; Vennesson, 2013). The methodological approach is oriented at a kind of process tracing. Process tracing is:

> "a procedure for identifying steps in a causal process leading to the outcome of a given dependent variable of a particular case in a particular historical context" (George and Bennett, 2005, p. 176; cited in Vennesson, 2013, p. 231).

A more interpretive perspective on process tracing allows to examine particular facts and their interlinkage to another. It does not only investigate into the particular mechanisms itself but also the context in which they occur (van Meegdenburg, 2022; Vennesson, 2013).

Here, the case studies serve different purposes: Frist, they are descriptive, giving a systematic description of the phenomena. Second, they interpret and explain the cases using theoretical frameworks, and third, the cases are hypothesis-generating and refining. Therefore, the aim is to generate a theory on the influencing factors of the governance arrangement and to what extent they are relevant. The overall research question is: How does the governance framework of sustainable and smart urban mobility influence multimodality and mobility hubs specifically? For each of the four dimensions of the governance arrangement presented in section 3.4 a sub-question was formulated: What do structural components/policy instruments/normative drivers/discursive negotiations contribute to the governance arrangement of the mobility hubs in the cities?

To access the empirical cases, the text corpus consists of two types of data: First, the local mobility plans of each city and additional policy documents. Within the mobility plans, only relevant passages for the analysis were identified. Second, semi-standardized expert interviews were conducted between November 2021 and May 2022. Figure 4 gives a first overview of the data used in each case.

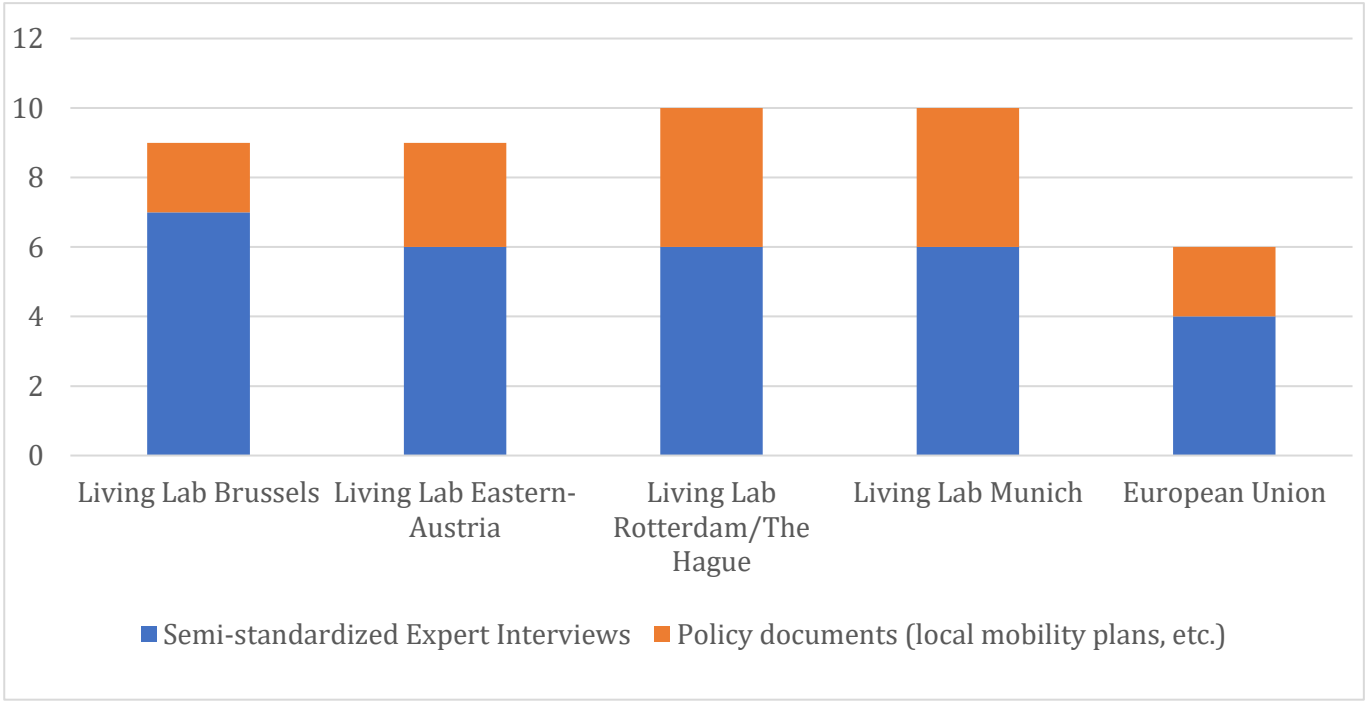


Figure 4 Overview of the collected data

The following sections will elaborate further on the data collection process and give an overview of the data used. Second, the analysis process will be explained and critically reflected. The material was coded along an abductive coding process and interpreted based on qualitative content analysis.

4.2. Data collection

The data collection process started with desk research on the political system of the four case studies. On the one hand, the overall political system was looked into to get a general understanding of the context in the four countries. On the other hand, the local, regional and national mobility policy and policy on multimodality and mobility hubs were investigated. The aim was to identify important policy documents and suitable experts for the semi-standardized interviews. Interviews can identify causal mechanisms that are not evident in other forms of data, like policy documents or newspaper articles (Mosley, 2013).

In a second step one background interview was held in the context of each living lab. The SmartHubs living lab leaders provided contacts to additional stakeholders, local context information, and possible interview partners. These meetings also aimed to get an idea of the existing and planned mobility hubs in each local context. In some cases, other project partners of the SmartHubs team were contacted and asked for additional interview partners for the research task. The potential interview partners from the desk research, and the background interviews were collected in a table including their position and expertise. From this list, interview partners were contacted and asked if they would be willing to conduct an expert interview in the context of the SmartHubs project. At the end of each interview, according to a snowball principle, the experts were asked if they could recommend colleagues or other experts from their work environment that would be potential interview partners working in the context of mobility hubs. This non-random sampling strategy was employed due to theoretical considerations, aiming to develop causal explanations and gain insights into the specific SmartHubs cases instead of representative sampling (Mosley, 2013).

The format of semi-standardized expert interviews was chosen to cover comparable data and gain insights into specific aspects of the governance system in each context (Matrakova, 2021; Prainsack & Pot, 2021). The questions of the pre-defined questionnaire were chosen according to the theoretical framework and reviewed by the SmartHubs consortium partners. A pretest was conducted with a colleague not working in the context of the interviews to test the interview guideline for comprehensibility and clarity (Buschle, Reiter, & Bethmann, 2021). The interviews were semi-standardized to gain comparable data, but also to maintain a certain openness during the interview. In order to access potentially hidden expert knowledge and gain insights on aspects that might not have been covered in the interview guideline, there was the possibility to ask additional questions. Additional questions were raised during the interview or came up as follow-up questions from previous interviews or case-specific desk research. Also, one general open question was included at the end of the interview to allow for highlighting or supplementing specific aspects. The questionnaire was sent to the interviewees before the interview. Often experts demanded to see the questionnaire before agreeing to the interview, while others wanted to prepare possible questions. In order to create similar conditions, all experts received the document before the meeting together with the consent form. All interviewees agreed to use the generated data in the context of the SmartHubs project and additional scientific research. The researchers ensure that data is handled carefully and stored only on the university's digital infrastructure. The questionnaire can be found in the Appendix of this report.

Overall, six to seven interviews were conducted between November 2021 and May 2022 in the four living labs. Additionally, four interviews were carried out in the European and international context. Most interviews are about 50 to 75 minutes long, with few exceptions. One researcher conducted the interviews in German, English, and French, following the language preferences of the interviewees. Table 1 illustrates the interviews, including the date when the interviews were conducted and the general professional background of the interviewees. All interviewed experts were asked to sign a permission to record, transcribe and use the data for scientific research. They could also agree to anonymized or non-anonymized citations. Due to the COVID-19 pandemic and related home-office rules, most interviews were held via Zoom and recorded in the call (see Howlett, 2021). Only a few interviews could be conducted on-site. The interviewer and author of this report was able to visit each (potential) hub location in person at least once throughout the research process. This helped to get an impression of the city's mobility system and the concrete onsite context.

The data collection process was similar to the policy documents. Starting with desk research and the background interviews with colleagues from the SmartHubs project already gave the first results on relevant policy documents. In addition, the experts were asked during interviews for relevant policy documents for their work in the context of mobility hubs. The documents were collected in German for the German-speaking cases in Munich and Vienna. For the bilingual context of Anderlecht and the Brussels Capital Region, the documents in French were collected and analyzed in the original French version. Due to limited language skills, the Dutch documents were translated with the online translation tool DeepL. In cases of uncertainty, Dutch-speaking colleagues were consulted to avoid translation errors. For the policy documents, only relevant passages from the documents were considered in the analysis. To identify these passages, the content of each chapter based on its headline or summary was investigated. Additionally, a lexical search was conducted to identify relevant passages that deal with

multimodality or mobility hubs. The documents included in the in-depth qualitative content analysis are also illustrated in table 1. The table gives a detailed overview on the expert interviews and the policy documents in each case. Other policy documents were also consulted but not coded and analyzed in detail.

	TYPE / DOCUMENT	DATE	BACKGROUND / EXPERTISE	ABBREVIATION / CITED AS
VIENNA	Policy document	2015	Urban mobility plan, STEP 2025	Vienna, 2015
	Policy document	2018	Guideline on Mobility stations in urban development areas	Vienna, 2018
	Policy document	2022	Smart Climate City Strategy Vienna	Vienna, 2022b
	Interview	February 2022	City administration, mobility unit	VI1
	Interview	February 2022	Public Transport	VI2
	Interview	February 2022	Mobility hub operator	VI3
	Interview	February 2022	Mobility-related NGO	VI4
	Interview	February 2022	City-Regional Management	VI5
	Interview	February 2022	Innovation Consultancy Vienna	VI6
MUNICH	Policy document	2021	Urban mobility plan, Mobility Strategy 2035	Munich, 2021
	Policy document	2022	Sub-strategy of local mobility plan on shared mobility	Munich, 2022b
	Policy document	2022	City council decision on shared mobility sub-strategy	Munich, 2022a
	Policy document	2020	Municipal coalition agreement	Munich, 2020
	Interview	March 2022	City administration, mobility unit	MI1
	Interview	April 2022	City administration, mobility unit	MI2
	Interview	March 2022	Public Transport	MI3
	Interview	March 2022	Public Transport / City regional management	MI4
	Interview	March 2022	Mobility related NGO	MI5
	Interview	March 2022	Mobility expert	MI6
BRUSSELS	Policy document	2021	Regional urban mobility plan, GoodMove Plan	Brussels Mobility, 2021
	Policy document	2018	Municipal coalition agreement of Anderlecht	Anderlecht, 2018
	Interview	November 2021	City administration, mobility unit	BI1
	Interview	November 2021	Political head of city administration, mobility unit	BI2
	Interview	December 2021	Regional administration, mobility unit	BI3
	Interview	November 2021	Regional administration, mobility unit	BI4
	Interview	January 2022	Public Transport	BI5
	Interview	November 2021	Mobility-related NGO	BI6
	Interview	January 2022	Car-Sharing Operator	BI7

THE HAGUE	Policy document	2021	Urban mobility strategy, New Mobility Vision The Hague	The Hague, 2021d
	Policy document	2021	City council proposal and decision on Mobility Strategy 2022-2040	The Hague, 2021e
	Policy document	2018	Report on sustainable mobility in Metropolitan Region Rotterdam/The Hague	MRDH, 2018
	Policy document	2021	Report on sustainable mobility development in Metropolitan Region Rotterdam/The Hague	MRDH, 2021
	Interview	December 2021	City administration, mobility unit	HI1
	Interview	December 2021	Regional administration, mobility unit	HI2
	Interview	December 2021	Public Transport	HI3
	Interview	May 2022	Public Transport	HI4
	Interview	December 2021	Mobility-related NGO / Consultancy	HI5
	Interview	December 2021	Mobility expert, transport planner Province Groningen / Drenthe	HI6
EUROPEAN UNION	Policy document	2020	Communication document, Sustainable and Smart Mobility Strategy	European Commission, 2020a
	Policy document	2021	Communication document, The new EU Urban Mobility Framework	European Commission, 2021
	Interview	March 2022	EU administration DG Move	EUI1
	Interview	December 2021	European city network POLIS	EUI2
	Interview	April 2022	Public transport organization UITP	EUI3
	Interview	May 2022	Mobility related NGO COMOUK	EUI4

Table 1 Detailed overview of the conducted data

4.3.Data analysis

This report uses qualitative content analysis to examine municipal mobility plans and the transcripts of expert interviews (Schreier 2012; Rädiker and Kuckartz 2019). "QCA [qualitative content analysis] is a method for systematically describing the meaning of qualitative material. It is done by classifying material as instances of the categories of a coding frame" (Schreier, 2012, p. 1). The study of the material was carried out with the analysis software MAXQDA. According to an abductive coding process, different coding processes were carried out. Therefore, a preliminary code system was developed based on the above theoretical concept. First-order codes were built on the four analytical dimensions (see figure 3). Since PAA describes these arrangements in a particular time and spatial frame, codes for different spatial scales and time frames were added. Codes for interdependency, policy integration, scale struggle, and institutional void were included to cover multi-level and multi-sector governance aspects. The initial code system drawn from the theoretical framework included 45 codes. They were listed in a table with definitions and examples for each code. The list was distributed and discussed amongst all researchers involved in the coding process. The coding procedure was carried out by the interviewing researcher and two additional assistants that constantly communicated over the coding manual function in MAXQDA and further weekly personal exchanges on the coding process, newly introduced codes, unclear passages, and other issues that came out during the coding. Working with several researchers increased the research design's intersubjective quality and gives opportunity to reflect during the data analysis process (Tracy, 2010). This first code system was completed by additional codes directly drawn from the material. Here sequences of the material are analyzed in more detail and assigned to different categories (Rädiker and Kuckartz 2019). At the end of the coding process, the MAXQDA included 404 codes used. In total, 9864 text segments were coded.

The empirical investigation of these plans does not represent a comprehensive analysis of the mobility policy of these cities in terms of a case study. Instead, it approaches the research question and illustrates the heuristics developed above. According to Liefferink (2006), the starting point of the analysis is important and can follow the research interest. In this case, the analysis was started from the structural components dimension and a strong focus on actors. This clarified the complex structure of actors and their interlinkages. Second, it possibly enables a broader perspective regarding changes in the interaction of state or private actors.

The display of results orients strongly on the theoretical framework given in section 3.4. For each case study, the analysis results will be outlined according to the four-dimensional framework. To avoid redundancy, overlapping results were only explained in one dimension, although they might also be part of other dimensions. Therefore, the description of results does not always strictly follow the differentiation in categories.

4.4.Critical reflection on the research process

In terms of reflecting the overall research approach, it is important to notice that the cases are predefined by the consortium members of the SmartHubs project. Therefore, the data collection process was also influenced by the consortium members of the Smart Hubs project and chosen experts. They might have acted as first gatekeepers to certain experts. This influence has been decreased by additional desk research and the snowball approach to gaining more experts. Due to practical reasons, there could only be a limited number of interviews in each case.

To increase the practical relevance of the research and reflect on the scientific approach, the author participated in different scientific and practical conferences and exchanges. This offered the opportunity to connect to other mobility experts working in the field of multimodal or sustainable mobility, for instance, at online webinars or conferences such as the Civitas Conference 2021 in Aachen, the Shared mobility rocks Conference 2022 in Bremen and the POLIS Conference 2022 in Brussels. Furthermore, the SmartHubs project organized two international symposiums in The Hague (May 2022) and Vienna (October 2022), giving additional opportunities to discuss preliminary results and gain background information. This additional exchange, as well as the twofold data sources used throughout the research project, enabled the researcher to triangulate data and strengthen the empirical base of the research (Denzin, 2017; Flick, 2022).

One central difficulty throughout the research process was the very heterogeneous background of the case studies. While Vienna and Munich already have mobility hubs and working procedures, the other cases do not have a coherent strategy or working procedures on the issue. Also, some mobility hubs do not yet exist or are still hypothetical. Therefore, in the cases of Anderlecht and The Hague, it was only possible to gain general information on the governance system and strategic plans for mobility hubs. In the case of Munich, the SmartHubs case study is not a permanent hub and does not belong to the mobility hub network initiated by the city administration. Finally, the case studies changed or were developed in the data collection process; therefore, some details could not be included in this report. The researchers tried to keep track of changes and recent developments even after the official data collection period.

5. THE SMARTHUBS CASES IN THE CONTEXT OF EUROPEAN MOBILITY POLICIES

5.1.European mobility policies

European transport policy is part of a multi-level-governance system (Benz, 2009; Knodt & Große Hüttmann, 2012; Sack, 2016). The vertical dimension includes multilateral negotiations among different national governments, subnational governments and political institutions with their own set of

competencies and norms. The horizontal dimension includes negotiations between public institutions and private stakeholders (Benz, 2009).

Although the transport sector and a unified transport policy within the EU had been sought since its inception, it took until the mid-1980s to act in forms of regulation. Plehwe (2008) describes an increased policy output, especially in hard law, between 1980 and 2004. This can be explained not only by a general ability to action regarding the European transport policy but also by an increased ability to compromise within the council of ministers. Regarding multimodality, the EU white paper from 2011 already mentions the goal of multimodal transport for people and goods. Other important points are the need to shift from road traffic to train and water transport and the use of emission-reduced fuels in air traffic. With the 2011 white paper, the EU gave up the goal of reducing traffic and instead promoted growing transport while supporting mobility that achieves emission reduction goals (Ponti, Boitani, & Ramella, 2013; Sack, 2014).

Knodt (2002) examines the role of regions in multilevel governance arrangements and analyzes the role of regions within the European governance system. Besides the tendency of blurring boundaries and trans-nationalization, the emerging discussion around a "Europe of Regions" in the 1980s and 1990s appear as two critical developments. The European system of governance is polycentric, split into multiple overlapping arenas characterized by loose coupling. The organizing principle is based on consociation. Therefore, the EU could be characterized as "network governance" (Eising & Kohler-Koch, 1999, p. 23). Decision-making is consensus-oriented and relies on the interaction and communication between its entities (Knodt, 2002). The multiple levels of governance are linked horizontally and vertically, which gives first insights into the structural dimension of the European governance arrangement. In terms of mobility hubs, this regional division could be illustrated in the Dutch provinces of Groningen and Drenthe, the Flemish Region in Belgium or the German city-state Bremen where regional networks of mobility hubs were created. These networks end at the borders of other provinces or regions (EUI4 12ff; COMOUK & SHARE-North project, 2021; eHUBS, 2020; Kask, 2021). With Vienna and Brussels Capital Region, two of the SmartHubs cases are located in comparable city-states. While The Hague and Munich act as autonomous municipalities, they also take part in different forms of metropolitan exchanges and collaboration. Especially in terms of mobility behavior, the metropolitan or regional connection plays a crucial role.

The tools used in different governance arrangements can be differentiated in terms of hard- or softness. Knodt and Schoenefeld (2020) identify three key dimensions over time to distinguish between hard and soft law: obligation, precision, and delegation. First, obligation describes whether or not a norm is legally binding; second, precision indicates how clear a rule is while; third, delegation refers to the extent to which implementation of the norm has been assigned to other actors. These descriptions should not be understood as a dichotomy but as a scale. The authors analyze a process of hardening soft governance; such a process can happen by the following elements: obligation, justification, precision, blaming and shaming, the role of third-party actors at the international / EU level, bundling, enforcement by coupling with other policy field(s), sanctions. This categorization of policy instruments on the EU level should help to understand EU transport policies better.

Referring to the "implementation gap in transport" (Banister & Hickman, 2013), Gössling and Cohen (2014) explain the failure of EU sustainable transport policies with a series of 'taboos' that need to be overcome to achieve significant sustainable transport policies. Currently, there is no effective integrated mix of market-based, command-and-control, and soft policy measures for mitigation in transport in the EU27, nor specific monitored year-on-year reduction goals. A 'technological optimism' predominantly but not only found among industrial actors is not matched by transport scenarios. A significant gap between emission pathways and mitigation objectives can be seen in scenarios.

> "Even though it is obvious that there is a gap and no plausible strategy to close it, this remains largely undebated in political circles, as closing this gap would require fundamental changes in the neoliberal structures of transport provision that facilitate mobility growth, e.g. 'powering down' (Urry, 2013)" (Gössling & Cohen, 2014, p. 200).

While a single focus on technological innovations generates no adequate solution, new forms of smart and shared mobility can play an essential role in the mobility transition. Which role new modes and

technological innovation can play and how these options are governed on the EU level leads to the following part.

5.2. European Urban Mobility Policies and Mobility Hubs

According to the principle of subsidiarity, the overall competence for urban mobility lies at the local level. Still, the European Commission issued several policy documents and funding opportunities in the mobility sector. The main Commission directorates-general (DG) involved are: DG Mobility and Transport (DG Move), which sets transport policies and finances transport infrastructure projects for the trans-European transport network (TEN-T). DG Regional and Urban Policy (DG Regio) provides financial support to Member States and regions which can be used for sustainable transport and urban mobility. Finally, DG Research and Innovation (DG RTD) organizes funding for research on mobility concepts in the urban domain (EUI 1 30ff., Court of Auditors 2020, 7). The primary source of EU funding for urban mobility is two of the five European structural and investment funds, the European Regional Development Fund and the Cohesion Fund. Other funds available are Horizon 2020 in the field of research and innovation and the Connecting Europe Facility (CEF) for transport (EUI 1 30ff., 44, Court of Auditors 2020, 10).

DG Move has around 430 employees and counts as a mid-sized directorate-general (Wallace & Reh, 2020, 71ff.). Since 2019, Adina Vălean from the Romanian liberal-conservative party is the responsible Commissioner for transport. Within DG Move, there is a unit working on urban mobility planning. They work on communication strategies, supervise the Sustainable Urban Mobility Plan (SUMP) framework, support and organize activities such as the CIVITAS network, the ELTIS webpage, and the European Mobility Week (EUI1 65ff.). The EU Mobility Week is an annual event that raises awareness for urban mobility topics and coordinates different events across member states (EUI1 65). As part of the SUMP framework, regular SUMP Awards honor network members for their engagement in sustainable urban mobility policies. The Civitas network includes sub-networks called CIVINETs that focus on research and innovation under the Horizon Europe framework (EUI 66ff.).

With the Urban Mobility Package from 2013 (COM (2013) 913 final), the European Commission reinforced the support for European Cities to tackle urban mobility challenges. The package focused on adapting SUMPs and asked Member States to support the development and implementation of these plans. SUMPs are an urban transport planning concept and are defined as follows:

> "A Sustainable Urban Mobility Plan is a strategic plan designed to satisfy the mobility needs of people and businesses in cities and their surroundings for a better quality of life. It builds on existing planning practices and takes due consideration of integration, participation, and evaluation principles" (Ruprecht Consult, 2019, p. 9).

SUMPs particularly emphasize the involvement of citizens and stakeholders, the coordination of policies between sectors, and broad cooperation across multiple layers of government and private actors. They focus not only on the territory of a particular city but also consider the whole functional urban area (Ruprecht Consult, 2019). The implementation of the SUMP framework varies strongly amongst the Member States (EUI1 85, EUI4 57ff.). At the same time, some countries made the framework obligatory for cities of a specific size; in other member states, cities are entirely free to use the framework. A SUMP coordination platform group with participation organizations meets every three to four months for regular exchanges (EUI1 63). The SUMP guidelines were supervised by DG Move but proceeded as a very interactive and collaborative process (EU1 63, EUI2 52). All cases are associated to the SUMP framework for the case studies of the SmartHubs project. Vienna, Brussels, and The Hague developed their mobility plans according to the SUMP guidelines. For Munich, only the old version of the mobility development plan from 2006 is linked to the city database platform (Eltis, 2023). Still, the mobility plan from Munich (2021) claims to follow the SUMP guidelines as well. The Good Move plan of the Brussels Capital Region won the SUMP Award in 2020 for the thematic points on safe walking and cycling (Brussels Mobility, 2022b).

The 'Sustainable and Smart Mobility Strategy – putting European transport on track for the future' was adopted in 2020 and set a shared European vision for the future development of sustainable, smart, and resilient mobility. The strategy refers to the goals of the European Green Deal (European Commission, 2019) to become climate neutral by 2050 and reduce at least 55% of greenhouse gas emissions by 2030. Part of the mobility strategy is an action plan defining concrete measures and a time schedule for revising the Urban Mobility Package from 2013. It also includes issuing guidelines to support the safe use of micro-mobility devices, assessing the need for measures to ensure a level playing field for local, on-demand passengers, revising mobility data coverage, and developing multimodal ticketing services (European Commission, 2020c). Under the so-called Flagship 2, "Making interurban and urban mobility more sustainable and healthy", the European Commission stresses the importance of MaaS applications and multimodal mobility hubs. Therefore,

> "[c]learer guidance is needed on mobility management at local and regional level, including on better urban planning, and on connectivity with rural and suburban areas, so that commuters are given sustainable mobility options. European policies and financial support should also reflect the importance of urban mobility for the overall functioning of the TEN-T, with provisions for first/last mile solutions that include multimodal mobility hubs, park-and-ride facilities, and safe infrastructure for walking and cycling" (European Commission, 2020a, p. 8).

As foreseen in the Sustainable and Smart Mobility Strategy, the revised EU Urban Mobility Strategy was released in 2021. Beforehand, a long-term coordination process of about three years took place from policy evaluation until the implementation of new regulation (EU1 55). Internally, other working units from DG Move were consulted, but also other related DGs. Externally the urban mobility unit cooperates with city networks such as POLIS or Eurocities and with consultation groups on a national level. In the case of urban mobility, there is a member state expert group with representatives of transport ministries of each member state (EUI1 62f.).

All SmartHubs case studies belong to at least one European cities network. Also, the local transport providers cooperate with international associations to share knowledge and expertise. Kern (2019) highlights the importance of city networks in upscaling local experiments in the European multi-level governance framework. She differentiates between different forms of vertical and horizontal upscaling mechanisms in which networks and associations of cities play an essential role. Table 2 gives an overview of the memberships of SmartHubs Living Lab partners.

Network	City of Munich	City and Federal State of Vienna	Municipality of Anderlecht/ Brussels Capital Region (BCR)	The Hague / Metropolitan Region Rotterdam-The Hague (MRDH)
Civitas	Yes	No	Yes, BCR	Yes
Eurocities	Yes	Yes	Yes, BCR	Yes
POLIS	No	Yes	Yes, BCR	Yes, South-Holland Province Yes, CROW, Rijkswaterstaat
UITP	SWM and MVG, Deutsche Bahn AG, DB Regio AG, + others	Wiener Linien, Wiener Stadtwerke	STIB/MIVB, TEC, De Lijn, SNCB + others	HTM, RET, NS + others

EMTAS	No	Yes, Verkehrs-verbund Ost Region (VOR)	No	Yes, MRDH
Covenant of Mayors	Yes	Yes	Yes, BCR	Yes, The Hague Yes, Rotterdam

Table 2 Overview of the SmartHubs cities' memberships

The nature of EU transport policy is voluntary, and communication based. The European Union does not hold competencies for hard laws in urban mobility. As with other strategies, the EU Urban Mobility Strategy is only a communication strategy and can be categorized as soft law (see above, EU1 23, European Court of Auditors, 2020). Therefore, policy implementation's responsibility relies primarily on local or regional governments. The Urban Mobility Strategy also takes up the SUMPs frameworks and strengthens its role in the EU urban mobility policies. For instance, there are attempts to link sustainable urban mobility planning more with EU funding opportunities to incentivize municipalities to follow the EU Guidelines (EUI1 23, 27ff.). Also, an assessment report on the Urban Mobility Strategy from 2013, conducted by the Court of Auditors, states that

> "there is no clear indication that cities are fundamentally changing their approaches. In particular, there is no clear trend towards more sustainable modes of transport. Although cities have put in place a range of initiatives to expand the quality and quantity of public transport, there has been no significant reduction in private car usage" (European Court of Auditors, 2020, p. 4).

This supports the thesis of an overall implementation gap in the European urban mobility transition. On the other side, the authors recommended linking funding more robust to the EU Urban Mobility Policy so that member states and cities are incentivized to follow urban mobility policies more ambitiously. The DG Move intends to follow this recommendation (EU1 29), which shows in the renewed TEN-T regulation and the role of TEN-T urban nodes. The concept of multimodality is specified as a guiding principle for urban mobility. Mobility hubs are also mentioned in the context of better transport management by using mobility hubs and digital solutions to increase system-wide efficiency (European Commission, 2021, see also EUI1 94). Voluntary guidelines are coupled with other policies to reinforce their impact; this can be characterized as a hardening process of soft measures, as described above.

Some other EU regulations are related to urban mobility policies. They unfold indirect influence on the local or regional level. However, these measures can have a big impact on cities and are hard to implement in the sense of hard law. The air quality directive has to be implemented into national law and exert much pressure on local authorities to increase air quality according to European standards. Other examples are the alternative fuels directive, with demands to install of electric charging points in all member states (Directive 2014/94/EU), the intelligent transport system directive (ITS, Directive 2010/40/EU), and urban vehicle access regulations (EU1 30, EUI2 71).

Many European experts point to the importance of the new proposal for the trans-European transport network (TEN-T) regulation (EUI1 98, EU2 69ff., EUI3 63f.) Article 40 defines requirements for urban nodes in this network: By the end of 2025 these urban nodes should adopt a SUMP in line with the EU framework and include measures towards zero net-emission transport. By the end of 2030, multimodal passenger hubs equipped with electric charging infrastructure should be developed to facilitate first and last-mile connection (European Commission, 2020b, EUI1 86). Still, TEN-T urban nodes are about long-distance infrastructure; this regulation does not necessarily cover small and medium-sized cities. Also, networks of small neighborhood hubs are not covered either (EUI3 65).

In the context of the EU Green Deal, the European Commission announced a European Mission on Climate Neutral and Smart Cities in 2021. The mission aims to support 100 European cities of different sizes and amongst all member states to become climate neutral by 2030. These cities shall act as frontrunners and best-practice examples for other European cities to become climate neutral by 2050

(European Commission, 2022). This mission is organized and financed over the Horizon 2020 framework linked to DG RTD (EU1 44). The Hague, Munich, and Brussels Capital Region are part of the mission, therefore, aim to become climate neutral by 2030 (European Union, 2022). Ambitious goals to reach climate neutrality can put additional pressure on more sustainable transport development. It might also increase the willingness to increase measures toward sustainable transport policies.

To summarize, urban mobility policies are mainly based on communication strategies, voluntary guidelines, and networks. However, the European Commission and DG Move aim to build a more coherent and interlinked framework. The predominantly soft measures in urban mobility policies are strengthened by setting financial incentives and guidance to member states and cities/ regions to implement policies. Also, multimodality and mobility hubs have become increasingly important and are mentioned in all recent policy documents. Additionally, European law on environmental standards, infrastructure funds, or the European Green Deal initiative can substantially impact national, regional, or municipal level policies.

In the following section, it will be examined in which way urban mobility and mobility hubs are governed on the different governance levels. Each case study will be summarized by a two-page overview that outlines the essential information regarding the local context. The following sections will go through each dimension of the four-dimensional theoretical framework and briefly summarize the most important aspects at the end of each section.

6. LIVING LAB BRUSSELS

6.1.Overview Anderlecht

SmartHubs

Place du Conseil / Raadsplein

Anderlecht, Brussels Capital Region (BCR), Belgium

City: 122,000 in 2021
Region: 1,220,000 in 2021

Net-zero target: 2030

Operator: SmartHubs Consortium
Operation Start: 2022

Available modes

Urban and socio-economically challenged district, square in front of the municipal building with tram station and different shops nearby. No permanent hub; only temporary measures are planned during the SmartHubs project.

Minister-President of BCR since 2013: Rudi Vervoort , social democratic party (PS)
BCR since 2019: Flemish: green, social democratic, liberal; French: social democratic, green, conservative coalition
BCR 2014-2019: Flemish: liberal, social democratic, conservative; French: social democratic, conservative, centralist coalition

GOVERNANCE LEVELS

Local Administration:

- Mobility Unit Municipality of Anderlecht,
- Alderwoman for Urban Development, Civil Engineering, Mobility, Parking, Public Space, Networks (Susanne Müller-Hübsch, Groen)

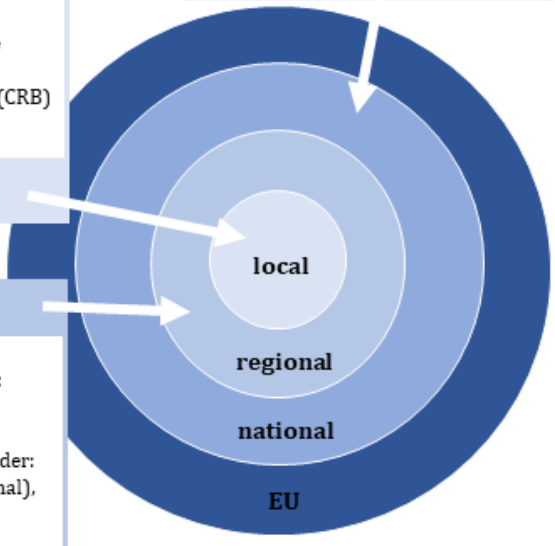
Local Networks:

- BruLocalis
- Association of Cities and Municipalities of the Brussels-Capital (BAS)
- Network of Mobility Managers Brussels
- Local Council of sustainable mobility
- CIVITAS, POLIS, Eurocities (CRB)
- UITP (PT provider)

Municipality

Federal Public Service for Mobility and Transport (Georges Gilkinet, Ecolo)

National State



Federal State

Regional Administration:

- Brussels Mobility
- Minister of the Government of the Brussels-Capital Region, responsible for Mobility, Public Works and Road Safety (Elke Van den Brandt, Groen)

Regional Public or Private Stakeholders:

- STIB/MIVB (PT provider)
- Additional PT provider: SNCB/NMBS (national), De Lijn, TEC
- Regional Mobility Commission

SmartHubs

POLICIES

"Good Move" Regional Mobility Plan 2020-2030

Time frame of document: 2020-2030
Author: Brussels Mobility
Main characteristics:
The Good Move plan takes part in the city's sustainable development planning. It was developed in a participatory process that started in 2016. It includes a regulatory framework as well as an action plan. It divides into six strategic focuses:

- good neighborhoods (mobility management in neighborhoods, quality of life for inhabitants)
- good network (organize transportation networks and efficient service)
- good service (provide integrated services)
- good choice (guide individual and collective choice)
- good partner (ensure partnership governance)
- good knowledge (update and evaluate mobility data)

Important regulations and buzzwords are:

- "STOP"-principle (hierarchy of transport modes: pedestrians, bike, PT, cars)
- speed limit of 30km/h in the regional area
- multimodal specialization of routes

Policies regarding multimodality or mobility hubs

Multimodality is described as one of six major levers to be improved.

- Central measures are the pacified neighborhoods ('quartiers apaisées') and local circulation plans
- Intersections of these neighborhoods could create potential mobility hub locations

Development of strategic changing points ('pôle d'échange') at big (international) intersections such as train stations

- these should follow specific standards and be measured due to user satisfaction and other parameters
- Additional park&ride stations to be planned
- No specific number of stations, schedule or budget defined in the plan

Other related transport policies

Local mobility contract for the network of Cureghem/Kuregem ("Contrat Local de Mobilite de la maille « Cureghem »") (work in progress)

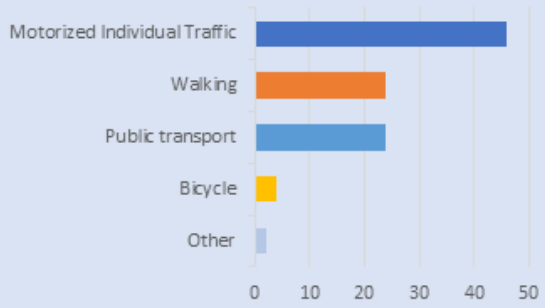
The local mobility contracts are planned as part of the "Good Move" Regional Mobility Plan. They define circulation schemes on a detailed district level in order to define what kind of modes and traffic should be on which streets. Additionally, the plan includes an action plan how to realize, finance and organize the implementation of the new schemes. The plan for Cureghem includes the square in front of Conseil/Raad in Anderlecht.

BRUSSELS MODAL SPLIT

MODAL SPLIT ANDERLECHT

No data available for the City of Anderlecht.

MODAL SPLIT CAPITAL REGION (2019)



Sources:
Brussels Mobility (2021): Good Move: Gewestelijk Mobiliteitsplan 2020-2030.
Environment Brussels (2022): Contexte bruxelloi. https://environnement.brussels/outils-et-donnees/etat-des-lieux-de-lenvironnement/contexte-bruxellois#mobilite-et-transports-en-region-bruxelloise (24.04.2023).
SmartHubs (2023): Raadsplein - Place du Conseil. https://data.smartmobilityhubs.eu/wiki/Hubs/6 (24.04.2023).

6.2. Governance framework

Brussels is the capital of Belgium. The constitutional monarchy of Belgium is characterized by a unique state organization: There are different federal regions along geographical and linguistic lines: the linguistic regions are separated into Dutch, French, and German-speaking regions. The geographical regions are Flanders, Wallonia, and Brussels Capital Region (see Deschouwer, 2012; Hecking, 2003). The Brussels Capital Region is officially bilingual and includes 19 municipalities. Political parties in Brussels are split into French and Dutch-speaking parties. Geographically, Brussels is surrounded by Flanders, which results in commuter traffic from and to Brussels. The Brussels Capital Region has 1,2 Mio. inhabitants and is characterized by its location of many European institutions (ibsa, 2022).

The SmartHubs case study is located in Anderlecht, a municipality in the west of Brussels. The municipality of Anderlecht has 122.000 inhabitants and is structured very heterogeneously (ibsa, 2022). It ranges from very urban and densely populated areas nearby the city center and the big international train station to the estate of compound houses and rather rural areas outside.

A coalition of French and Dutch-speaking parties governs the municipality of Anderlecht. The government, the so-called 'Collège', composes 11 aldermen and -women, including the mayor. Alderwomen for Urban Development, Civil Engineering, Mobility, Parking, Public Space, Networks is Susanne Müller-Hübsch (Groen). Since the regional authorities have many competencies in guiding municipal decisions, this report will look into regional politics in more detail. The Brussels Capital Region is the component authority in urban development and housing, environment, public transport, and public works (Brussels, 2022b). The Government of the Brussels-Capital Region is composed of a Minister-President (French-speaking) and four Ministers (two French-speaking and two Dutch-speaking) elected by the parliament of the Brussels-Capital Region. Regional Minister responsible for Mobility, Public Works, and Road Safety is Elke Van den Brandt (Groen). The regional public transport provider in Brussels is the STIB/MIVB. Additionally, some lines are provided by the national train company SNCB/NMBS and the Flemish and Wallonian companies De Lijn and TEC.

The central mobility plan for Brussels is the Good Move plan authored by Brussels Mobility, the regional administrative institution for mobility. It was published in 2021 and deals with a planning horizon from 2020 to 2030. The Good Move plan takes part in the city's sustainable development planning. It was developed in a participatory process that started in 2016. It includes a regulatory framework as well as an action plan. A significant concept is the "STOP"-principle, which defines a hierarchy of transport modes: from pedestrians to bikes and public transport and, at last, cars. The region aims to introduce a speed limit of 30km/h in the regional area and a multimodal specialization of routes via circulation plans. These circulation plans are planned and adopted by the municipalities. Multimodality is one of six major levers to be improved. The plan foresees implementing strategic changing points or hubs ('pôle d'échange') that should follow certain standards and be measured due to user satisfaction and other parameters. The Good Move plan refers to central changing points, such as train stations and intersections of major streets (Brussels Mobility, 2021).

6.3. Organizational dimension

6.3.1. Structural components

The case study in Brussels is at the tram station Place du Conseil/Raadsplein. The public transport stop directly lies at a square in front of a municipal building in Anderlecht. Nearby but not directly visible is a metro station. At different corners of the square is a car-sharing spot operated by Cambio and a station-based bike-sharing operated by 'villo!'. There is no visible connection between the mobility modes. In Anderlecht, additional car-sharing, bike-sharing, and shared mobility services are planned (BI1 85, BI2 36). But as mentioned before, there are currently no specific plans to implement mobility hubs. Conducted research and participation formats in Anderlecht remain temporary.

Municipality of Anderlecht

There are two political institutions in Anderlecht: the so-called “Collège”, the council of mayor and aldermen and -women, and the city parliament. General political decisions need to be approved by the city parliament. The Collège decides daily business but needs to inform the city parliament (BI2 11). The Collège is described as a “red-green” coalition (BI2 152). It comprises four members of the green parties, four of the social democratic parties, two from Centre Démocrate Humaniste (CDH), a conservative party, and one from DéFi, a French-speaking splinter party with a conservative background (BI2 152). The Collège decides on political guidelines for the administrative bodies (BI1 82). In Belgium, members of the local governments are personally liable in terms of prosecution for security (BI2 416ff.), In Anderlecht, the members took out insurance for these cases.

Since 2018 Susanne Müller-Hübsch (Groen) has been an alderwoman for urban development, mobility, and construction (BI2 3). At the beginning of the legislative period in 2018, the Collège set up a strategic plan for envisaged actions in Anderlecht (Anderlecht, 2018, BI2 32). The document serves as a guideline for the city administration and includes measures with indicators. The plan strengthens the role of citizen participation and supports efforts to support environmentally friendly mobility modes. Mobility hubs are not mentioned in the document (Anderlecht, 2018).

So far, there are no mobility hubs in Anderlecht (BI2 9). However, the municipality is generally interested in best practices from other international cities, for instance, looking at pop-up bike lanes in Berlin or housing districts in Vienna (BI2 262). One expert claims that Anderlecht is influenced by the Flemish system of mobility hubs (called mobipunten, see SHARE-North project, 2022) and takes them as a kind of role model (BI2 206). Mobility hubs are considered a substantial aspect. Experts refer to the idea of central urban hubs, like important train stations:

> “ je pense que ces pôles multimodaux sont primordiaux. On en a déjà quelques-uns et on pousse la région à en développer d'autres. On a des pôles qui sont chaque fois autour d'une station métro, pour la plupart. On a la gare de l'Ouest, qui est est située entre Molenbeek et Anderlecht, […]. C'est des endroits où on a déjà le métro, les lignes de transports en commun, soit de bus, soit de tram, soit les deux, parfois même des bus de sociétés différentes” (BI1 76).
>
> "I think that these multimodal hubs are essential. We already have some and we are pushing the region to develop others. We have hubs that are mostly located around a metro station. We have the gare de l'Ouest, which is located between Molenbeek and Anderlecht [...]. These are places where we already have the metro, the public transport lines, either bus or tram, or both, sometimes even buses from different companies" (own translation, BI1 76).

Therefore, multimodality is nothing new and is partly already planned in the sense of connectivity in the context of metro stations. But still, there is no encompassing design, signage, or branding.

The city administration of Anderlecht is divided into different departments, like the Department for Urban Development (“development de la ville”). This department's unit on urban development and mobility is responsible for mobility planning and implementation (BI1 20). For municipal decisions, the urban development and mobility unit prepares technical aspects of regulation and the legal service or experts from Brulocalis to check these measures for legal correctness (BI2 104). If Anderlecht develops mobility hubs, this department would be responsible for the whole process from planning to construction in the streets (B2 9). The unit is slit up into two sections, one working on urban development and another working on mobility. Urban development includes the conception and planning of land use. Mobility consists of all guidelines, concrete street planning, bicycle parking boxes, and others. Both sections work together closely because some aspects overlap due to the common usage of public space (BI1 20). It holds about 10 to 12 employees (BI1 26). Human resources are limited in the administration, so even onsite construction works are sometimes retarded or performed by external private companies, especially in bigger constructions (BI1 222, BI2 62, 164). Financial resources in Anderlecht are minimal. The municipality is slowly coming out of the financial restructuring plan. That means it was under the supervision of the region concerning expenses and municipal finances. Therefore, the city had very little budget to maintain the roads and other basic measures for years (BI1 108, BI2 60). Still, Anderlecht relies heavily on subsidies from different institutions on the regional, federal or European level:

> “Au niveau de la mobilité, ce n'est que par subsides qu'on fonctionne quasiment. On a un tout petit budget qui nous permet de mettre des arceaux vélos, ce genre de choses, mais tout le reste est subsidié” (BI1 108).
>
> "In terms of mobility, it's pretty much all subsidies that we operate on. We have a very small budget that allows us to put in bicycle racks, that kind of thing, but everything else is subsidized" (own translation, BI1 108).
>
> “Wir arbeiten sehr, sehr viel mit Subventionen, und zwar von der Region, also vom Bundesland, mit europäischen Subventionen, wie zum Beispiel jetzt hier in diesem Projekt [Anm. SmartHubs project]. Dann gibt es noch so ein paar private Institutionen, unter anderem die Stiftung König Baudouin. […] Ja, und so ist das also ein ewiger Kampf zu gucken, wo kriegen wir die Finanzierungen her” (BI2 60).
>
> "We work very, very much with subsidies, from the region, from the federal state, with European subsidies, such as in this project [note: SmartHubs project]. Then there are a few private institutions, including the King Baudouin Foundation. [...] Yes, and so it's an eternal struggle to see where we can get the funding" (own translation, BI2 60).

The limited financial resources make it difficult for the municipality to implement additional services and infrastructure beyond necessary measures.

Other basic infrastructure, such as water or energy, is organized by private companies owned by the municipalities. Vivaqua is the company for water management, and Sibelga manages the energy supply in Brussels. Members of all involved municipalities collaborate in consortiums for these companies (BI2 176ff.). Regarding potential mobility hubs, the energy supply needs to be considered in cases of charging opportunities and digital pillars.

In Anderlecht and the other Brussels municipalities, Beliris conducts work on the infrastructure. Beliris is a collaboration between the federal government and the Brussels region. It carries out construction, renovation, and restoration projects on a daily basis in various fields and from A to Z: mobility, social housing, green spaces, revitalization of districts, culture, and others. Mobility represents a large part of its activity. Beliris works directly for the Brussels region but is integrated into the Federal Public Service Mobility and Transport for daily management. Currently, 125 million euros per year are allocated to projects and the organization's functioning. A committee defines the Beliris program made up of regional and federal ministers. To propose a project, official contact must be made with the office of the Minister-President of Brussels and the national office in charge of Beliris (Beliris, 2022). This institution is an important resource for Anderlecht to conduct additional construction in their territory (Brussels Mobility, 2021, BI1 46, 272). The national government generally holds fewer competencies in the mobility sector that are relevant for mobility hubs. Minister for transport and mobility is Georges Gilkinet (Ecolo). Relevant competencies are the national train network. Accordingly, local exerts claim less influence from the federal state on municipalities in terms of mobility (BI2 256).

Regarding networks, Anderlecht relies primarily on inner-regional networks, and employees are connected with colleagues from other municipalities in Brussels. The informal network “Urb 19” is helpful for exchanging with colleagues and gaining insights from other cities in the mobility and urban development sector (BI1 140). There is, of course, regular and intense contact with the regional level. One expert described the cooperation between the Collège in Anderlecht and the regional minister as “absolutely fantastic” and mentioned the support of the regional level, which helps “to get a lot done” (own translation, BI2 158). Another relevant network is Brulocalis. It is organized as an association and links the municipalities and the region. According to one expert, there is a great potential for expertise in Brulocalis, and the municipalities can rely on regular exchanges. Brulocalis not only works in the field of mobility but also covers different topics (BI2 88ff.)

Anderlecht has a local-level commission on sustainable mobility for networking with civil society, formerly known as ‘bike commission’ (“commission vélo”). It serves as a roundtable for members of the administration, politicians, and interested citizens. The roundtable meets about every two months and exchanges on different topics regarding mobility in Anderlecht (BI1 156, BI2 340). More openly for all citizens, Anderlecht provides a municipal participation service point. The idea is that people have only one point of entry into the municipality and obtain a collected record of inhabitants’ remarks. At the

service point, citizens can get informed on different measures and provide feedback. Until recently, citizens could also form small councils or neighborhood committees to submit small projects to obtain funding and to implement ideas like installing benches, creating flowerbeds, or redesigning a square. The local budget could not renew the funding for these citizen projects (BI1 166ff.). These financial subsidies could have posed a funding scheme to create mobility hubs by the citizens.

In addition to this exchange, Anderlecht's mobility unit holds regular contact with the police. An expert from the mobility and urban development unit describes the police as the principal partner regarding problems onsite (BI1 156). Because some parts of Anderlecht have fallen victim to vandalism, this is also relevant for future mobility hubs and shared mobility services (BI2 502, 564ff.). Also, cases of unsecured parked e-scooters are in the jurisdiction of the police or public order forces (BI3 26).

Brussels Capital Region

On the regional level, Brussels is governed by a French-speaking Minister-President from the Socialist Party (PS) and four Ministers (two French-speaking and two Dutch-speaking) elected by the Parliament of the Brussels-Capital Region. The Dutch-speaking ministers are from the green Flemish party (Groen) and the conservative-liberal party (Open Vld). The French-speaking ministers are from the French equivalent green party (Ecolo) and the social-liberal party (DéFI). In addition, three regional Secretaries of State are elected by parliament as deputies to a government member (Brussels, 2021). Minister for Mobility, Public works and Road Safety is Elke Van Den Brandt (Groen). The Brussels capital region aims to become climate neutral by 2030. It was selected as one of the 100 cities EU's Mission for 100 climate-neutral and smart cities, (European Commission, 2022). The regional level authored the Good Move plan, the central mobility plan for the region and its municipalities (BI4 75). The document will be discussed in detail under the policy instruments section below.

The department for mobility is called Brussels Mobility (Brussels Mobilité). Bruxelles Mobilité oversees the definition of mobility strategies and projects to develop, renew and maintain public spaces and roads, as well as public transport infrastructure and taxis of the region. Bruxelles Mobilité is organized into the following departments: General Direction and Support; Planification, Construction, DITP (Infrastructure of Public Transport), Maintenance and Exploitation, and Transport (Brussels Mobility, 2022a). Because there is no specific network on mobility hubs, no unit directly works on mobility hubs. Currently, the unit 'organization of mobility services' working more generally on new topics in mobility is dealing with mobility hubs. Around 15 employees overview policies on MaaS and micro-mobility. An expert from Brussels Mobilité describes Mobility as a Service as a "new topic" to deal with (BI4 12).

Brussels mobility holds close contact with the 19 municipalities in Brussels. This contact varies depending on the municipality. With some, the exchange is going well; with others, there is less positive cooperation (BI3 40, BI2 158). On the political level, the contact between Anderlecht and the region is very positive (BI2 158). The exchange between Anderlecht and regional administration is weekly, or even not more often. They coordinate mobility projects and cases of urban development, which often have at least a component of mobility (BI1 98ff.).

In Brussels, there is a mobility council with representatives as well. It meets monthly and involves different interest groups in a dialogue on planned measures. Members can exchange opinions, raise critiques and participate in agenda-setting. Still, their decisions are not binding to the government, so this council has only advisory functions (BI4 26, BI6 66ff.).

Internationally, Brussels Mobility is following networks like UITP and the ITF but also research projects like the eHubs project to follow recent trends and developments in mobility polices (BI4 46ff.).

The road network in Brussels is divided among different governance levels: A regional road network and a municipal road network demand close cooperation between Bruxelles Mobilité and city administrations to integrate and complete networks (BI1 90, BI3 38, BI4 10, BI6 158). In general, Brussels governance system is fragmented and, therefore, difficult to deal with (BI3 38, BI4 10, 20, BI5 60, BI6 56, BI7 34). This might also influence the implementation of mobility hubs. As experts explain:

> "[T]here are many laws, regional local laws that we have to deal with, but it's more the urbanism and so on that is limiting or not because we are restricted, in what we can do and in Brussels, it's

> really difficult because you have the council level like Anderlecht is a council, but they have the same powers as a region on some aspects. […] So it's not always easy, for mobility hubs that is a difficulty" (BI5 60).
>
> "Here [on regional level] we can decide for our own lanes and streets, but you have 19 other municipalities, so that makes it not that effective, and to be honest, we are really pleading for institutional reform within Brussels, but that would lead us too far from this discussion. But just keep in mind you have different road managers, different road authorities" (BI3 38).

Public transport: STIB/MIVB

The STIB/MIVB[2] is the public transport provider for the Brussels Capital Region. It has a regularly updated contract with Brussels Mobility specifying the responsibility of each institution. As a public transport operator, the STIB holds concessions to provide public transport, mobility hubs, or other additional services that are not automatically included in agreements (BI5 14, 26). The STIB is publicly financed by the Brussels Capital Region and gets funding for different activities regarding public transport.

So far, there is no specific budget to allocate to mobility hubs (BI4 32, BI5 26). Consequently, the STIB does not have a particular unit working on mobility hubs. The topic touches on the working field of experts already working with the MaaS application and other teams organizing the public transport stations or stairways of metro stations (BI5 26). The STIB cooperates in different working groups with the other public transport companies from Wallonia (TEC) and Flanders (DeLijn) and the national rail company SNCB (BI5 47). The topic of mobility is raised in several meetings, for instance, with 'Bikes for Brussels', which organized bike parking in Brussels. Still, no internal working groups are designated for mobility hubs or combined mobility (BI5 55).

The STIB has an official assignment to work on a MaaS tool. In this context, mobility hubs are of note because they are understood as their physical counterpart. As one expert from the STIB puts it:

> "We see mobility hubs as a physical aspect that goes with the digital MAAS, and they need to go together" (BI5 20).

Besides that, the work on mobility hubs is at an early stage, including research, building an understanding, and running some first pilots (BI5 14). For instance, there was a trial of additional shared mobility services and the MaaS application at the station 'Albert' (BI5 26). As some intersections of public transport evolve almost automatically as mobility hubs – at least in terms of integration of different modes the STIB sees good potential for mobility hubs, especially in the context of metro stations these intersections are seen. The questions of standard designs, signage, and branding on the stations are still being discussed (BI5 20).

Due to the funding scheme and overlapping topics, the STIB is closely cooperating with different units of Brussels Mobility (BI4 32). Also, there is close cooperation with the municipalities. In the Anderlecht case, positive collaboration is described (BI1 286, BI2 186). On the one hand, the STIB has access to subsidies that Anderlecht, as a municipality, cannot apply for. In some cases, they cooperated in terms of rails for the tramway, with meant construction works for the entire road cross-section and rebuilding of the whole public space (BI2 190ff.). On the other hand, the STIB provides a contact person for each municipality that can be contacted in cases of problems with public transport on their territory (BI2 192). Internationally, STIB is a member of the UITP and collaborates in a working group on combined mobility (BI5 55).

Public transport experts also name some sharing providers multiple times: Cambio is a car-sharing provider operating in Brussels and other cities. Cambio Belgium started in 2002 (Cambio, 2022) and is

[2] STIB is the French and MIVB is the Dutch abbreviation for the company. To facilitate the reading, the company will be only referred to as STIB. Same goes for the national train company SNCB/NMBS, which will be only referred to as the French abbreviation SNCB.

closely linked to the NGO MPact, although it is managed independently (BI7 11, 23). It is not the only car-sharing company operating in Brussels, but it was the first one, and several experts mentioned Cambio in specific (BI1 80, BI2 40, BI5 33, BI6 32). The general goal of Cambio "is intermodality, so less dependence on car ownership, more use of biking, walking and public transportation (BI7 13) following the guideline of doing "more with less" (BI7 23). Amongst other Belgian public transport companies, the STIB co-funded Cambio and is still a shareholder (BI5 51, BI6 32, BI7 25). Cambio reinvests profit directly so that the shareholders do not get any benefits (BI7 25). In the beginning, Cambio also held close contact with Brussels Mobility to figure out the creation of a new market and the regulatory framework (BI7 29). Cambio also has strong links to the 19 municipalities of Brussels since the concrete car-sharing stations have to be negotiated with the local level. This process is considered "difficult, [...] [and] a lot of work each year" (BI7 29). Regarding digital integration, Cambio implemented the first steps to facilitate access. In cooperation with STIB, it is possible to use the STIB card to access Cambio cars. The payment is organized differently over a separate payment system from Cambio. Also, with the so-called Mobihubs card, subscribers of Cambio can unlock shared bikes from 'villo!' (BI5 33). Sometimes station-based shared mobility providers compete for attractive spaces. According to one expert, this process mostly leads to compromises since interests amongst operators vary in aspiration for accessibility, security, and visibility (BI7 68).

Under the brand 'villo!', JC Deceaux provides a stationary bike-sharing system for the Brussels Capital Region. Due to the regional focus, they have less contact with the municipal level but rather coordinate with regional stakeholders (BI2 124ff.). Their stationary shared bikes are often located nearby metro stations and enable easy changes from public transport (BI2 126). But there are also shared bike stations further away, so there is no strategic cooperation to provide reliable bikes at each public transport station (BI5 51). Because JC Deceaux is actually an advertising company, one expert assumes that 'villo!' focusses more on the public and well-visible advertisement of their bikes and stations than providing mobility services (BI5 51).

6.3.2. Policy instruments

Regional Good Move plan and local circulation plans

The main mobility planning document for the Brussels Capital Region and its municipalities is the Good Move plan which the city parliament accepted in 2020 (Brussels Mobility, 2022b). The plan has the legal status of regional law, which means it bounds the regional institutions. On the other hand, the municipalities cannot totally oppose the plan with their policies (BI2 446). The later sections of Good Move plan are considered the most crucial part of the mobility plan since it comprises concrete timelines, budgets, and responsibilities (BI2 276, see also Brussels Mobility, 2021). The other part describes a vision that describes general guidelines and goals but does not have legal consequences (BI3 71). Therefore, the plan includes informative, administrative, and financial instruments. It consists of 50 measures in total, but the pacified or peaceful neighborhoods ('quartiers apaisées') are the most visible and tangible (BI1 124ff., BI2 246, BI3 14). One expert describes the circulation plans as the "heart piece" of the Good Move plan (BI2 246). They are set into practice by circulation plans, which define different categories of roads permitted or closed for vehicles comparable to the concept of superblocks.

Good Move plan foresees to develop train stations and hubs at significant intersections further into so-called exchange points ('pôle d'échange'). It sets the goal of seven stations that follow the defined standards (Brussels Mobility, 2021). The measures are to be financed by regional budgets. In addition to these major exchange points, the plan foresees additional park&ride stations for cars and bikes to facilitate the exchange to public transport and reduce traffic in the city center (Brussels Mobility, 2021, see also BI4 42). The plan does not foresee a concrete number of stations to be created. Since the Region of Flanders already implemented mobility hubs, the Brussels Capital Region aims to connect or orientate any hubs system according to the Flemish system (BI4 16, 42, also on local level BI1 206). The procedure for mobility hubs is less concrete than others:

> "it's one of those that is the least defined or the least exact in which terms or which deadlines the project has and which results the government wants to see in a few years, so that's one of those that, if you compare it to other fiches on the same subject or other subjects of Brussels Mobility and even with MAAS, mobility hubs is fairly loose defined in Good Move" (BI4 75).

Somewhat connected to the idea of mobility hubs, indicators for bike parking are set, which could also facilitate multimodal mobility (BI5 64ff.). The measures show that the Brussels Capital Region does not have a concrete plan for implementing an encompassing network of differently sized mobility hubs or prioritizes the topic of mobility hubs (BI6 109).

In terms of resources to implement the Good Move plan, some experts raise budget concerns:

> "But I think that … sometimes we are limited in funding. It's a way of thinking in mobility hubs, like if you enroll a network, it's almost logical that you wouldn't have a fully done network of 50 mobility hubs in Brussels from one month on the next one" (BI4 58, see also BI4 28).

Another expert explains:

> "I think everybody's more or less convinced that it's more of less a good idea … but there's no budget until now" (BI6 119).

According to experts, implementing the Good Move plan depends on the subject or measures. One focus is creating circulations zones, including speed limits (BI4 79). Due to the COVID pandemic, the circulation plans are delayed. Plans in Anderlecht should have been put into practice in the first trimester of 2022. The actual implementation of the circulation plan Cureghem in the summer/autumn of 2022 caused controversial political debate and onsite demonstrations. This will be further elaborated under discursive negotiations. So far, the implementation has been postponed, and the plan will be revised. In general, realizing the Good Move plan faces the difficulty of many involved stakeholders. Local administration, regional stakeholders, and public transport providers must cooperate closely and find common ground on measures. Therefore, the implementation is highly dependent on policy integration and coordination (BI1 224, BI2 486).

Some experts say it might be too early to tell how the plan might turn out since it is fairly new and the first measures are only to be implemented (BI5 64). Another expert critiques a lack of regional integration: the question of commuters from other Belgian regions needs to be solved to see changes (BI7 59). In a general sense, one expert describes a gap between expectations for change and the speed and capacities of the municipality:

> „Aber was wir ganz krass spüren ist sozusagen, dass es eine riesige Differenz gibt zwischen den Erwartungen und wie schnell und wie intensiv man Dinge umsetzen sollte und verändern sollte und dem, wie wir nachziehen können in der Gemeinde" (BI2 64).
>
> "Something we feel quite blatantly, so to speak, is that there is a huge difference between expectations and how quickly and how intensively things should be implemented and changed and how we can follow suit in the community" (own translation BI2 64).

Finally, one expert raises concerns about the realization of the goals. These were ambitious and technically difficult, plus the municipality is orienting according to the goals of the region:

> "Les priorités, pour l'instant, en tout cas, on [the municipality of Anderlecht] se rallie à celles de la région. C'est-à-dire que l'objectif de la région, tout le monde le sait, c'est que pour 2035, il n'y aura plus un moteur atmosphérique en région bruxelloise. Maintenant, même si moi, je doute un petit peu de la faisabilité technique actuelle de cet objectif, je pense que ce n'est pas une mauvaise chose de viser cela" (BI1 40).
>
> "Our [the municipality of Anderlecht] priorities, for the moment in any case, are in line with those of the region. That is to say that the objective of the region, as everyone knows, is that by 2035, there will no longer be a combustion engine in the Brussels region. Now, even if I have some doubts about the current technical feasibility of this objective, I think that it is not a bad thing to aim for" (own translation BI1 40).

As mentioned above, the Good Move plan sets goals involving municipalities such as Anderlecht. Generally, many regulative measures by the municipality need validation from the region.

> "Du coup, là où on est 'libres', entre guillemets, de faire ce qu'on veut parce que de toute façon, la finalité du travail doit être validée par la région. C'est toujours comme ça à Bruxelles. Même pour le développement urbain, c'est pareil" (BI1 126).

> "As a result, there we are 'free' in quotes, to do what we want because in any case, the outcome of the work must be validated by the region. It's always like that in Brussels. Even for urban development, it's the same" (own translation BI1 126).

Anderlecht has its own municipal mobility plan but is also involved in implementing the regional Good Move plan (BI1 124, BI2 14). There is no direct obligation to implement the plan because municipal independence is an important guideline. Still, the municipalities are motivated to implement the plan and cooperate (BI2 22, 454). In cooperation with a private planning office, the municipality of Anderlecht works/worked on circulation plans for the districts Cureghem and la Roue (BI1 124ff., BI2 246). The municipal level prepares these plans but needs validation from the regional government. The region subsidizes the process, and Anderlecht is required to apply for funding and implementation at the regional level. The district of Cureghem in the northeast of Anderlecht, directly connected to the Ring, is among the first realized (BI2 227). The location of the SmartHubs case study at Place du Conseil/Raadsplein lies in the area.

A central challenge with creating circulation plans in Anderlecht is the border to the Flemish Region and the access routes to the Ring (a pentagonal road around the historical city center of Brussels). According to one expert from Anderlecht, three main roads cause(d) difficulties in the planning process (BI1 236). During the planning process, citizen participation was initiated to involve them from an early stage (BI2 232). According to some experts, the circulation plan and the pacified districts could automatically create mobility hubs (BI2 194, BI5 64).

> "Maintenant, par le fait de travailler avec Good Move et nos fameuses mailles, on en arrive à avoir des points d'intersection, donc des hubs, au niveau de la mobilité par défaut**,** dans le sens où on va mettre des axes principaux sur lesquels on va avoir des transports en commun qui vont être traversés par des rues inter-quartiers, qui elles-mêmes vont être traversées par des pistes cyclables et ce genre de choses. […] Je pense que c'est quasiment inné dans le programme de Good Move" (BI1 194).

> "Now, by working with Good Move and our famous grids, we come to have points of intersection, therefore hubs, in terms of mobility by default, in the sense that we will put main axes on which we will have public transport which will be crossed by inter-district streets, which themselves will be crossed by bicycle lanes and this kind of thing. [...] I think it's almost a built-in part of the Good Move program" (own translation BI1 194).

Apart from the mobility plan, another potential instrument to facilitate or even demand mobility hubs is building permits for larger buildings. During the permission process, so-called reports on effects ("rapport d'incidence") regarding the mobility system need to be conducted. These reports also include recommendations on parking space that needs to be provided. Often, these recommendations are followed or adjusted minimally. Developers could be motivated to incorporate mobility hubs or alternative mobility services into their plans (see BI1 238ff.).

In terms of informative instruments of the municipality, their public relations channels include Facebook, a local newspaper by the city administration, and an openly accessible participation service in the city center ("Maison de la Paticipation") (BI2 318). These administrative and informative measures by Anderlecht could be used as levers to support the implementation of mobility hubs and communicated changes to inhabitants in the future.

Additional measures region / Brussels mobility

On the regional level, Parking Brussels is responsible for parking policies. They organize and control many parking spaces in different municipalities and consult them with the formulation of new local parking regulations or the organization of controls (BI2 106, BI3 55). In addition to regional parking policies, Anderlecht has its own municipal parking regulations (BI1 190, BI2 106). The definition of stationary car-sharing spaces lies in the responsibility of the city administration of Anderlecht. In cooperation with the car-sharing provider, they locate and define suitable locations. Cambio is the only remaining company operating station-based car-sharing in Anderlecht (BI2 116, 120).

The "Contrat de service public", contract between the political head of the regional administration and the STIB is renewed every five years. It defines the goals and commitments of STIB and the Region in

favor of mobility development in Brussels. An included business plan defines STIB's mission and vision as well as the strategy implemented to achieve the objectives set by the public service contract. So far, mobility hubs are not included in this contract (STIB-MIVB, 2022).

At the time of the interviews, Brussels Mobility was reevaluating the regulation of free-floating shared mobility services. The rules were to become a little stricter, as "chaotic situations" have occurred in Brussels "where you have a lot of e-scooters on sideways, who are really in the way of pedestrians or elderly" (BI3 24). From the first of July 2022, Belgium has introduced new federal laws for using e-scooters. The Brussels Capital Region has implemented even stricter measures to strengthen road safety, for example, by reducing the maximum speed in major pedestrian zones to 8 km/h (Modijefsky, 2022). An administrative instrument could be the creation of drop-off zones for free-floating shared mobility services. These could support the idea of designated areas for shared mobility and facilitate exchanges from one mode to another. According to one expert, Brussels mobility is currently working on these zones but has not yet presented results (BI5 57ff.). Since these zones do not require complex permits, they might have the potential for "quick wins" and enable to try whether people combine different modes more willingly with these designated zones (BI3 26, BI5 60). These 'hubs' could follow the idea of at least physically integrated mobility hubs if installed nearby public transport stations.

Regarding experimental instruments, Brussels Mobility is involved in several smaller and larger research or experimental projects on different topics in mobility (BI4 12, 32). The general idea of "tactical urbanism" also implies a certain exploratory character; small measures are practically realized to see if it is useful and accepted by citizens (BI3 16).

6.4. Ideational dimension

6.4.1. Normative drivers

Central normative drivers can be drawn from the Good Move plan (47ff.). Amongst others, the Brussels Capital Region sets the following goals: The overall quality of life in public space shall be raised by promoting active modes of mobility and public transport. The aim is to create a dense, mixed and multipolar city with opportunities for active mobility. It reduces the negative impacts of travel-related stress, transport-related noise, and environmental emissions. The region wants to raise security and the sense of safety and accomplish 'Vision Zero'. Brussels households should be provided with targeted aid linked to their income level (Brussels Mobility, 2021). One expert adds that the long-forgotten, challenged districts should also be considered (BI2 500). Many points reflect a more just, healthy, and sustainable mobility system.

For the mobility vision, the Good Move plan differentiates between megatrends, behavioral and technological changes. Megatrends are urbanization, digitalization, individualization, and sustainability. Behavioral changes include everything-as-a-Service, shared economy, green and healthy behavior, and changing lifestyles. Technological changes mentioned are autonomous vehicles, connectivity, alternative energy sources, speed, and efficiency (Brussels Mobility, 2021). Another central norm is the changed hierarchy of mobility modes: According to the so-called STOP principle (after the Dutch words stappen, trappen, openbaar vervoer en privé vervoer), the prioritization of mobility mode should start with walking, cycling, public transport, and lastly the private motorizes traffic (Brussels Mobility, 2021, BI6 148ff.).

The central idea of the Good Move plan is the pacified neighborhoods (quartiers apaisés) comparable to the concept of superblocks (BI1, BI2, BI5 64, BI3 14). One expert described them as the heart or core piece of the plan ("Herzstück", BI2 246). These pacified neighborhoods follow the idea of the STOP principle and translate it into practice. Many goals of the Good Move plan are combined with this measure: it shall lower emissions and raise security and quality of life. One expert summarizes:

> "The aim is to work with circulation plans to avoid any transit traffic to pass by the neighbourhood, to slow down the traffic, to slow the noise and the air pollution. So that is one of the main goals" (BI3 14).

As an economically working company, STIB is focussing on the customer perspective. An important driver is the user value of additional measures (BI5 26). As a company operating in public transport, STIB needs to follow stricter rules regarding inclusivity than entirely private companies (BI5 86). The city and regional administration show a similar orientation but more general as seeing itself as a service for all citizens:

> "Sinon, […] par rapport au service, c'est clair que je travaille dans une administration, donc je suis au service du citoyen. Pas que je fais ce que le citoyen veut absolument : […] Le service écoute les demandes du citoyen et on étudie les possibilités de ce qu'il demande et on essaye de se rapprocher au maximum de ce qu'il souhaite, en tout cas" (BI1 36, see also BI4 58).
>
> "Otherwise, [...] in relation to the service, it is clear that I work in an administration, so I am at the service of the citizen. Not that I do what the citizen absolutely wants: [...] The service listens to the citizen's requests, and we study the possibilities of what they ask for, and we try to get as close as possible to what they want, in any case" (own translation BI1 36, see also BI4 58).

The regional administration follows a 'hands-off' approach in regulating mobility providers. The aim is to harmonize regulation and enable operators to provide their services. A satisfying result of this approach would be if users were not even aware of the regulation in place. The administration takes

> "a fairly hands-off approach and just make[s] general guidelines in which operators need to work and on which they need to agree on or base their system on if they want to see any sort of subsidization or any matter, […] if we do our job properly for the user of mobility it wouldn't always be clear that it is the result of our job, […] although we push the market in a certain way and push providers into filling the void for a future we'd like to see for the Brussels mobility" (BI4 24).

One problem for the mobility transition might be that mobility users seem 'non-flexible'. They tend to stick to mobility options they already know. This might also be explained by the limited integration of different mobility options in the Brussels Capital Region (BI4 26). In this context, new mobility services are seen as part of the solution to encourage more sustainable mobility behavior. Also, mobility hubs could be used to adapt different mobility modes to one another:

> "I think that at this moment micro-mobility as well as Mobility as a Service, so mobility hubs as well as mobility as a service, are our solving ways of mending those options […] that aren't really adapted to each other" (BI4 26).

The local level equally aims to support private mobility operators in implementing shared mobility services as well as possible (BI2 44ff.). These modes are seen as a crucial part of the mobility system because otherwise, it might be challenging to satisfy all mobility needs of the city:

> „Uns bleibt gar nichts anderes übrig. Weil ansonsten können wir diese Stadt hier nicht transportieren" (BI2 52).
>
> "We have no other choice at all. Because otherwise, we cannot transport this city here" (own translation BI2 52).

Without including shared mobility services in Brussels's mobility system, it might not be possible to satisfy all mobility needs.

6.4.2. Discursive negotiations

The Brussels mobility system suffers from congestion and bad air quality (BI2 36ff., 594, BI4 22, BI7 46). Many people work in Brussels, which goes along with many commuters. Experts mention the problem of financial subsidies for company cars, which facilitates car usage even more (BI5 78, BI7 54, 59). Another factor is housing prices; if renting or buying living space in the city becomes too expensive, many people are forced to move further away, resulting in more traffic (BI2 30, 238, BI7 80). Brussels has a less strong cyclist community, showing fewer bike users than other Flemish cities. In the Capital Region, only 4 % of trips (Brussels, 2022a). Due to its hilly topography, Brussels might appear less attractive for cycling (BI4 75). In Anderlecht, the number of cyclists is also relatively low but seems to

catch up recently (BI2 36ff.). For Brussels, one expert describes positive development in recent years. Especially the infrastructure and conditions for cycling and walking seem to improve compared to very car-centric conditions 20 years ago (BI6 24ff., BI7 80).

Anderlecht comprises a vast area and is amongst the most populated municipalities of Belgium. Its territory is diverse, from very urban close to the ring to rural areas close to the Flemish border (BI2 310). Another characteristic of Anderlecht's infrastructure is its position on both sides of the canal. It builds a natural barrier for traffic flows and makes crossings in the form of bridges expansive (BI2 524). Some roads are in terrible shape (BI1 220). As already mentioned, Anderlecht is situated at the Flemish border, which leads to much transit traffic from commuters (BI1 240, 282, 514). Due to the high number of commuters, a modal shift needs to include attractive alternatives for commuters (BI1 242). As one expert describes the mobility system, especially in terms of new services, Anderlecht appears to be ten years behind the 'hip municipalities' (BI2 142)

The implementation of circulation plans in Anderlecht is highly political and contested. Anderlecht is amongst the first five plans that are realized. These plans resulted in much political tension (BI2 232). One involved expert summarizes it as exciting and politically critical:

> „Ja, das ist mega spannend und hängt politisch gerade am seidenen Faden" (BI2 226).
>
> " Yes, it's super exciting and politically it's hanging by a thread right now" (own translation BI2 226).

The onsite realization of the circulation plan for Cureghem was approved by the city council in April 2022 and was carried out in August 2022 (Anderlecht, 2023). It was followed by demonstrations and vandalism against road blockades. The plan was controversially discussed in the local council. While the Collège defended the implementation plan, the opposition and several citizens raised their critique loudly and, in some cases, aggressively (Bruzz 2022). As a result of the heavy criticism, the circulation plan will be reversed. A new version of the circulation plan will be developed in the coming months. The mayor of Anderlecht and the Alderwoman ensure that the process will start from scratch and residents will be closely consulted. A concrete schedule is not yet communicated (Chini, 2022).

Another challenge in the concrete implementation is the coordination of construction sites; since there are many roadworks in Anderlecht and Brussels in general, these measures need to be coordinated carefully not to collapse the whole urban traffic (BI2 486).

Considered the capital of Europe, Brussels gets special attention which could serve as an additional driver for advancing mobility policies (BI4 20). One expert describes the city population as divided into two groups: people who want to see changes in the current mobility system towards more public transport and active mobility and others who wish to defend road infrastructure for car use (BI2 584ff.). Mobility is intensively discussed in Brussels amongst social groups but also political parties. Oftentimes the Green political parties (French and Dutch) are engaged intensively in the debate on mobility transformation (BI5 76). One expert explains that with the more leftist government in Brussels (compared to Flanders), more ambitious mobility policies become possible (BI6 47). As mentioned above, the central challenge is strengthening public transport and active mobility. Still, one expert demands that the guiding question in mobility policies should be:

> "[S]hould we still own cars and as many cars as we do? That is the statement in Good Move, and that is certainly a point where public transportation has a central role, combined to other solutions" (BI5 76).

For the political head of the region, it is essential to make changes visible and with small measures.

> "We [political leadership of Brussels Mobility] call it tactical urbanism, or micro-projects, that can sometimes, on crossings, make a huge difference for cyclists or for pedestrians or for elderly. We have made a list of priorities, and we follow that up together with our administration who's in charge to effectively build these micro-projects and to adapt the city on these small little things" (BI3 16)

Other experts also mention this idea of creating changes with small steps. More considerable changes can be achieved by starting with small and practical measures (BI1 46, BI5 14, BI6 137). On one side,

this is mentioned in the context of the magnitude, and on the other, in the context of limited resources and capacities.

Although there seems to be a general agreement on supporting environmentally friendly modes, it is less clear which mode to support over the other. There needs to be prioritization in the cases of limited resources, capacities, and available public space (BI2 20, 148ff., BI3 42f., BI4 28, BI6 143). Two experts raise the concern of a justice dimension: They emphasize the importance of pedestrians and a good walking infrastructure because it serves the needs of the most vulnerable people (BI1 54). Here the accessibility of elderly, mobility-impaired people and caregivers could be strengthened (BI1 56, 248, BI6 10). The struggles in shared micro-mobility and the planned reevaluation of associated regulations are discussed in the section on policy instruments (see above). Public transport is seen as the central element, as the backbone of the mobility system. Potential mobility hubs should follow the public transport system (BI6 156). The region invests many million euros yearly into public transport (BI3 22). According to studies, public transport customers in Brussels evaluate the offer very positively. According to one expert, this could be seen as proof of the right priorities in the past (BI3 24). In terms of public debate, one returning issue is the metro expansion. While the metro system can cover many passengers underground without disturbing traffic aboveground, it is costly and therefore takes budget from other measures in public transport (BI2 530).

In terms of mobility hubs, there is no clearly defined responsibility. This also shows in the question of who should pay for specific measures, whether it should be the STIB as the public transport operator, the regional government as the public transport authority, or another institution (BI5 74). This institutional void might need to be solved to implement a coherent system of mobility hubs. So far, the idea of mobility hubs is described as 'future music' but still, peoples' expectations seem to grow in terms of additional services:

> "I think it's for a lot of people still future music, still a far-off topic, mobility hubs themselves, but in a broader way, as we see in the Mobility Council, the accessibility and the different kinds of services that people tend to expect from public infrastructure towards mobility, that is evolving. More people are using public transport and shared mobility modes, and there is an expectation with the public and mobility hubs is one of the ways we try to, and MaaS as well, check some of those boxes that we tend to notice that the public really demands from their government, as in to take a guiding role in those matters" (BI4 81).

Since local circumstances are very heterogenous in Brussels, planning authorities need to customize mobility hubs to local contexts. A 'one size fits all solution' might not be expedient for the whole region(BI5 82). An expert also raises the same thought from Cambio in the context of their experiences with implementing stationary car-sharing in different municipalities:

> "And therefore, when you think about Smart Hubs organized in something very definitive, very technical, with information boards, digital information boards, and with different service providers, that's maybe not enough flexible in a region like Brussels, or it will cost a lot and is it really necessary to invest so much for this kind of things?" (BI7 29).

Additional measures are under political discussion in Brussels: One big task is the introduction of a city tax to limit vehicle access for the whole of Brussels (BI4 89ff., BI2 510ff.). While the goal is relatively clear, it remains unclear how to implement the access regulation so far. Also, there are struggles with Flanders and Wallonia on the introduction of such a regulation (BI6 47ff., BI7 63). Another possible measure is to redistribute public space in favor of environmentally friendly modes by reducing car parking space and raising prices for it (BI5 78). The number of cars should be reduced by 34% in 2030. Also, the number of parking spaces shall be reduced by about 65.000 places to under 200.000 parking spots in Brussels. The lockdowns during COVID and increased homeworking is described as a foretaste of what the city might look like with this goal (BI3 16, BI7 21). Another expert criticizes the idea of focusing too much on the electrification of mobility. Limited resources and energy used during the construction of electric cars are often not considered. In this context, the idea of downsizing cars appears to be easily forgotten. The same goes for negative externalities regarding space consumption, social justice, and other emissions. Inner-city mobility via individual vehicles should become the exception (BI7 50ff.).

Overall, the fear of change and the lack of political will to make changes are crucial and might be even more challenging than the financial one (BI1 46, BI2 148, BI3 57).

There seem to be different opinions about the independence of the municipalities in Brussels. One expert sees the local autonomy diminishing :

> "Il y a une certaine autonomie des communes. Soyons clairs, l'autonomie des communes est en train de disparaitre au fur et à mesure du temps. Quand je compare, quand je suis arrivé à l'administration et maintenant, on a perdu facilement entre 50 % et 60 % de notre autonomie communale" (BI1 232).
>
> "There is a certain autonomy of the communes. Let's be clear, the autonomy of the communes is disappearing as time goes by. Compared to when I joined the administration, and now, we have easily lost between 50% and 60% of our municipal autonomy" (own translation BI1 232).

While other experts emphasize the independence of the municipalities as important good and mention their importance (BI2 22ff., see also BI4 67):

> "The communities [the 19 municipalities of Brussels Capital Region] themselves have a big voice in how legislation is implemented in Brussels Capital Region" (BI4 67).

One central aim of the regional administration is to harmonize and coordinate mobility policy for the whole region (BI3 14). The question of the complex governance system in Belgium and Brussels, in specific, is partly raised by experts. They also explain that since the system is historically grown, changes can become very political and difficult (BI3 38).

This highly fragmented organizational dimension (see here and in the section on structural components in section 6.3) can lead to contradicting political decisions, so the municipal council might take agreements on measures that the regional level does not agree with (BI2 158, BI3 40, BI5 60).

> "We [the STIB] have daily matters with councils agreeing on what we want to do but the region not, and then the council is deciding to do it anyway, and we are from the region, so we are a bit in between" (BI5 60).

Participation of different stakeholders is crucial to many mobility-related aspects in Brussels. The local mobility council in Anderlecht and the Mobility Commission for the Brussels Capital Region exemplify this. Citizens were invited to participate in developing the Good Move plan. The development of the document started in 2016 already. During the process, stakeholders from the local and regional levels, research, commerce, public transport, politics, associations, and others were consulted in elaborating on a joint mobility vision (Brussels Mobility, 2021). Non-organized citizens were invited to contribute their remarks online and during public assemblies or via the website of Brussels Mobility and the Good Move plan (Brussels Mobility, 2021).

In Anderlecht, the municipality keeps in touch with certain people from the civil society (BI2 234ff.). In almost all districts, there are committees. These are self-organized committees of very engaged citizens of a distinct. One expert of Anderlecht describes these committees as good contact persons on the very local level (BI2 316). Additionally, the municipality is in contact with local stakeholders and persons organized in youth and senior organizations (BI2 316). As mentioned, there is an additional chance to participate in the commission on sustainable mobility, which gets consulted in cases of more significant urban development projects. According to a local expert, no conflict has arisen in the context of this committee (BI2 344ff.).

There are no projects possible in Anderlecht without part-taking of the population:

> "Wir können keinerlei Mobilitätsprojekte mehr machen heutzutage, die wir nicht irgendwo vorher in der Öffentlichkeit besprochen haben. Die sind tot. Das funktioniert nicht. Also selbst wenn das dazu führt, dass es Widerstand gibt und wir da auch krasse Diskussionen haben, heißt das ja nicht, dass wir uns dem anpassen müssen. Aber wir müssen die Leute anhören. Wir müssen auf jeden Fall da sein. Und wir haben auch schon oft Projekte angepasst, aufgrund von Hinweisen, aufgrund von Anmerkungen. Das ist ganz klar. Die Leute haben natürlich viel mehr Ahnung – vor Ort, was passiert, als wir das oft haben" (BI2 374ff.).

"We can't do any mobility projects these days that we haven't discussed in public beforehand. This is dead. It doesn't work. So even if that means that there is resistance and we also have tough discussions, that doesn't mean that we have to adapt to it. We have to listen to people. We have to be there in any case. And we have often adapted projects based on indications, based on comments. That is self-evident. Of course, people on the ground have a much better idea of what's happening than we often do" (own translation BI2 374ff.).

Due to cases of vandalism and the critique of imposed projects, the city administration claims to take acceptance as an essential indicator for measures:

> “Je pense — et ça, j'en suis convaincu depuis longtemps — que le plus gros indicateur pour moi, c'est un, le respect de l'aménagement qui a été fait » (BI1 66).
>
> "I think – and this is something I've been convinced of for a long time – that the biggest indicator for me is respect for the development that's been done" (own translation BI1 66).

Still, conflict with civil society regularly shows in citizen assemblies, where citizens raise their concerns even more aggressively. One local expert describes the following situation:

> “Also wo ich mich komplett in krass konfliktöse Situationen wiederfinde ist, wenn es Bürgerversammlungen gibt. Also ich habe mich schon mehrmals in Sälen befunden, wo 60 Leute auf mich eingebrüllt haben. Also das ist absolut normal. Das gehört absolut dazu” (BI2 366ff.).
>
> "So where I completely find myself in very conflictual situations is when there are citizens' assemblies. So I've found myself several times in meeting halls where 60 people were shouting at me. So that is absolutely normal. That is absolutely part of it" (own translation BI2 366ff.).

Later the expert explains possible contextualization or explanations: People that show up to participation formats are generally dissatisfied and possibly do not differentiate participation formats. This would result in destructive debates and frighten off other people who are in favor of certain measures (BI2 392). Also, there is a problem with so-called ‘NIMBYs’ (short for ‘not in my backyard’), people who generally favor a measure but do not want to have the changes made in their direct surroundings (BI2 382ff.). Last, the time slots of participation formats are not suitable for certain groups, like families (BI2 392).

6.5.Summary

Structural Components

- No encompassing mobility hubs system in place, no defined responsibilities, but general interest in implementing hubs on the municipal and regional level
- Brussels Capital Region (BCR) has a highly fragmented governance arrangement, which hinders the implementation of mobility hubs and sets up high demands for policy integration
- Local governance lacks financial and human resources to expand infrastructure
- STIB, the regional public transport provider, cooperates closely with the regional mobility department and develops a Mobility as a Service tool

Policy Instruments

- Regional Good Move plan serves as the main mobility planning document; it does not directly oblige the 19 municipalities in Brussels
- Implementation of the plan faces the difficulty of a fragmented governance arrangement
- Local circulation plans are a central part of the Good Move plan and aim to pacify districts; they are coordinated and implemented on the municipal level (Municipality of Anderlecht) and are financed by regional budgets (BCR)
- Major exchange points between pacified districts could serve as locations for mobility hubs automatically; they are not explicitly planned
- The municipality of Anderlecht faced difficulties with the implementation of a local circulation plan in Cureghem due to vandalism and accusations of lacking participation and acceptance

Normative Drivers

- STOP-principle in the Good Move plan serves as a guiding norm; it is described as traffic calming principle and changes the hierarchy of mobility modes; therefore pacified neighborhoods are successively implemented
- Additional regional drivers are to raise the sense of safety and accomplish vision zero plus the achievement of climate neutrality by 2030
- New mobility services, like shared mobility to encourage more sustainable mobility behavior

Discursive Negotiations

- Political pressure due to congestion, bad air quality, and safety issues
- Critique of tax advantages for company cars, free access into the city and availability of car parking and lack of political will to make changes
- Regional strategy refers to 'tactical urbanism', making small but strategic changes in the urban infrastructure to create high visibility and effectiveness with relatively small measures
- Public transport as the central mode for mobility, but high amount of commuters
- Strengthening active modes also in light of limited resources and availability of public space
- Local mobility plan in Anderlecht resulted in political tension and withdrawal Citizen participation is crucial to realize projects

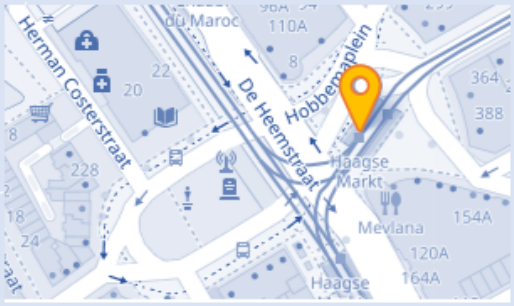
7. LIVING LAB ROTTERDAM / THE HAGUE

7.1.Overview Haagse Markt/ Hobbemaplein

SmartHubs

Haagse Markt/ Hobbemaplein

The Hague, Netherlands



City: 550,000 in 2021
Region: 2,700,000 in 2021

Net-zero target: 2030

Operator: N.N. / SmartHubs Consortium
Operation Start: 2024

Currently, only a public transport stop is located next to a large market in a heterogenous urban neighborhood. The municipality is redesigning the square with a mobility hub in mind. During the SmartHubs project, temporary measures are planned.

Mayor since 2018: Jan van Zanen, conservative-liberal party (VVD)
Since 2022: conservative, liberal, green, Christian democratic, and social democratic coalition
2018-2022: conservative, liberal, and green coalition

Available modes

GOVERNANCE LEVELS

Local Administration:
- Department of Urban Development Department of City Management
- Alderman Mobility and Culture (Robert van Asten, D66)

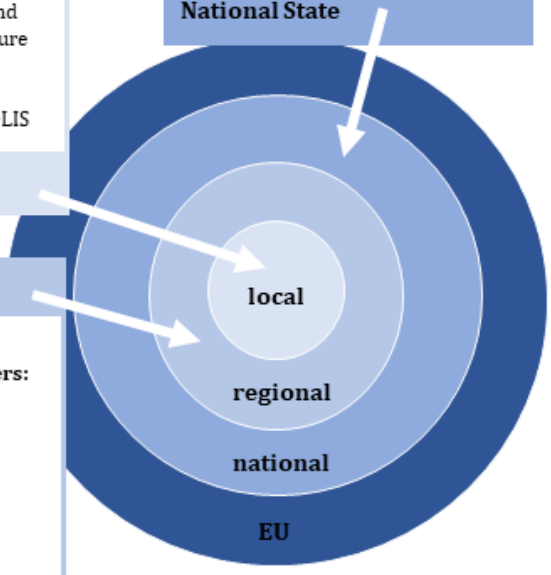
Local Public or Private Stakeholders:
- Haagsche Tramweg Maatschappij (HTM) (PT provider)

Local Networks:
- Association of Dutch Municipalities (VNG)
- Municipal Network for Mobility and Infrastructure (GNMI)
- Eurocities
- Civitas, POLIS

Municipality

Federal Ministry of Infrastructure and Water Management (Mark Harbers, VVD)
Minister of the Environment (Vivianne Heijnen, CDA)

National State



Federal State

Regional Administration:
- Metropolitan Region Rotterdam The Hague (MRDH)
- Province of South Holland, Regional Ministry for Mobility and Public Transport, Environmental and Safety Licensing and Governance (Frederik Zevenbergen, VVD)

Regional Public or Private Stakeholders:
- Regional PT Providers (HTM, RET, EBS,)
- NS/ NS Stations (national)
- CROW

SmartHubs

POLICIES

Mobility Transition Strategy The Hague 2040

Time frame of document: 2022-2040
Author: Municipality of The Hague, Mobility Division
Main characteristics:
Four themes and corresponding strategic choices:
1. "the compact city" - Prioritizing pedestrians and cyclists; achieving safe and slow traffic
2. "mobility on a human scale" - Putting the traveler in the center by making shared mobility, cycling, and public transport more user-friendly by a target group and area-oriented approach
3. "city-friendly transport" - Address safety and waste management considerations in the creation of new and existing spaces
4. "region and node development" - Mobility hubs are the key for a mobility network

Area-based opportunity maps, incl. instruments for district types (center environments, pre-war city districts, post-war city districts, regional context, and mobility hubs)
Guiding principle: STOMP (hierarchy of transport modes: pedestrians, bike, PT, cars)

Policies regarding multimodality or mobility hubs

Area-based approach:
- Emphasis within the mobility transition will differ per area or district; tailor-made mobility system

Efficient use of existing space:
- Shared mobility is an instrument for making space in public areas,
- Smart logistics mobility hubs
- Cars preferably parked on private property

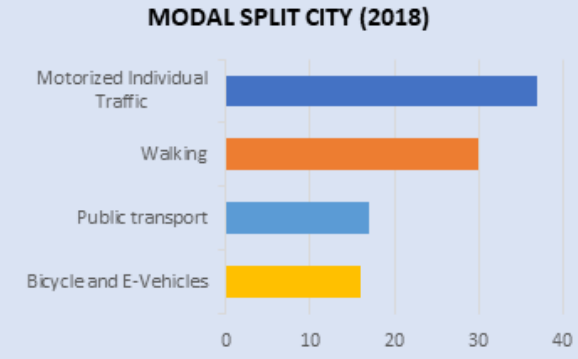
Accessible mobility networks:
- Mobility hubs as a key instrument for a mobility transition
- Neighborhood hubs and regionally connected hubs

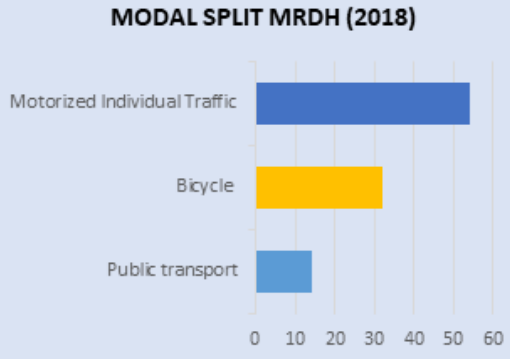
Other related transport policies

Smart Mobility Vision Den Haag (2021)
Summary:
Overall goal: Everyone has a mobility system at their disposal that is tailored to their needs, safe, sustainable, clean, affordable, and connected.
Vision of Smart Mobility: three pillars of mobility
1. Physical and digital infrastructure
2. Mobility solutions
3. Community-oriented bottom-up approach for initiatives, on-site update of travel information

New approach: "wave" technic
Smart mobility team of the municipality identifies new applications (waves), twice a year status update, local government can decide which wave they want to surf

THE HAGUE MODAL SPLIT





Sources:
MRDH (2018): Verkeersmodel MRDH 2.0. https://mrdh.nl/sites/default/files/documents/rapport_verkeersmodel_mrdh_2.0_-_001594.20181026.r1.02.pdf (24.04.2023).
The Hague (2020a): Haagse visie Smart Mobility: Optimale inzet van innovatie voor de Haagse reiziger.
The Hague (2021): Strategie mobiliteitstransitie Den Haag 2022 - 2040.
SmartHubs (2023): Haagse Markt. https://data.smartmobilityhubs.eu/wiki/Hubs/4 (24.04.2023).

7.2.Governance framework

The Dutch city of The Hague has about 550.000 inhabitants and is located in the Province of South Holland. Together with Rotterdam and 21 surrounding municipalities, the cities form the Metropolitan Region of Rotterdam-The Hague (MRDH). This area has about 2,7Mio. Inhabitants and is economically highly interlinked. This also reflects in highly interlinked mobility behaviors. The Hague has eight city districts and a total of 44 neighborhoods along the coastline of the North Sea (The Hague, 2021a). The city is the seat of the Dutch King and many national and international institutions.

The municipal council is the city parliament of The Hague. Together with the Municipal Executive, it builds the government of The Hague. Generally, the Municipal Council lays down the main principles of policy while the Municipal Executive implements the decisions. In 2022, The Hague formed a new political coalition between the conservative (VVD), liberal (D66), green (GroenLinks), Christian democratic (CDA), and Social democratic (PvdA) parties after lengthy negotiations (van Bree & Brakema, 2022). Before the elections in March 2022, a conservative, liberal and green coalition governed the city (The Hague, 2018). The current Mayor of The Hague is Jan van Zanen (VVD).

The Hague's city administration is divided into nine departments. The Department of Urban Development is responsible for urban planning, mobility, infrastructure, and housing. Amongst many other tasks, the Department of City Management is responsible for maintenance and street cleaning, and the Department of Municipal Administration is responsible for public order and safety (The Hague, 2021c). The alderman for urban development and deputy mayor is Robert van Asten (D66). The public transport provider of the Hague is HTM. The shares of HTM are held by the Municipality of The Hague (99%) and the MRDH. It transports travelers based on two transport concessions (rail and bus) granted by the MRDH (HTM, 2022).

In 2022, The Hague formulated a mobility transition strategy, 'The Hague 2040', providing general guidelines and goals for developing the mobility sector until 2040. The plan emphasizes shared mobility's role in making space in urban areas. Also, the different types of mobility hubs are described. On the one hand, logistic hubs should be established for efficient freight transportation. On the other hand, different types of passenger hubs, from neighborhood hubs to regionally connected hubs, are explained. There are no concrete goals or timelines for the implementation, measures, or responsibilities regarding human and financial resources. The mobility strategy refers to insights from the Smart Mobility Vision of The Hague from 2021. This document deals with new innovative forms of mobility. Therefore, it includes the physical and digital integration aspects of mobility planning.

Although the city of The Hague refers to mobility hubs in its planning document, none are yet in place. The location of the 'Haagse Markt', which serves as a case study for the SmartHubs project, is currently a tram stop nearby a large permanent multicultural market. Shared mobility services are available within walking distance, but no signage or visible connections exist between the different modes. The whole intersection is the subject of an urban development process in which the construction of mobility hubs should be included. Due to new trams, the entire rail system has to be renewed in this area.

7.3.Organizational dimension

7.3.1.Structural components

City of The Hague

The Department of urban development is responsible for the local urban mobility plan of the city. It is divided into several divisions, including a mobility division. One unit is responsible for so-called chain mobility and mobility hubs, working on topics like multimodality, the development of mobility hubs, and transport-oriented mobility (HI1 12). The planning of mobility hubs in The Hague is still at an early stage, starting with conceptualizing the mobility strategy and already conducting the first pilots. Initially, the city administration aimed to develop one overall mobility strategy and one strategy dedicated to mobility hubs. This plan changed so that the mobility strategy includes aspects of mobility hubs (see below under policy instruments). About 20 employees are working on the mobility strategy

and correlating elements. The mobility unit holds approximately 60-70 people, including permanent and temporal staff members (HI1 34). The mobility plan and first experiments are covered with sufficient financial resources (HI1 24, 38). Especially when financing new public transport infrastructure, projects can be very costly; the city is still working on that. The city budget is decided upon every four years, the same as the local legislative period. Still, there remains certain flexibility within the budget to reallocate some projects. By selling shares in a large energy company, the city of The Hague has recently gained an extra budget for additional measures in the mobility sector, for example, hiring a consultancy office to support the new mobility strategy (HI1 48ff.).

Internally, the mobility department collaborates with other units within the public administration. Regarding mobility hubs, they exchanged a lot with the responsible team for controlling and maintaining public space. Here, reservation about the idea of additional measures in public space was experienced (HI1 63). In terms of public transport, the city administration holds close and regular contact with the HTM and its strategy unit (HI1 122, HI3 52, 82ff.).

The mobility unit is part of different networks. Locally, it holds contacts with various individuals and organizations from civil society and companies in smart mobility. On a regional and national scale, it is also collaborating in different networks. The importance of regional and national level government is considered to be very high, especially from the long-term perspective (HI1 40). The Hague is part of the Metropolitan area Rotterdam-The Hague (MRDH) and the Province of South-Holland. To both networks, the city of The Hague contributes human and financial resources (HI1 26ff.). Additionally, The Hague is part of the G5, a city collaboration of the five largest cities of the Netherlands (Amsterdam, Rotterdam, The Hague, Utrecht, and Eindhoven). These cities exchange regularly and amongst different topics in a network (HI1 28, 46). Together with other stakeholders, the city administration of The Hague also uses a lot of "lobby capacity" to influence the formation of new national political guidelines at the federal ministry for mobility (HI1 28).

Another important non-governmental organization for Dutch stakeholders is CROW. The organization is involved in research and applied projects and works on different topics, for example, dealing with shared mobility and the use of public space. With about 120 employees, CROW has numerous and diverse resources of staff and expertise (HI5 22, 41, 81). CROW is mainly financed by a shared funding scheme of municipalities, provinces, and the national government (HI5 13, 45). A critical aspect of their work is the development and regular update of guidelines, such as safe road design, that apply to the entire Netherlands (HI5 23, 47, 65). Another aspect is collecting and connecting knowledge from different Dutch stakeholders (HI5 23, 41, 79). Knowledge is also shared over seminars for transport planners from different administrative levels (HI5 43). Regarding shared mobility, CROW provides a dashboard mainly looking into car- and bike-sharing. Based on an agreement with shared mobility operators, pre-defined data is collected and published on a publicly accessible dashboard. It aims to give an overview for policymakers on what positive and negative impacts these services can have (HI5 23, 69ff.). The Ministry of Infrastructure and Water management has developed national standard for the branding and wayfinding of hubs and implementation is being tested in several cities, including Rotterdam, across the Netherlands in 2023 (Mijksenaar, 2022, HI5 53).

Metropolitan Region of Rotterdam / The Hague

The MRDH is an administrative partnership between 23 municipalities. The political leaders of the municipalities, such as Mayors, Aldermen, and -women, are organized into different boards and committees within the MRDH. Every four years, they set a strategic agenda on topics that should be tackled. Additionally, the MDRH board meets monthly to discuss current issues and establish a common agenda (HI2 125, MRDH, 2022). The members of the MRDH are very heterogenous; the large cities of The Hague and Rotterdam might face different challenges than smaller municipalities in the surroundings. According to a rational expert, this also reflects in positions toward mobility hubs and available resources and capacities (HI2 29, 35). While big cities have units on different topics related to mobility, the smaller municipalities might have only one or a few employees in the overall mobility department (HI2 53). Overall, the MRDH has about 120 employees. Within its administration, the unit for traffic has about 15 employees and deals with mobility hubs, amongst other topics (HI2 10, 51ff.).

The national government gave the MRDH the status of a transport region, including legal tasks related to traffic and transport. In this function as public transport authority, the MRDH offers concessions to

the public transport operators running for about 10 to 15 years and grants subsidies for public transport (HI3 18, 34, 42). The MRDH is mainly financed by the national government for the public transport companies operating in the area, the HTM, RET, and EBS. A small share of the funding is for regional policy and goals such as supporting sustainable mobility, bike lanes across municipal borders, and other projects (HI2 48, 102ff., HI3 18, MRDH, 2022). Consequently, the MRDH is closely cooperating with public transport companies. Also, the province of South Holland is an important partner for many mobility-related topics (HI2 48, 71ff., HI3 42, 52). One crucial competence of the municipalities and the province is the property or the right of the land, so these institutions have the authority over public space. In contrast, the MRDH has no jurisdiction in this regard (HI2 78).

So far, the MRDH does not play an active role in implementing mobility hubs on the regional level. It is instead figuring out what role the region should play. The same goes for shared mobility and MaaS (HI2 25, 35). The MRDH is currently working to support and connect municipalities and facilitate data exchange (HI2 27ff.). This support is provided rather on an administrative level by regular interaction with local policymakers (HI1 26ff., HI2 116ff.). Additionally, there are monthly meetings with all policymakers from involved municipalities on different topics (HI2 123). Currently, the MRDH is working on a vision to contribute to the issue of mobility hubs and shared and connected mobility (HI2 35f.). Overall, tasks and responsibilities in terms of mobility hubs seem to take part in a certain degree of an institutional void.

Regional policy papers by the MRDH address all involved municipalities, but it does not hinder them from developing their own municipal policies on specific topics (HI2 63). This can be challenging since the municipalities are not forced to follow regional guidelines. Also, this can result in uncertainty and institutional void regarding the implementation responsibility. The MRDH doesn't have legal power or local administrative authorities, while some municipalities ask for regional action:

> "They [the municipalities] are looking at us for certain information, for certain directions, but we are asking them, 'OK, but what are you going to do?' And so there's a little bit of a mismatch between the policy and actually doing something with the policy because the roles are not as clear as we want them to be. They're still looking a lot towards us instead of actually doing it themselves" (HI2 69).

Regarding exchanges with civil society, the MRDH does not directly have contact with citizens. They are in contact with ROVER, a public transport passenger organization. Rover represents passengers' interests through lobbying and public relations work. It wants to expose deficiencies and strengthen public transport as an attractive alternative. Rover has a legal right to consult and is in exchange with various transport companies and (regional) governments (HI2 91ff., Rover, 2022). The HTM also contracts with ROVER and other societal organizations to include different status groups in public transport planning (HI3 74).

Public transport provider: HTM

The public transport provider in The Hague is HTM operating under the authority of the MRDH (see above, HI3 10). The spatial focus relies on the territory of The Hague and surrounding municipalities (called Haaglanden), for which HTM holds concessions (HI3 16, 48). The department working on travelers and customer satisfaction has about 40 employees. Part of this department is the strategy and development unit, with about six employees (HI3 28). Generally, this unit focuses on long- or middle-term developments, new products, and how to answer passengers' needs. Concretely, this involved a thematic orientation towards door-to-door mobility, shared bike systems, like the own HTM shared bikes or cooperation with moped operators (HI3 10ff.). The income from sold tickets and public funding via subsidies for public transport finances the HTM. Extra revenues are collected in a "quality budget" and are spent back on improving public transport (HI3 42). During the COVID pandemic, the incomes of HTM, as all public transport providers, decreased massively and made the company dependent on additional public aid (HI3 102ff.). The expertise on public transport and information about customers' travel behavior is considered an informative resource of HTM. This information is gained by chip cards and regular customer surveys, questionnaires, or focus groups (HI3 24ff., 74). Additionally, CROW works on an annual national survey on public transport and customer satisfaction (HI5 88ff.).

In terms of mobility hubs, the HTM could support the operation with their infrastructure of public visibility, information points, maintenance, and stuff (HI3 26, 40). For the maintenance of tram tracks and stations, HTM generally holds more responsibility than in the cases of bus stops (HI3 36). In the SmartHubs case of Haagse Markt/ Hobbemaplein, the HTM is also responsible for maintaining the mobility hubs (HI3 40). Currently, HTM is working on a long-term development project called scale jump ('OV Schaalssprung'). The project aims to scale up public transport rapidly to compensate for the growing demands. By expanding PT, the Hague hopes to strengthen regional accessibility, lay a foundation for a mobility transition in the city, contribute to the climate challenges and expand transport capacity and speed (The Hague & MRDH, 2018a). This project is additionally funded by the national government (HI3 48, 80, 104).

HTM is part of several national and international networks. It is a member of the UITP, the International Association of Public Transport, and the National Dutch Railforum. The knowledge network Railforum was established in 1992 and now consists of 200 companies and organizations active in the rail sector (both passenger and freight transportation). The network aims to exchange knowledge and experiences to increase the social and economic efficiency of rail transport. The association organizes regular meetings with members to bring different parties together (Railforum, 2021). Additionally, HTM cooperates with local universities and other regional and national public transport providers on diverse topics (HI3 66ff.) For instance, the HTM collaborated with other companies on the project Rivier to develop a common digital MaaS platform (HI3 118ff., Rivier, 2022). 9292, a digital journey planner for the Netherlands, is another application that HTM is involved in. In the App, passengers can buy tickets for all available PT modes: train, bus, tram, metro, and ferry. The app also shows up-to-date travel information for all public transport and gives alternative travel advice in case of delays (HI3 74, 9292, 2022).

Other stakeholders

Another possibly important player in developing central urban hubs in Dutch cities is NS Stations, a sub-company of the Dutch railway company NS managing the train stations if there are railway station buildings (HI4 3, 7, 25). The NS is a privatized company operating fully commercially but owned by the national state (HI4 15). In addition to the operation and management of the station and the surrounding public space, NS Stations owns some shops and kiosks operating at the stations. Other brands and shops present at stations are just renting commercial spaces (HI4 19, 106ff.).

NS is operating a bike-sharing system called 'OV fiets', offering shared bikes in almost 300 railway stations across the country. NS is currently doing tests with shared e-bikes in a few cities. But, so far, due to environmental concerns, NS does not intend to include e-mopeds or e-scooters (called steps in Dutch) in their shared bike service (HI4 37). NS Stations cooperates with ProRail on providing bike and car parking at their stations (HI4 25, 68). ProRail is also a company publicly owned by the Dutch state and manages the rail infrastructure in the Netherlands. Additionally, they intend to provide additional spaces for other shared micro-mobility services, such as mopeds and e-scooters (if allowed in the Netherlands, HI4 39). According to internationally codified fair competition guidelines, NS Stations has to treat all companies equally (HI4 96). The company regularly collects data on customer satisfaction in the station, which could also be used as a monitoring tool to measure improvements due to more connected mobility hubs (HI4 15, 86).

Since there are already different public transport modes, cars, and shared micro-mobility services at almost every station, these stations could already be seen as mobility hubs. Until 2025, NS aims to upgrade 200 large and small stations with additional services following the idea of advanced mobility hubs. Other services include waiting and sanitary facilities, warm beverages, and free tap water (HI4 7, Dutch Railways, 2022). However, digital integration, a common branding as hubs or signage to all provided mobility modes, is not necessarily included. NS Stations could provide public space, internet connection, maintenance, and security services over their corporate structures to further develop the idea of mobility hubs (HI4 43ff.). Currently, NS Stations is running pilots in cooperation with the national Ministry of Infrastructure and Water Management and ProRail to work on parking facilities for all different mobility modes present at railway stations and their direct surroundings. In the Netherlands, this includes many bikes, but also cars, and new mobility shared mobility services. These pilots aim to

develop a comprehensive national strategy that might also take up the idea of mobility hubs. This broader strategic plan is planned for 2023 (HI4 50, 58).

Since municipalities have the authority over the public space, they remain central partners for the NS Stations. Before the NS Stations can integrate them into the local train station, shared mobility providers must first get a general permit to operate in a specific city (HI4 60). There are regular meetings between municipalities that have shared mobility services and NS Stations. The Hague also cooperates in these meetings and pilots (HI4 68ff.). On the other hand, the shared mobility operators are also important partners since they can give feedback on their needs and which locations are well accepted by users or are not used (HI4 74ff.)

In developing mobility hubs around train stations, NS Stations and especially municipalities face the difficulty of fragmented ownership structures of the surrounding space. This complicates and slows development down. As one expert describes it:

> "Yeah, the difficulty, the main difficulty, I think, is that the space we all want to develop in is owned by so many different parties in the Netherlands. [...] And if you're lucky, then you have to deal with just one owner. But if not, you have to deal with five, six, maybe ten different owners if you want to develop something. And it could be a hub or a housing project. So, it takes quite a lot of time to get these things done. It's really, this is the, for the municipality especially, this is the main difficulty" (HI4 127).

In this context, experts mentioned a new environmental law called 'Omgevingswet' by the national government as a relevant instrument. It regulates how to design and develop public space while also requiring stakeholder participation. According to one expert from CROW, the purpose of the law is to reduce the number of sub-laws and directives into one to facilitate overall planning procedures (HI5 102). The law also demands close cooperation between the local administration and regional and national stakeholders. Nearby stakeholders like shop owners, companies, and property owners must also be consulted and involved (HI4 9, 84, HI5 96).

Besides this environmental law, the national coalition agreement also emphasizes the importance of mobility hubs (HI5 139). The federal government is developing a general hub style, including a design and logo. The usage will not be mandatory but linked to subsidies, which might act as a strong financial incentive (HI4 119ff.). According to an expert, this style orients at the hubs design for the province Groningen and Drenthe.

> "So, they want to have this recognizable style throughout the whole of the Netherlands. And I think it's a nice idea. We'll see if it works, but that's at least one thing" (HI4 115).

So far, this design was not published yet. As part of the digital integration of mobility hubs, the national government invests in developing a MaaS app (HI6 49, 56).

7.3.2. Policy instruments

Local mobility plan: Mobility Transition Strategy 2022-2040

The overall mobility plan of The Hague is the Mobility Transition Strategy 2022 – 2040. The document describes a mixture of policy instruments and takes insights from the Smart Mobility Vision published in 2020 (The Hague, 2020a). The city parliament discussed the new mobility plan in January 2022. It was accepted with the votes of the social democratic and green parties, while the other parties voted against or had reservations (The Hague, 2022). The document is oriented at the SUMP framework (HI1 14). The goals for mobility until 2030 are to be safe, efficient, clean, tailor-made, affordable, and connected. This includes the aims of zero traffic victims per year, efficiency in terms of the usage of space and infrastructure, and meeting environmental and climate ambitions. Mobility should enable everyone to reach their destination; it should be affordable for travelers and the government and connect the region and other metropolitan regions (The Hague, 2021d).

The mobility plan includes so-called learning labs. Seven pilot projects link up with various dilemmas that emerged from the participation process with residents of The Hague, entrepreneurs, interest groups, and visitors (The Hague, 2021d). These learning labs can be described as experimental

governance instruments. Additionally, one local expert explains that experimental governance helps to translate general topics into concrete issues. As the expert said:

> "one thing we encountered was that it was still really a bit theoretical, all, the mobility hubs, so we didn't really know what the definition was and what were the effects of these new types of instruments, and what we then thought we needed was more experiments, so just building or creating these hubs in the city and look what happens. And these kinds of pilots and studies like the SmartHubs project are really helpful in that to pinpoint really the exact effects and critical factors for success in these mobility hubs" (HI1 12).

The document focuses on four topics: the compact city, the human scale, city-friendly transport modes, and the regional context (The Hague, 2021d). According to the strategy, shared mobility should be used to make more public space available. The number of parking spaces in urban development areas shall be reduced in favor of alternative mobility modes and hubs (The Hague, 2021d). The fourth topic, 'regional context and mobility hubs' is dedicated to mobility hubs (The Hague, 2021d). They are seen as key instruments for a mobility transition. They also contribute to the so-called scale jump for public transport and the compact city. In this context, mobility hubs are also described as playing a pivotal role in enabling travelers to switch comfortably and easily between transport modes (HI3 48, 80, 104, The Hague, 2021d).

The plan aims to take up on already existing hubs at train stations, public transport stops with shared mobility services, or park&ride stations and strengthens them to emerge into new multifunctional hubs. Additionally, new small-scale hubs can be implemented at minimum walking distance from living, working, or other facilities. These intersections could even serve as points of social exchange and economic activities. Advantages offered by mobility hubs could be easy switching, saving spaces, more freedom of choice, supporting usership instead of ownership, creating a more attractive urban environment, and facilitating the conjunction with public transport (The Hague, 2021d).

The mobility strategy translates the topics into urban contexts based on area-oriented opportunity maps. The Haagse Markt / Hobbemaplein area belongs to the area of pre-war districts. For these areas, mobility hubs shall reduce pressure on public space and increase public safety. Also, designated district and neighborhood hubs could be implemented with shared mobility services such as e-scooters, (e-) bikes, and car-sharing (The Hague, 2021d). In the regional context, mobility hubs are seen as an important tool to enable regional multimodality without depending on private vehicles (The Hague, 2021d).

Overall, the strategy seems to follow a data-driven and informative approach. Several figures and statistics explain all strategic choices in the topics. The mobility strategy serves as an administrative and informative instrument, including experimental elements. However, it does not set specific financial or human resources goals for the implementation. Since the expert interviews were conducted in December 2021, before the city parliament accepted the mobility strategy, there are fewer critical reflections on the plan as in the other case studies.

Other regional or national policy instruments

Regionally, the municipalities involved in the MRDH work together within the sustainable mobility program (MRDH, 2018). The common aim is to reduce CO2 emissions from mobility in the region by 30% in 2025 compared to 2015 (MRDH 2018). The mobility program includes 45 measures that should enable the MRDH to reach this goal. Amongst these measures are implementing logistics hubs (B17) and upgrading public transport hubs (D2). While logistic hubs are considered part of municipal responsibility, the upgrade of public transport hubs lies upon the MRDH (MRDH, 2021). The report on the effects of the mobility program indicated that smaller municipalities might need regional support in translating measures into their local policies. Big cities like Rotterdam and The Hague have more extensive administrations with more human resources to cover these topics (MRDH, 2021).

In the context of mobility hubs, the regulation of shared mobility services is essential. In the Netherlands, these modes are regulated based on national law. So far, e-scooters are not allowed in the Netherlands. Even though more vehicles might be observed in The Hague, they are officially illegal in the public space (HI1 69ff.). The national government generally decides what mobility modes are allowed in Dutch cities

but also permits municipalities to regulate the specific operation of shared mobility providers. As one expert summarizes:

> "it's decentralized, but on a national level they decide on what is […] on the local level and on the regional level we decide how it's done in our own borders" (HI1 75).

So, in the case of The Hague, when shared mobility is mentioned, it includes shared cars, bikes, cargo bikes, and mopeds (HI1 69). A permit system came into force on 1 April 2020 (The Hague, 2021b); it applies to all shared mobility providers and should limit the negative consequences of using shared vehicles (HI3 80, The Hague, 2021b). According to experts, there was a fear of blocked sidewalks as in other European cities. Public space is given almost freely to shared mobility providers in return for data exchange and transparency on how these companies regulate the usage and parking of their vehicles. Current regulation aims to find a good balance between avoiding negative effects on sidewalks and allowing the advantages of shared mobility in the city (HI1 65). For this reason, there is a quarterly evaluation meeting with each provider, where in addition to overall performance, attention is also paid to specific reports and complaints from citizens (The Hague, 2021b). One local expert describes:

> "First, we allowed to park them everywhere, like free-floating, and now we try to change it into a kind of station-based or hub system. And we take parking space away for that. So, we are really trying to regulate this more into a hub idea" (HI1 134).

As mentioned, the idea is to include the concept of mobility hubs stronger into the regulation of shared mobility.

7.4. Ideational dimension

7.4.1. Normative drivers

Due to different factors, the mobility policies in The Hague seem to be driven by a sense of urgency. As the presentation of the mobility strategy summarizes, the document presents the choices necessary to keep the city accessible, livable and safe for traffic (The Hague, 2021e). The mobility plan itself describes the overall driver as follows:

> „De aantrekkelijkheid van de stad is in gevaar. De stad slibt dicht. Dat geldt voor alle (deel)voertuigen als er geen keuzes worden gemaakt. De (internationale-) bereikbaarheid is in gevaar omdat het op de weg en in het ov steeds drukker wordt. […] Verschillende vervoerswijzen (fiets, auto, ov, lopen) worden te weinig in samenhang benaderd, wat leidt tot conflicten in de verdeling van de openbare ruimte en infrastructuur" (The Hague, 2021d, p. 11).

> "The attractiveness of the city is in jeopardy. The city is becoming congested. This applies to all (shared) vehicles if choices are not made. The (international) accessibility is in danger because the roads and public transport are getting increasingly crowded. […] Different modes of transport (bicycle, car, public transport, walking) are not approached in a coherent way enough, which leads to conflicts in the distribution of public space and infrastructure" (translated The Hague, 2021d, p. 11).

It becomes clear that there is a strong call for action, and not acting does not seem to be an adequate solution. Even to keep the status quo upright, action is needed. This urgency can partially be explained by the growth in citizens, workers, and tourists in The Hague. The city expects the number of cars traveling in, from, and to the city to grow by 150,000 per day in 2040 (The Hague & MRDH, 2018b). This increase in people with mobility needs will result in more traffic-related emissions, safety issues, and congestion (HI3 110). As stated in the presentation of the mobility plan:

> "Ook zijn er ernstige zorgen over het toenemend aantal verkeersslachtoffers, het milieu en de aantrekkelijkheid van de stad" (The Hague, 2021e, p. 1).

> "There are also serious concerns about the increasing number of traffic casualties, the environment, and the attractiveness of the city" (translated The Hague, 2021e, p. 1).

Almost all experts claim sustainable mobility to be a central driver for action (HI1 18, HI2 157, HI3 14, 52, HI5 28, 131, HI6 24). Mostly sustainable mobility is understood as an alternate mobility mode to private car use. As one local expert describes, by strengthening public transport and the sustainable modes network more comprehensively and enabling door-to-door mobility, sustainable modes should be "a better competitor" to private car use (HI3 22, see also HI3 14, HI4 27).

The general goals of the municipality of The Hague are based on the vision that mobility serves the broader challenges of the city, such as quality of life, broad prosperity, climate change, and the housing challenge (The Hague, 2021d, p. 4). Generally, all municipalities in the MRDH deal with shared mobility and MaaS (HI2 153, also HI3 106). As one expert summarizes:

> "So, we try to stimulate the shared mobility, mobility as a service, and that's a big topic at this moment by the municipalities. When we look at mobility programs of the municipalities, we will see in almost every program that mobility transition is a part of the policy at this moment" (HI2 153).

The STOMP principle is an important sustainability norm in the transport sector in The Hague and other national contexts in the Netherlands (HI5 131, The Hague, 2021d)[3]. It serves as a guideline for the design of public space. The principle defines a hierarchy for different mobility modes, starting with pedestrians and cyclists, followed by public transport and shared mobility and lastly, private vehicles. Many experts refer to the principle itself or the hierarchy of transport modes. The priority of active modes (walking and cycling) over private vehicles is mostly mentioned, as well as the additional support of shared mobility (HI1 18, HI3 100, HI5 131).

Amongst the sustainable mobility modes, the aim is to allow shared mobility but protect sidewalks from being blocked by irrespectively parked shared vehicles (HI1 65, see also HI4 92). Also, the multimodal combination of cycling and public transport is considered a very powerful alternative for individual car use (HI1 86, HI3 22). But as one expert from HTM indicates, about 90% of people walk to public transport stops (HI3 22). Therefore, using mobility hubs for first and last-mile transport could strengthen the accessibility of public transport (HI2 157, HI3 22).

The city administration of The Hague is orienting on the concept of the 15-min city, following the example of Paris (HI1 18). This requires transport-oriented urban development and planning a dense and mixed city so that the need for travel reduce and several services can be reached within walking distance (HI1 86).

Another central aspect is to make mobility on a human scale. By that, the mobility plan means to make mobility physically accessible and safe for all residents. As the presentation statement for the mobility plan states:

> „Een ander belangrijk punt is dat de mobiliteitstransitie vertrekt vanuit de menselijke maat. Niet alle inwoners zijn even digitaal vaardig of fysiek mobiel. Het zal ook in de toekomst vragen om creativiteit voor passende mobiliteitsoplossingen waardoor bijvoorbeeld mensen met kleine beurs, ouderen, kinderen en mensen met een fysieke beperking zich comfortabel en betaalbaar kunnen verplaatsen. De doelstelling is om iedereen te laten beschikken over geschikt vervoer van voordeur tot bestemming" (The Hague, 2021e, p. 1).
>
> "Another important point is that the mobility transition starts from the human dimension. Not all residents are equally digitally literate or physically mobile. In the future, too, it will be necessary to be creative in finding suitable mobility solutions so that, for example, people with small budgets, the elderly, children, and people with physical disabilities can travel comfortably and affordably. The objective is for everyone to have suitable transport from their front door to their destination" (translated The Hague, 2021e, p. 1).

Another priority in the context is traffic safety (The Hague, 2021d, p. 41). The ubiquitous availability of parking places contrasts the livable city (HI3 110). Many experts raise concerns about inclusiveness and

[3] In the Belgian context this principle is refered to as STOP principle.

transport poverty (HI1 18, 91, HI3 74, HI4 88, HI5 83). As mentioned above, HTM exchanges with different societal organizations to ensure that mobility-impaired people, "for example, the elderly or the blind or the less abled people, are also heard" (HI3 74). Equally, NS and NS Stations follow a company strategy taking inclusiveness and comprehensive mobility solutions into account:

> "the company strategy [NS] is to/ I have to say this in Dutch first 'Nederland duurzaam bereikbaar - voor en door iedereen', which means we are there to make sure everyone can move around the whole of the Netherlands. […] it's about inclusive travel, and it's about door to door" (HI4 27).

Another expert raised the concerns of less digitally skilled people, especially in the context of shared mobility, which often requires a smartphone and different applications. One mobility expert working on hubs explains:

> "We are also looking at what else is needed because about 10% of society cannot read or understand how a smartphone works. The best thing would be to have a system for them too" (HI6 49).

These normative drivers might also influence the implementation of mobility hubs in The Hauge.

7.4.2. Discursive Negotiations

Because The Hague is located on the coast, there is only a half ring of highway around the city, which causes a lot of traffic and congestion (HI1 86, HI2 153). As mentioned above, The Hague and the surrounding metropolitan region are growing in terms of inhabitants and mobility needs which puts additional pressure on the already congested road system. A shift towards a more sustainable mode seems to be demanded even for purely economic reasons.

The specific environment of Haagse Markt/ Hobbemaplein is challenged in different ways. The district is rather a working-class area with very heterogeneous inhabitants. It faces social tensions, and many inhabitants have low economic status. At the same time, the area produces many economic activities. The transport system around Haagse Markt leads to traffic-related health and climate issues (HI1 16, 86). The overall site is part of a more extensive development area. Due to new and bigger trams, the ground rail system will be renewed, and the street design will be adopted (HI1 112, HI3 54, 90ff.). In addition to the city administration of The Hague, HTM and MRDH are involved in the development project. There is an intense exchange with local shop owners, local networks, and stakeholders in points of interest like the library, cafes, shops, and the Market itself (HI1 120, HI3 54). One expert describes the redevelopment of the area as a positive development but raises concerns about the danger of starting a gentrification process (HI1 118). As the expert says:

> "[T]his can also be a very valuable place for the city. And on the local level, that is also interesting because you can use it in terms of place-making, so you can involve the local people in what they want and need for the area so that you can also make a hub that works for the local community because the danger is that you really activate a kind of gentrification process if you only look at certain aspects" (HI1 118).

As this quote shows, the specific area requires careful development and intense stakeholder participation in implementing a mobility hub onsite.

One overall problem mentioned by several experts is the limited urban space. Especially in bigger cities, urban space is contested (HI1 63, HI2 153, HI4 92, HI5 105, 131). The mobility plan of The Hague takes up this dilemma. It states: "There is simply not enough space to satisfy all wishes" and that even sustainable modes compete against each other for urban space and funding (The Hague, 2021d, p. 7). Different examples show this negotiation process amongst the environmentally friendly mobility modes: The potential conflict on sidewalks between shared micro-mobility and pedestrians has already been mentioned. On the other hand, HTM advocates prioritizing public transport and not only focusing on active mobility such as walking and cycling. While generally supporting the 'STOMP principle', HTM raised concerns about losing importance in mobility planning. It should be ensured to equally strengthen public transport as the backbone of the mobility system and keep its quality. As one expert states:

> "What we see as HTM is that the municipality wants to focus more on the sustainable modes, of course, so that's a good thing, but they focus mainly on walking and cycling and, after that, public transport. That means that there is less focus on public transport than we would like. And that means that it's also possible that the public transport is getting worse in the end, because if you are slowing down all traffic for cycling and walking then also the public transport will slow down" (HI3 100).

Supporting first- and last-mile mobility with multimodal options and mobility hubs seems valuable. But it should not be "an end in itself" (HI5 34). Most important is that these offers are used and support a modal shift.

Overall, mobility and the debate on its sustainable transition are interlinked with many different topics in The Hague and the Netherlands. Many experts describe the climate crisis as a 'window of opportunity' for changes in the mobility sector (HI1 91, HI4 123, HI5 131ff.). Also, there is additional pressure in the Netherlands due to the famous Urgenda vs. The Netherlands juridical decision to comply with the set goals regarding greenhouse gas emissions (Göbel, 2019). One very urgent topic raised by many experts is the housing crisis. One local expert summarizes the thematic interlinkages as follows:

> "The interesting thing is that everything is connected now. So housing is connected to mobility is connected to climate is connected, in The Hague also, to a large extent, to immigration, to poverty and segregation" (HI1 100).

Additionally, experts mention the importance of including regional perspectives on mobility. There is a need to create multimodal alternatives to "get people out of their cars" (HI1 86, also HI3 22, HI5 105). The problem in this context is that shared mobility is often more available in dense urban areas with already good public transport connections. Operators often settle in big cities because they have more potential users and promising business cases than in villages and rural areas (HI6 24).

Besides strong interlinkages with housing policies (HI1 77, also HI4 125, HI5 105, The Hague, 2021d), experts mention parking policies as a crucial measure in mobility policy (HI1 77, HI2 157, HI4 102). Mobility hubs, combined with additional parking limitations, could help gain back urban space for public use and citizens (HI2 153). Still, other measures face difficulties in sufficient political or administrative support. In the context of the metropolitan mobility transition plan, interviews with 20 out of 23 aldermen and -women in the MRDH region were conducted. They were asked to evaluate different measures. The least popular actions were parking policies, tolls, and velocity policies. The most popular were additional concessions, bigger fleets, and upscale public transport and cycling infrastructure (MRDH, 2018). The report resumes:

> "Opvallend is dat de meeste maatregelen kunnen rekenen op een positief draagvlak. Parkeerbeleid, tolheffing en snelhedenbeleid hebben weinig draagvlak. Wethouders zijn over alle andere maatregelen gemiddeld positief" (MRDH, 2018, p. 14).
>
> "It is striking that most measures can count on positive support. Parking policy, tolls and speed policy have little support. Aldermen [and -women] are on average positive about all other measures" (translated MRDH, 2018, p. 14).

The impact assessment in this report comes to the same conclusion:

> "Voor een aantal maatregelen ontbreekt op lokaal niveau bestuurlijk draagvlak om deze in te voeren. Dit geldt in nagenoeg alle gemeenten voor innovatieve beprijzing en in een aantal gemeenten voor parkeerbeleid (betaald parkeren in de centra, gedifferentieerde parkeertarieven, lagere parkeernormen)" (MRDH, 2021, 42f.).
>
> "A number of measures lack administrative support at the local level for their introduction. This is true in almost all municipalities for innovative pricing and in a couple of municipalities for parking policy (paid car parking in centers, differentiated parking fees, lower parking standards)." (translated MRDH, 2021, 42f.).

This lacking support also shows in one expert's critique. Besides the fear of losing support and, thereby, quality in public transport, one expert from HTM stresses that general ambitions also need to be followed practically:

> "I think this is a really important discussion. What is the priority for public transport, and do we actually act on it as well? Only saying public transport is important isn't enough, because in the end if you are making more and more car parking places, then it's not working, right? That's an important one, I think" (HI3 102).

While the aldermen and -women in the MRDH region seem to share opinions about certain measures in mobility, the topic is generally discussed differently amongst political parties in The Hague and the Netherlands. The local populist party of The Hague 'Groep de Mos/Hart voor Den Haag' seems to associate car use strongly with freedom. With one of its slogans being 'Vroom Vroom!', so describing a car noise when accelerating, the party emphasized its pro-car position during the election campaign (HI1 100ff.). It became the strongest political party in the elections in 2022. The Greens highlighted the climate crisis and its implications for the mobility sector, while the liberals saw the potential for economic growth (HI1 106). The political parties and the legislative period influence the mobility policies so that no alderman or woman wants to implement significant changes one year before the elections (HI1 92). The same dynamic can be observed nationally (HI5 129ff.). Mobility policies also seem to be a very controversial topic on the national level. Still, one expert mentions that road pricing as an additional measure was included for the first time in the new coalition treaty (HI5 131).

Detached from political parties, one expert describes the difficulty of finding the right balance between driving a big transition and not losing the support of people:

> "On the other hand, there's also a lot of resistance, mainly in local and working-class areas that really depend on the car, and historically The Hague is a really car-oriented city, so it's really difficult to try to change that. So yeah. On the one hand, there's a big opportunity and on the other hand, a lot of resistance, but I think that's typical for these big transitions" (HI1 91).

In the process of finding the right balance, the topic of participation seems to emerge almost automatically. A participation process accompanied the mobility plan of The Hague. The report on Participation in Mobility Transition (The Hague, 2020b) summarizes information and results about this process. The results of this process and other participatory formats were worked through by employees of the mobility unit (HI1 52). Additionally, the strategy refers to seven learning labs conducted in March 2021 to learn more about dilemmas that appear during complex development processes and changes in the mobility system. One of the results of these learning labs was that meeting the needs and interests of all participants could be challenging. Therefore, the city of The Hague has developed a multi-criteria analysis template to enable decisions while considering different interests (The Hague, 2021d).

Since there are not yet mobility hubs developed and implemented by the city administration of The Hague, this report cannot give further insights on participation formats in the concrete implementation of mobility hubs. Apart from mobility hubs organized by public authorities, a small number (currently two hubs in The Hague) of privately managed mobility hubs run by the company Hely. They focus on residential areas, apartment complexes, and business sites throughout the Netherlands and combine different types of shared vehicles under one membership (Hely, 2023). These hubs are not explicitly part of this analysis.

7.5.Summary

Structural Components

- No encompassing mobility hubs system in place yet, also no defined responsibilities or working groups, but foreseen in the local mobility plan
- Mobility department relatively strong in terms of financial and human resources
- Relatively new local government and mobility strategy
- Close cooperation within administrative departments and on regional level with the MRDH, and public transport provider
- National ministry is currently working on implementing mobility hubs with a common branding as well as national railway company NS Stations

Policy Instruments

- Local mobility plan Mobility Transition Strategy The Hague 2040 from 2022 includes the implementation of mobility hubs in different sizes and functionality (adding new small-scale hubs at minimum walking distance)
- Implementation strategy recurs on already existing stops at public transport locations and upgrades them into more sophisticated multimodal mobility hubs
- Mobility plan aims at meeting climate ambitions, enabling affordable and regionally connected mobility, and uses shared mobility to redistribute public space
- A permit system for shared vehicles was established to limit negative consequences in public space

Normative Drivers

- Policies are driven by a sense of urgency: congestion, safety, and environmental effects
- STOMP principle (reversed hierarchy of mobility modes) as guiding norm: Active modes prioritized over private vehicles
- Referring to concepts of planning on human scale, '15min city', and inclusive mobility: making mobility physically accessible and safe for all residents
- Mobility plan is based on a data-driven and informative approach
- Allowing shared mobility but protecting space on sidewalks, driven by concerns about inclusiveness and transport poverty

Discursive Negotiations

- Climate crisis as a 'window of opportunity' for changes in the mobility sector
- Growing number of inhabitants puts additional pressure on the already congested road system
- High importance of regional perspectives on mobility in MRDH area
- Mobility policies are a very controversial topic on the local and national level
- Recently, strong political influence of car-friendly positions in local government
- Limited and contested urban space
- Redevelopment of Haagse Markt / Hobbemaplein raises concerns about the danger of starting a gentrification process

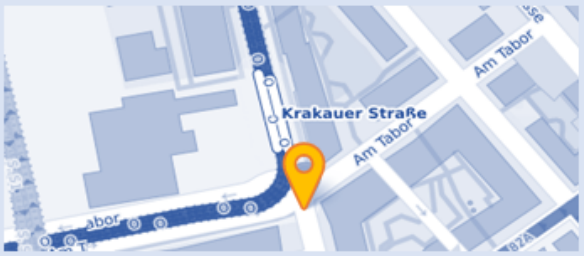
8. LIVING LAB EASTERN AUSTRIA

8.1.Overview Bruno-Marek-Allee

SmartHubs

Bruno-Marek-Allee

Vienna, Austria



City: 1,900,000 in 2021
Region: 1,900,000 in 2021

Operator: MO.Point, Wiener Linien
Operation Start: 2020

Net-zero target: 2040

Housing-based, decentralized hub, with car- and (cargo-)bike-sharing and PT nearby, parking zone for micro-mobility
Urban development area, operated by MO.Point and branding of WienMobil Stationen

Mayor since 2018: Michael Ludwig, social democratic party (SPÖ)
Since 2020: Social democratic and liberal coalition
2018-2020: Social democratic and green coalition

Available modes

GOVERNANCE LEVELS

Local Administration:
- see regional administration
- 2. District Leopoldstadt (District Head: Alexander Nikolai, SPÖ)
- District Council

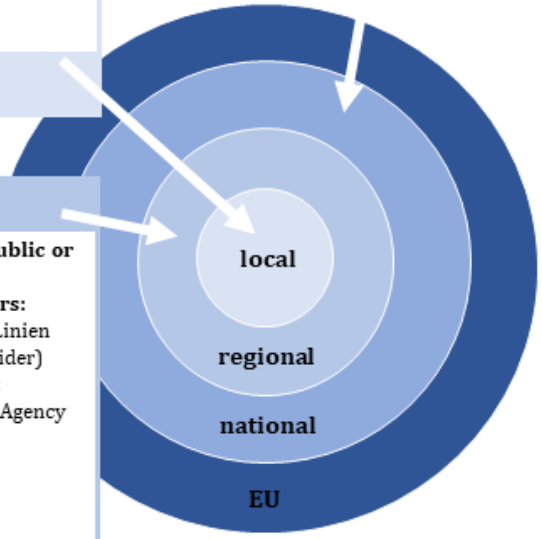
Local Public or Private Stakeholders:
- see regional stakeholders
- Neighbourhood Management Nordbahnhofsviertel (NBV)

Local Networks:
- Climate Council Vienna
- Eurocities, POLIS
- UITP (Wiener Linien)

Municipality

Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology (Leonore Gewessler, Grüne)

National State



Federal State

Regional Administration:

City Administration ('Magistrat'),
- MA18 Urban Development and Planning – Unit for Innovation, Urban Planning and Mobility
- MA21 City District Planning, MA 28 Road Administration and Construction, MA46 Traffic Organisation and Technical Traffic Matters, MA67 Parking
- Executive City Councillor for Innovation, Urban Planning, and Mobility (Ulli Sima, SPÖ)

Regional Public or Private Stakeholders:
- Wiener Linien (PT provider)
- Mo.Point
- Mobility Agency Vienna

SmartHubs

POLICIES

MOBILITY PLAN - STEP 2025 Urban Mobility Plan Vienna

Time frame of document: 2015-2025
Author: Vienna City Administration, MA18
Main characteristics:
Mobility plan as part of a strategic city planning process (STEP 2025), following SUMP guidelines of the European Commission, targets objectives of 'Smart City Vienna Framework Strategy' (renewed into "Smart Climate City Strategy Vienna" in 2022)
The City of Vienna is committed to prioritizing public transport, pedestrians, and cycling as the most environmentally friendly mobility modes, emphasizing the human scale. Therefore, Vienna embodies a future-oriented urban mobility policy that is not only ecologically but also economically and socially acceptable and hence sustainable.
Objectives: Fair, healthy, compact, eco-friendly, robust, and efficient mobility system

Policies regarding multimodality or mobility hubs

Objective 36 of STEP 2025 plan
Multimodal Stops:
- PT stops with added services
- Special attention to the design and surroundings of potential hubs (crucial: clear arrangement and barrier-free design)
- Great potential for urban nodes with regional bus line connection & PT network of the region

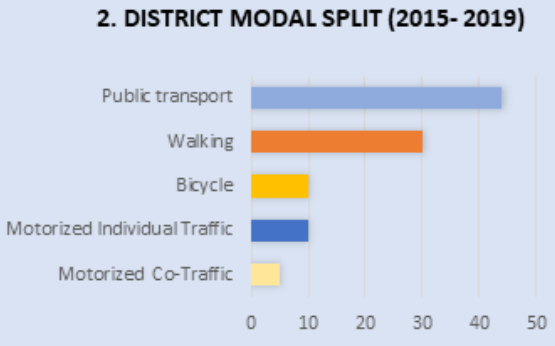
Depending on needs, stops can be given added value, e.g., in the shape of bicycle parking facilities, bike-sharing systems, car-sharing spaces, kiss-and-ride zones

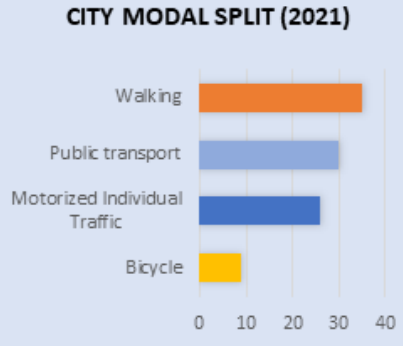
Other related transport policies

Smart Climate City Strategy Vienna (2022)
Smart City Strategy adjusted in terms of climate adaptation and mitigation goals for the mobility and transport sector:
- Increase share of extended environmental alliance (PT, cycling, walking, sharing) up to 85% until 2030
- Mobility guarantee (without private car use)
- 15-minute-city and redistribution of public space
- Reduce private car ownership to 250 cars / 1.000 inhabitants by 2030
- Reduce energy consumption by 40% and CO2 emissions by 50% per person by 2040

Vienna Climate Roadmap ('Wiener Klima-Fahrplan', 2022)
A strategic planning document to achieve climate neutrality by 2040, including measures on mobility and transport
- Parking management and access regulation
- Expansion, densification, and acceleration of public transport, walking, and cycling infrastructure
- Support for shared & on-demand mobility
- Price differentiation according to environmental impact

VIENNA MODAL SPLIT





Sources:
Vienna (2015): STEP 2025 - Thematic Concept: Urban Mobility Plan Vienna. Wien.
Vienna (2021): Aktive Mobilität in Wien. https://blog.stadtentwicklung.wien.gv.at/wp-content/uploads/sites/57/2021/03/Vert_Ausw_Aktiv_Mobili_Endb_21.01.2021.pdf (24.04.2023).
Vienna (2022): Smart Klima City Strategie Wien: Der Weg zur Klimamusterstadt. Wien.
SmartHubs (2023): Mobility Point Bruno Marek Allee. https://data.smartmobilityhubs.eu/wiki/Hubs/8 (24.04.2023).

8.2. Governance framework

The Austrian capital Vienna has 1.9 Mio inhabitants and is located in north-eastern Austria (Vienna, 2022a). The city of Vienna is a municipality and federal state at once. Its governmental bodies, therefore, fulfill a double role. Politically, the city has a long tradition of social-democratic mayors and majorities. The social democratic party (SPÖ) has recently needed to build coalitions with other parties, such as the Greens or NEOs. The City Administration, called the 'Magistrat', is divided into several departments. The Innovation, Urban Planning, and Mobility department are mainly responsible for urban development and mobility planning. Ulli Sima (SPÖ) currently works as the executive city councilor for innovation, urban planning, and mobility. The public transport provider in Vienna is Wiener Linien, a privatized municipal company owned by the city. With its modal split of 63% environmentally friendly modes (walking, cycling, and PT), Vienna is already quite advanced compared to other cities (Wiener Linien, 2021a).

The city of Vienna formulated several strategic documents dealing with mobility. The main document in terms of mobility is the STEP 2025 Urban Mobility Plan Vienna, released in 2015. It follows the guidelines for sustainable urban mobility plans (SUMPs) by the European Commission. Vienna also targets mobility-related goals in its Smart Climate City Strategy and its Climate Roadmap, both from 2022. Here, the city government aims to achieve climate neutrality by 2040 (Vienna, 2022b) and an increased share of the extended environmental alliance (PT, cycling, walking, sharing) of up to 85% until 2030. Also, private car ownership shall be reduced to 250 cars / 1.000 inhabitants, currently there are 371 cars / 1.000 inhabitants (VCÖ, 2018). General guidelines for achieving these goals are a mobility guarantee (without private car use), a 15-minute city, and a parallel redistribution of public space (Vienna, 2015, 2022b).

Regarding mobility hubs, the STEP 2025 plan describes the goal of developing multimodal stops. Public transport stops with added services, such as bicycle parking facilities, bike-sharing or car-sharing, or kiss-and-ride zones. Particular attention shall be given to the design and surroundings of potential hubs. A straightforward arrangement and barrier-free design are described as crucial factors. The hubs developed by Wiener Linien are planned in public spaces. Private investors and operators can implement additional mobility hubs in urban development areas. Finally, the STEP 2025 mobility plan sees great potential for urban nodes with regional bus line connections and for developing a regional public transport network. In August 2022, 16 mobility hubs called 'WienMobil Stationen' with different services and mobility options were implemented into an interactive online map on the Wiener Linien website (Wiener Linien, 2022).

The mobility hub at Bruno-Marek-Allee runs under WienMobil Stationen but was operated by MO.Point from October 2020 to October 2022, it holds three car-sharing spots, several e-bikes, and e-cargo-bikes. The surrounding area of Bruno-Marek-Allee belongs to a big urban development area of the 'Nordbahnhof' district. Since 2018, MO.Point developed the mobility hub for the consortium of developers (MO.Point, 2022b). It is located at two different spots; the cars are directly next to the street, while the bikes are some meters away in the yard of the nearby building. The different modes are connected by well-visible signage and a common design (VI3 45ff., own observations). The location and history of this particular hub differ from hubs planned, implemented, and operated by either MO.Point on private space or Wiener Linien in public space. The following analysis mainly focuses on mobility hubs in public areas and the institutional arrangements of these hubs. Nonetheless, some insights on all forms of mobility hubs in Vienna are also included.

8.3.Organizational dimension

8.3.1.Structural components

The city of Vienna

As described above, the local mobility plan of Vienna describes mobility hubs as a strategic goal to enable attractive, multimodal behavior. The strategic mobility planning unit (MA18) develops mobility plans but is not necessarily involved in their implementation. They bring actors and their expertise together and translate long-term topics in city politics. Strategic planning documents, such as the mobility plan or the climate action plan, are developed by the administration but must be accepted by the city parliament (Gemeinderat). Therefore, the administration depends on political support or needs to adjust the plan according to political preferences (VI1 33, 83).

A coalition of SPÖ and NEOs holds the majority of votes in the city parliament. It also elects the mayor and responsible heads of the departments. With her announcement to support and finance at least 100 mobility hubs in Vienna, Ulli Sima (SPÖ) gave the needed political support for the additional stations (Wien.ORF, 2021). The connection between mobility policies and political parties is further discussed under the subsection of discursive negotiations. Following political decisions, the mobility department describes the strengthening and extension of public transport and active modes of mobility as its priories. Additionally, logistic and electric mobility shall be supported (VI1 19).

Wiener Linien and the working group on mobility hubs

A working group on mobility stations started the process of mobility hubs in Vienna. Important members and initiators were the strategic mobility planning unit in the mobility department (MA18), the Wiener Linien, Urban Innovation Vienna (UIV), other units from the city administration, and additional stakeholders (VI1 51ff., VI2 72f., VI6 7, 75). Based on these first exchanges and pilots under the lead of Wiener Linien, more elaborated responsibilities and working procedures were defined. The unit for multimodal mobility planning of the Wiener Linien is mainly responsible for planning, implementing, and maintaining mobility hubs in the public space. The team currently has seven and one halftime employees. Based on a contract between the city administration of Vienna and the Wiener Linien, the company can grant concessions to private operators for mobility services at the mobility hubs. Wiener Linien also operates its own car- and bicycle-sharing systems (VI2 35).

Nonetheless, other private operators must be included discrimination-free at the mobility hubs. In general, it is cooperation with providers of free-floating and station-based shared mobility services (VI2 46f.). The maintenance is covered by in-house divisions, which also take care of other public transport stops (VI2 31). Wiener Linien claims their agility and experiences with entrepreneurial behavior as an asset to managing mobility hubs successfully and cost-efficiently. Twice a year, Wiener Linien organizes an exchange with all involved stakeholders to set common ground on information and discuss future development (VI1 51ff., VI2 73). Some stations are managed by a private mobility hub operator that provides car-, bike, and cargo-bike-sharing under the Wiener Linien brand - WienMobil Station. The mobility hub Bruno-Marek-Allee in the second district of Vienna is such a station (VI1 103ff., VI2 57, VI3 15, see also MO.Point, 2022a). As a public transport company, the Wiener Linien carries out regular market research like surveys or interviews with customers and holds contact with different interest groups, for instance, with people with mobility impairments (VI2 77).

While the strategic planning unit of the city administration was a significant stakeholder in the beginning, its role decreased with the emergence of fixed responsibilities. Under the present circumstances, other units of the administration are essential stakeholders, for instance, street management and construction (MA28), urban development (MA21), public lighting (MA33), traffic organization and technical traffic matters (MA46) or the legal traffic matters (MA65) unit (VI1 52ff., VI2 33, VI3 43, VI6 28ff.).

The district level: 'Bezirke'

Essential actors in the implementation of mobility hubs are the 23 districts in Vienna. They are organized with their elected representatives (Bezirksvertretung) and district leader

(Bezirksvorsteher:in), who do not automatically have the same political background as the city parliament and government. According to the city constitution of Vienna (WStV), the districts are responsible for the concrete construction, signage, and lighting of streets. Therefore, they can oppose planned mobility hubs or influence their location (VI1 37ff., 69ff., VI2 51, VI3 31ff.). The districts are elected separately at the municipal level. Therefore, the political leadership amongst the 23 Viennese districts varies. This also implies a high variety in positions toward political and administrative support for mobility hubs and potential redistribution of public space (VI1 75, VI4 63). Some districts may also oppose measures that were accepted on the city level. One expert describes the problem,

> “dass der Bezirk teilweise für Dinge zuständig ist, wo auf Stadtebene etwas formuliert wird. Also es gibt manche Bezirke, die machen sehr viel und andere, die möchten gar keinen einzigen PKW-Stellplatz aufgeben” (VI4 69).
>
> "that the district is partly responsible for things that were formulated at the city level. That means there are some districts that do a lot, and others that don't want to give up a single car parking space" (own translation VI4 69).

According to experts, informal contact at the district level is essential to find common understanding and support for district-level measures (VI4 69).

Regional management

As Niederösterreich surrounds Vienna, there is much traffic between these regions. Many people from Niederösterreich commute to Vienna or the other way around. The SUM (Stadt-Umland Management), ‘city-surrounding area management’, is a publicly financed institution that aims to harmonize these regions' policies. In the case of mobility hubs and shared mobility, this could include organizing cross-border usage of shared modes or at least enabling users to switch directly and smoothly from one transport mode to another (VI5 165). Still, the SUM focuses on avoiding conflicts and has limited resources to initiate projects (VI5 11). One expert observes a tendency of different institutions to blame each other for cross-regional difficulties instead of striving for closer cooperation (VI5 37, 83). The SUM keeps formal and informal contact with many stakeholders of the Viennese ‘Magistrat’ and the administrations of surrounding municipalities. Next to institutional difficulties in cooperating across regional borders, the unequal resources of involved institutions are mentioned. In many cases, rural municipalities have fewer capacities, access to know-how, and financial resources at their disposal (VI5 25).

8.3.2. Policy Instruments

Local mobility plan: STEP 2025 mobility plan

The central mobility planning document is the STEP 2025 Mobility Plan from 2015. The plan included results from a previously written sharing strategy that was never officially published (VI1 13). The most recently published Smart Climate City Strategy and the Climate Roadmap take up the most important measures of the mobility sector. Here, the city of Vienna follows international climate policies agreed on in the Paris Agreement of 2015. The Austrian government plans to become climate neutral by 2040, which is also expected by the mobility sector (BMK, 2021).

As described above, Vienna wants to increase the share of the extended environmental alliance (PT, cycling, walking, sharing) to 85% by 2030. Also, private car ownership shall be reduced to 250 cars per 1.000 inhabitants. General guidelines for achieving these goals are a mobility guarantee (without private car use), a 15-minute city, and a parallel redistribution of public space (Vienna, 2015, 2022b). Also, STEP 2025 describes the goal of developing multimodal and public transport stops with added services and created with particular attention to design and surroundings. Many experts consider the mobility plan a useful concept. Experts generally mention the high number of concepts that set good intentions and ambitious goals for the city of Vienna. One expert notes, "Vienna is a city with a very high density of strategies” (own translation VI6 69). While the general goals are appreciated, experts criticize the implementation in terms of ambition or speed (VI1 81, VI2 83, VI4 11, 69, VI5 189, VI6 69). Goals are too imprecise and do not set specific and quantifiable goals, for example, in terms of a concrete number of bicycle lanes per year (VI2 9, 83, VI4 69, 73).

> "Also die Ziele sind toll und es funktioniert teilweise sehr schlecht. […] seit 1994 zum Beispiel gibt es Stadtentwicklungspläne, wo Modul Split Ziele drin sind, das heißt, wir haben eigentlich hauptsächlich MIV-Reduktionsziele. Und seitdem wurden die quasi nicht erreicht, seit zehn Jahren stagniert der Anteil des Autoverkehrs. Und dann bei den Maßnahmen, die sind teilweise recht konkret, aber die sind meistens nicht quantifiziert und auch nicht terminisiert" (VI4 69).
>
> "So the targets are great, and it works very badly in some cases. [...] since 1994, for example, there have been urban development plans in which module split targets have been included, which means that we actually have mainly MIV reduction targets. Since then, they have not been achieved, so to speak, and the share of car traffic has stagnated for ten years. Then there are the measures, some of which are quite specific, but most of them are not quantified and not scheduled" (own translation VI4 69).[4]

Also, many goals are 'comfortably' far in the future, making them easy to push aside (see above and VI6 83). One expert mentioned the undefined responsibilities that might explain the problem regarding concrete realization (VI2 83).

As required by the European SUMP guidelines, the mobility plan of Vienna was created with participatory elements. Citizens and other stakeholders were included at different stages of the plan's development. According to the city administration, participation is described as "state of the art" when new planning documents are worked on (VI1 77). For the Wiener Linien the mobility plan gives general guidelines and a long-term planning perspective; additionally, the participatory development provides additional legitimization for their actions (VI2 81). Nevertheless, civil society criticizes the administration for communicating "from above" and for being on "no equal base" ("Augenhöhe", VI4 41). In addition to participation formats initiated by the Magistrat, the NGO 'Platz für Wien' (Space/Place for Vienna), for example, organized onsite actions, small demonstrations, or collected signatures for a petition (VI4 11, 31, see also discursive negotiations 8.4.2).

Initially, the mobility hubs followed the idea of co-creative development and thereby satisfied the needs of citizens (VI6 9). In the case of Bruno-Marek-Allee, the hub was presented at various neighborhood events, and on public notice boards; also, residents received an information package on the specific details (VI3 59ff.). These measures can be described as informative measures. Regarding other mobility hubs by the Wiener Linien, no co-creative processes or other participatory measures with citizens beyond providing the information is known.

For the development of 100 mobility hubs, around 15 Mio EUR are provided by the city administration. While Wiener Linien financed the first pilots of mobility hubs in 2018 on their costs, the city-wide expansion is co-financed by the city administration (Vienna, 2018, 2021; Wien.ORF, 2021). Although the users of mobility services pay fees, the stations in the public space currently need additional financial support (VI1 49, 63, VI2 87ff., VI3 49).

Additional measures

In 2018 the city of Vienna published a guideline on mobility hubs in urban development areas (mainly on private spaces) and how to implement them (Vienna, 2018). The document provides a definition, purpose, and potential equipment for mobility hubs. They distinguish between basic and additional equipment of mobility hubs. Basic equipment can be (e-) car-sharing and bike-sharing, charging opportunities for electric cars, an information board or pillar, WIFI, and a mechanic access system (for example, a key box). Additional equipment can be shared vehicles, like cargo bikes, e-scooters, or – interestingly – a public transport stop. Besides more transport modes, additional services like bike parking or service stations, parcel lockers, shopping opportunities, or others can be added to a mobility hub (Vienna, 2018). The document gives an overview of the planning steps: first, the planning procedure regarding urban developments, administrative responsibilities, and usage of public space. Second is the implementation process. The developer needs to activate partners and relevant stakeholders, define the equipment of the hubs, estimate the costs, and define a business and operator model. Finally, the

[4] MIV is the German abbreviation for motorisierter Individualverkehr, motorized individual traffic.

operator builds and operates the hubs (Vienna, 2018). Besides this guideline as an informative instrument, the city of Vienna set up a mobility fund for complex development projects with more than 1.000 accommodation units. It is a joint financial instrument across property units and developers to facilitate mobility measures, like mobility hubs or collective garages defined in an integrated mobility concept (Vienna, 2018). The guideline also suggests that urban developers use mobility maps to inform residents about mobility hubs and their usage (Vienna, 2018).

Another related instrument raised by experts is parking management (VI3 71). Since March 2022, parking fees must be paid in all districts of Vienna. Free parking is, therefore, no longer possible in public spaces in Vienna. Another instrument regarding parking is the limitation of parking spaces (Stellplatzregulativ) of Vienna's Building Code. As zoning and land use plans are drawn up, the statutory obligation to provide a certain number of parking spaces in the street can be reduced if an area is well connected to public transport. This reduction of obligatory parking spaces supports the transport policy object of strengthening eco-mobility (public transport, cycling, walking) (Vienna, 2015). Since the creation of parking spaces takes up to 8,5% of the total costs, this is also a significant financial incentive in favor of creating mobility hubs instead of car parking (Vienna, 2018).

8.4. Ideational dimension

8.4.1. Normative Driver

Sustainable development is one main driver for creating mobility hubs (VI1 13, VI2 51, 105ff., VI3 11, VI4 11,99, VI6 15, 57, 87, Vienna, 2015). According to the goal to make public transport more attractive and reduce car usage, mobility hubs are expected to impact sustainability positively. The concept of sustainability acts regulative, for instance, constraining unsustainable behavior such as private car use. At the same time, it also works constitutive in evoking new actors, such as ecologically interested NGOs (see VI4 5ff.) or supporters for the construction of cycling lanes and mobility hubs. In Vienna, a stronger emphasis on the concept of climate neutrality can be observed (VI2 105, VI4 91, VI5 199, VI6 87), which can also serve as a catalysator for more ambitious mobility policies (VI4 91).

Like the climate roadmap, the STEP 2025 mobility plan stresses the mobility guarantee ('Mobilitätsgarantie', see Vienna, 2022b, 41, 55f., VI1 25). It is defined as the guarantee to be mobile with the only sustainable mode of transport and without a private car. This concept serves as a frame to avoid potential critique or fear of losing the ability to move.

As discussed briefly in the previous section, the entrepreneurial dimension of mobility hubs is another critical driver. Like other sharing services, the mobility hubs face a dilemma of economic outcome and potential impact. Sharing mobility is generally more profitable in densely populated and central locations. The more rural and less populated specific areas are, the fewer potential users are attracted. The success of mobility hubs is measured by the number of users and the profitability of shared mobility services facilitated. In the case of Wiener Linien, additional collaboration with private stakeholders is also mentioned (VI2 17, VI3 11). Regarding private operators of mobility hubs, the non-profitability of hubs might result in closing them (VI3 15ff.) since they underly market mechanisms and potential concurrencies (VI3 27). In order to be attractive to actual and potential users, mobility hubs need to offer a comfortable and safe environment. Also, users demand high availability and economic advantages compared to owning a vehicle (VI3 13ff.). The Wiener Linien mobility hubs also raise the attractiveness of the public transport system. Therefore, the economic calculation is more complex than in the cases of private operators. Overall, the Wiener Linien aims to create multimodal mobility services (VI2 9). In addition to the actual usage of shared mobility modes and public transport, mobility hubs can also positively affect marketing for the operator. Therefore, the consistent branding under the corporate design of Wiener Linien was mentioned as an important aspect (VI2 25).

At different points, the aspect of a social justice dimension was raised. For example, questioning who uses shared mobility services and for whom accessibility improves by new shared modes and mobility hubs (IV5, IV4).

> „[G]erade bei Mobility Hubs, muss man auch noch mitdenken, dass das durchaus eine neue Technologie ist. […]. Also wessen Erreichbarkeit verbessert das wirklich, ne?" (VI5 159).
>
> "Particularly with mobility hubs, you also have to consider that this is definitely a new technology. [...]. So whose accessibility does that really improve?" (own translation VI5 159).

Other experts mention the aspects without concrete examples or measures of how this issue is addressed. Since mobility is a curial part of societal activities, changes and inequalities in mobility access might also affect other matters like housing, working, or the general quality of life (VI5 159ff., 209, VI6 87, VI2 111, VI3 11). Therefore, the overall definition and concrete translation of what the social justice dimension implies in mobility hubs remains fuzzy.

8.4.2. Discursive Negotiations

Generally, regional and city planning is considered conflictive by nature; therefore, it might also be necessary to combine different interests and find common ground (VI1 15, VI5 21). Vienna's overall public transport system is relatively strong, which also shows in the high usage of 30% in relation to 26% of individual motorized traffic in Vienna's modal split (VI4 9, Wiener Linien, 2021b). Still, there are relatively numerous and comfortable car parking opportunities as part of Vienna's infrastructure (VI6 81).

The topic of mobility is described as especially political in Vienna. Conflicts arise between different interest groups, but also in terms of the political parties. The Green party in Vienna is considered to be interested in ambitious mobility transition policies and a more substantial containment of private car use. In contrast, the historically strong social democratic party (SPÖ) in Vienna is criticized for following a 'too late, too little' policy in the mobility sector (VI4 11). Also, the image and positions, even amongst one political party, can be highly heterogeneous on the district level, where members of the same political party can show different preferences and political support for mobility policies (VI4 63). The NGO 'Platz für Wien' strategically placed mobility topics and events before local election campaigns in Vienna. The NGO tried to put pressure on the subject and to support the argumentation of progressive policies in the public discourse but also within the political parties and city administration (VI4 19, 43). They organized demonstrations, onsite events and collected signatures for a petition. According to one expert, their list of demands was partly implemented in the political statement of the SPÖ (VI4 11).

The districts are important stakeholders in terms of mobility hubs due to their competencies in the specific design and great importance on the particular distribution on the street level. The districts are very heterogenous in their leadership and positions towards mobility hubs. According to experts, informal contacts can help facilitate a common understanding in advance. These contacts variate amongst the districts (VI1 75, VI4 63).

The city administration of Vienna and their political leader (Ulli Sima, Alderwoman for mobility, and Peter Hanke, Alderman for finances and economy) have recently shown broad support in terms of financial aid and the provision of public space for mobility hubs (see above, VI2 51). Therefore, a consensus concerning the planning of mobility hubs could be assumed. Conflicts arise regarding concrete implementations when spaces are redistributed, or priorities are defined.

One central topic in Vienna was and still is the use of public space. As public space in urban areas is limited, additional demands or redistribution can be conflictive.

> "Also man muss ja ehrlicherweise sagen, was wir betreiben, ist Kampf um Fläche" (VI2 103).
>
> "Well, you must be honest and say that what we are doing is fighting for space" (own translation VI2 103).

One central conflictive line is spaces for cars sparking against the usage of public space for alternative or more environmentally friendly modes (VI1 49, VI4 57, 91, VI5 169, VI6 69). The pressure on sidewalks is already high, and their width does not follow theoretical regulations of 2-3m. Therefore,

additional sharing services are often perceived as additional obstacles for pedestrians. On the other hand, car parking is described as "very very holy" (VI1 49). Stationary traffic is considered an essential part of mobility planning and mobility hubs in specific and highly defended (VI4 65, 69, VI5 169, VI6 85). Another conflictive line is the privatization of public space which an expert raised. Most shared mobility services are run by private operators that run their businesses in public space. Therefore, the question arises of what space they should be allowed to use and on what conditions. The public authorities are responsible for all citizens and ensure public space stays open for everyday use, not just to some users of shared mobility (VI1 103). The Wiener Linien also emphasized the importance of branding and the marketing aspect of mobility hubs, allowing the company to show its services and branding in very well-visible public spaces (VI2 23). Also, one mobility expert raised concerns about the effectiveness and impact of shared mobility services since many users of shared mobility formally used other environmentally friendly modes (VI4 99). Space for individual bike parking and bike sharing should be equally provided to not playoff environmentally friendly modes against each other and to raise acceptance of additional mobility services at mobility hubs (VI3 63).

Another central topic is the prioritization of measures. Experts are concerned with only building more alternatives while avoiding setting up restrictive measures. These measures are called push and pull measures or factors in transportation science. As one expert puts it:

> "Also der Zugang ist eher: Man versucht Angebote zu schaffen, also man versucht es über die Anreizebene. Um aus einer Metaebene zu sprechen. Man versucht eher Pullfaktoren zu stärken mit besseren Öffiangeboten [Anm. Angebote des öffentlichen Verkehrs], auch Sharingangebote zu stärken, Mobilitätsstationen zu entwickeln. Und die Pushseite wird halt nur sehr, sehr behutsam aufgetan" (VI6 85).
>
> "So the approach is rather: trying to create offers. So, you try to do it through the incentive level, to speak from a meta-level. They are trying to strengthen pull factors with better public transport services to strengthen sharing services and to develop mobility stations. And the push side is just being opened up very, very cautiously" (own translation VI6 85).

Other experts raise the same concern regarding expanding (underground) metro lines, which are costly and long-term projects. Still, they at least do not affect any redistribution on the ground (VI4 77, 91). This is also criticized because financial resources are unavailable to complete the sharing system network (VI2 51). Finally, although mobility plans indicate stronger support for environmentally friendly mobility modes, conflictive measures still remain. Viennese experts mentioned car-friendly traffic lights and space distribution (VI4 77). Also, new highways are still being built, although they conflict with the goals set and raised lots of public protests (VI4 83, 91, VI6 65).

In Vienna, a tendency to avoid conflict can be observed. This shows in the aforementioned examples of focusing more on pull measures than on somewhat restrictive push measures. One expert described this as choosing "feel good topics" like the expansion of sharing and cycling highways instead of redistribution of public space or limitation of the number of cars (VI1 109, see also VI6 85). Additionally, one expert criticized the tendency to avoid conflict out of fear of angry car drivers and being too attentive toward car drivers' interests (VI4 73). This fits the next point of polarization.

In Vienna, a kind of polarization can be observed. As one expert describes it:

> "Ich habe das Gefühl, dass da eine Polarisierung im Gange ist. Dass man eigentlich nicht mal mehr Meinungen austauscht oder wirklich einen Diskurs führt, sondern, es gibt Standpunkte, die sehr unterschiedlich sind und trägt man vor sich her" (VI5 233).
>
> "I have the feeling that there is a polarization going on. That people actually don't even exchange opinions or really have a discourse anymore, but there are very different points of view and people carry them in front of them" (own translation VI5 233).

On the one hand, interests from the city center often differ from those of the rural areas or outskirts of the city (VI4 81, VI5 205ff., VI6 81). Additionally, in Vienna, the Donau seems to set a geographical and also psychological border of interests for the city. All parts north of the Danube are frequently forgotten or less considered in the public debate (VI4 97). The different interests and mobility needs manifest clearly – but not only – with the question of how to commute. People living in relatively central districts

of Vienna might find active mobility more attractive and valuable to fulfill their mobility need that people who need to realize longer distances with possibly worse public transport connections (VI3 73, VI5 41ff.). Often experts mention fears of change in a very general sense or fear to be forced to adapt everyday mobility habits and lose the potential of mobility or even personal freedom. This is mentioned in different contexts, either planners and politicians are afraid to make certain far-reaching decisions or fears are perceived by or projected on citizens (VI1 25, VI2 77, VI4 69, VI5 227, 239). These diffuse fears might hinder experts and citizens from striving for more ambitious mobility measures.

On the other hand, polarization amongst groups of people can be observed. To put it simply, on one side, experts speak of "old school" transport planners (VI6 63) and progressive, transition-oriented people on the other side. These old-school transport planners are described as rather conservative (VI6 57). One expert mentions the conservative "car drivers party" as thankful enemies for public events (VI4 63); also, they describe a type of 'elderly male car driver' (VI4 65) as a kind of opponent for ambitious sustainable mobility policies. Some experts describe the phenomenon of a 'bubble', referring to the fact that people stick to like-minded persons instead of getting into conflict with people with different opinions (VI4 61, VI6 63). In Vienna, there are somewhat regular exchanges of like-minded people interested in the mobility transition for exchanging ideas and networking. These exchanges are open to all interested people and informally organized about four times a year (VI4 55ff.). Within this exchange format, positions are relatively consensual.

8.5.Summary

Structural Components

- First pilots of mobility hubs initiated by Winer Linien in 2018, followed by institutionalization of developed structures
- Clearly defined responsibility at public transport provider Wiener Linien and working group on mobility hubs with involved local stakeholders (i.a. city administration)
- Contract between Wiener Linien and city administration, including public funding, aim to build 100 WienMobil Stationen by 2025
- Informal networks of like-minded actors, limited communication among opposing groups
- Districts as very influential players in regulation of public space, veto-power
- Missing regional integration with surrounding federal state

Policy Instruments

- Mobility hubs as part of strategic mobility & climate plans
- Critique raised by experts: no quantifiable goals and indicators, undefined responsibilities, and long timeframe and slow implementation
- Additional instruments: encompassing pricing system and parking restrictions
- Incentives for private urban developers to build mobility hubs, supporting with limited parking regulations and informative instruments
- Request: Car-Sharing Law to facilitate planning procedure

Normative Drivers

- Stronger focus on climate neutrality than on mobility transition
- 'Mobility guarantee' (Mobilitätsgarantie) to ensure car-free mobility for all residents promoted by strategic planning documents, like local mobility plan STEP 2025
- Business logic: Public transport and mobility providers operate profit-oriented
- Fuzzy understanding of social justice dimension of shared mobility

Discursive Negotiations

- Mobility is a highly political topic; conflicts among political parties
- Political opposition along geographical location (city center vs. periphery)
- Conflicts over priorities & public space: 'old school transport planners' vs. transition-oriented people
- Tendency to avoid conflicts: Car parking as "holy" & focus on creating alternatives instead of limiting car use, difficult redistribution of public space
- Fear of change or loss

9. LIVING LAB MUNICH

9.1.Overview TUM Campus

SmartHubs

TUM-Campus

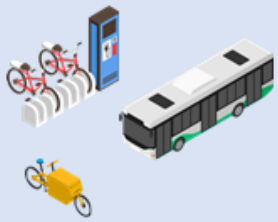
Munich, Germany

City: 1,400,000 in 2019
Region: 13,400,000 in 2020

Operator: SmartHubs Consortium
Operation Start: 2022

Net-zero target: 2030

Available modes



Central urban district in the proximity of the main campus of the Technical University of Munich, this hub will only be temporary and – so far – not part of the official mobility hubs network operated by the mobility department of Munich.

Mayor since 2014: Dieter Reiter, social democratic party (SPD)
Since 2020: green, LGBTQI Voter group and social democratic coalition*
2014-2020: conservative and social democratic coalition

GOVERNANCE LEVELS

Local Administration:
- Mobility Department, Unit for Shared Mobility
- Building Department
- Alderman for Mobility, Georg Dunkel (no party)

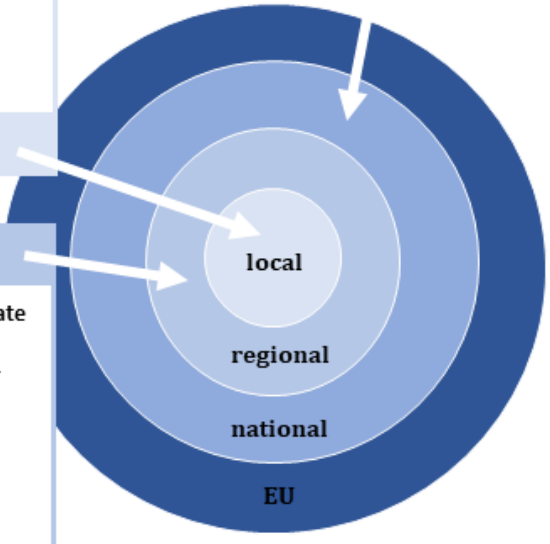
Local Public or Private Stakeholders:
- Stadtwerke München GmbH,
- MVG (PT provider)

Local Networks:
- Deutsche Plattform für Mobilitätsmanagement (DEPOMM) e.V.
- Platform 'Wir bewegen Bayern'
- AG Shared Mobility
- Inzell Initiative, Städtetag, DStGB
- Civitas, Eurocities,
- UITP (SWM/MVG + DB)

Municipality

Federal Ministry for Digital and Transport
(Volker Wissing, FDP)

National State



Federal State

Regional Administration:
- Bavarian State Ministry for Housing, Construction and Transport Bavarian, Minister: Kerstin Schreyer (CSU)
- Department 6 'Connected mobility and public transport'

Regional Public or Private Stakeholders:
- Münchner Verkehrs- und Tarifverbund GmbH (MVV)
- Several regional PT providers
- Bavarian Railways Company (BEG)
- European Metropolitan Region Munich (EMM)

SmartHubs

POLICIES

Mobility Strategy 2035 ('Mobilitätsstrategie 2035')

Time frame of document: 2021-2035
Author: City of Munich, Mobility Department
Main characteristics:
Mobility Strategy 2035 as central document for mobility planning in Munich. It replaces old mobility development plan (Verkehrsentwicklungsplan, VEP). Overall goals of the strategy:

- At least 80% of inner-city traffic by emission-free vehicles, PT, cycling, or walking by 2025
- Climate neutrality until 2035
- Additional specialized goals in sub-strategies

Planned: 19 sub-strategies:

- One per mode (PT, walking, cycling, shared mobility + MaaS, individual motorized traffic)
- Additionally on specific topics, such as safety, justice, digitalization, financing, regional traffic, etc.
- Strategy on Shared Mobility + MaaS decided on in 2022

Policies regarding multimodality or mobility hubs

See Strategy on Shared Mobility and MaaS

Other related transport policies

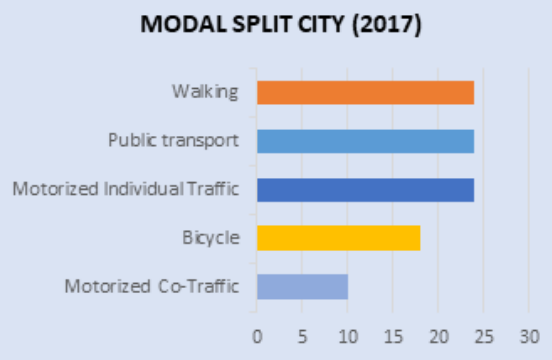
Sub-Strategy Shared Mobility (2022)
Author: City of Munich, Mobility Department
Main characteristics:
The Sub-Strategy Shared Mobility is part of the overall mobility strategy 2035; see above.
Policies regarding multimodality or mobility hubs:
The goal for 2026: Built at least 100-200 mobility hubs in the municipal area of Munich.

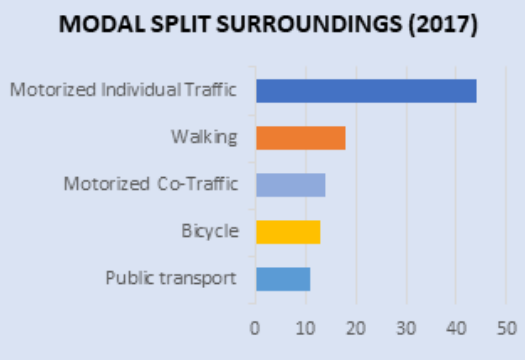
- Working group 'shared mobility' will meet regularly (every second meeting with representatives of the political parties)
- Citizens will be involved in the implementation process of the strategy
- Existing hubs will be transferred into the new concept
- A regional expansion of mobility points will be supported in cooperation with the MVV and MVG
- Building department supports with equipment and signage

Related policies:

- All providers (public and private) shall be included and be booked over one central platform, shall include
- Regulation of car-sharing will be revised, strengthened regulation on e-scooters
- 600 parking spots for station-based and 1.000 for free-floating car-sharing will be defined until 2026
- Redistribute car-parking spaces for alternative modes and climate adaptation

MUNICH MODAL SPLIT





Sources:
Munich (2021): Mobilitätsstrategie 2035: Entwurf einer neuen Gesamtstrategie für Mobilität und Verkehr in München Beschluss über die Finanzierung ab 2021.
Munich (2022): Einstieg in die Teilstrategie Shared Mobility: Etablierung von Mobilpunkten und Angebotsausweitung in München.
Munich (2023): Verkehrsdaten: Erhebungen und Prognosen. https://stadt.muenchen.de/infos/verkehrsdaten.html (24.04.2023).
SmartHubs (2023): TUM Hub. https://data.smartmobilityhubs.eu/wiki/Hubs/10 (24.04.2023).

9.2.Governance framework

Munich is the capital of the federal state of Bavaria. It currently has 1,4 Mio. inhabitants and is located in south-eastern Germany (Munich, 2022f). With only a few exceptions, the city of Munich was governed by social democratic mayors during the last decades. Until 2020 the social-democratic (SPD) or conservative (CSU) parties were the strongest political parties. With the recent election in 2020, the green party (Bündnis 90/ die Grünen) has become the strongest party, followed by CSU and SPD. The federal state of Bavaria has a long tradition of conservative governments. The city administration of Munich is divided into several departments. Since 2021, Munich has got a designated mobility department (Mobilitätsreferat); before, the mobility sector was part of different departments, mainly the city planning and construction unit. Georg Dunkel (no party) has led the department since 2021. The public transport provider in Munich is the MVG. It is a privatized municipal company owned by the city and part of the local energy provider (MSW). Like Vienna, Munich has a relatively high share of environmentally friendly modes (66% by walking, cycling, and PT), regarding transport within the city. However, transportation in Munich's outskirts shows a much higher percentage of car use (58%) which leads to a share of only 42% environmentally friendly modes.

In Munich, the local mobility plan Mobility strategy 2035 was agreed on in 2021 and followed the SUMP guidelines. It foresees 19 sub-strategies dealing with a specific topic. The first to be published was the Shared Mobility strategy, which also included measures toward multimodality and the implementation of mobility hubs. The Mobility strategy 2035 takes up Munich's climate goals to become climate neutral by 2035.[5] It aims to realize at least 80% of inner-city traffic by emission-free vehicles, PT, cycling, or walking by 2025. The shared mobility strategy plans with different extension stages; the first stage sets the goal of at least 100-200 mobility hubs in the municipal area of Munich by 2026. According to the strategy, a crucial impact factor for the shared mobility modes is the distance of no longer than 5min walking to reach a shared mobility service. Based on this calculation, a network of about 1.300 entry points would be needed (Munich, 2021). Overall, shared modes have the potential to realize a modal shift away from private car usage of 8,3% (Munich, 2021). It defines formalities, and working procedures for the working group shared mobility. Citizens should be included in the implementation process. Cooperation of the local transport provider (MVG) and the regional management organization for public transport (MVV) shall support the regional expansion of mobility hubs in the surroundings of Munich. Additional related policies are that all providers (public and private) shall be included and booked over one central platform. The regulation of car-sharing and e-scooters will be revised and strengthened. Also, 600 parking spots for station-based and 1.000 for free-floating car-sharing will be defined until 2026.

By August 2022, there were 17 mobility hubs listed on an interactive map on the website of the mobility department. The site provides additional information on available services at the stations. These stations are clustered in three geographical areas in Munich (Munich, 2022c). One cluster is in the districts of Isarvorstadt, Ludwigsvorstand und Sendling, another in the districts of Schwabing and Milbertshofen, and a third cluster is located in Aubing, Pasing and Locham. This can partly be explained by different research projects focusing on specific geographical locations.

The SmartHubs hub was initially planned on TUM Campus. Due to difficulties finding the right location in cooperation with the university's administration, the location was changed into a public space nearby TUM Campus. It was built in a participatory workshop together with students. The hub was created as a parklet to offer possibilities to rest and also provide information on the experiment. The parklet was placed in a parking spot. Next to it, shared mobility modes were available as well as a nearby bus stop. Due to the city's regulation, the parklet has to be put away during the winter and can be replaced in

[5] The city of Munich is part of the EU Mission on climate-neutral cities; therefore, the renewed aim, according to the program, is to become climate neutral by 2030 (see above, 5.2 European Urban Mobility Policies and Mobility Hubs).

Spring 2023. Therefore, the SmartHubs experimental hub is not permanent and does not belong to the city's network of hubs.

9.3. Organizational dimension

9.3.1. Structural components

City of Munich

The mobility department in Munich (Mobilitätsreferat) was only created in 2021 and is still in the process of growth and reorganization. It was constructed to design the mobility transition of Munich and translate general guidelines into concrete action. According to external experts, the mobility department is still in the reconfiguration phase in general (MI3 53) and in terms of mobility hubs (MI3 54, MI4 94). The department claims to promote public transport and complement it with shared mobility services (Munich, 2022g). The department is responsible for developing the local mobility plan and shared mobility strategy that needs approval by the city parliament. The current coalition of the Green Party and SPD/Volt supports the expansion of the mobility hubs in their coalition treaty (Green Party & SPD/Volt, 2020).

Working groups on shared mobility and mobility hubs

The mobility department is separated into two different divisions, one strategy-oriented and one implementation-oriented division. As part of the strategy division, the unit for 'connected and shared mobility' has about seven employees. Two employees of this unit work exclusively on the planning and implementation of mobility hubs (MI1 34f., 38, MI2 6, MI3 9, Munich, 2022b). According to the sub-strategy of shared mobility, the mobility department is – amongst others – involved in a working group on shared mobility and different sub-working groups, such as sub-working groups on mobility hubs (Unterarbeitsgruppe – UAG Mobilitätsstationen) or MaaS. The sub-working group on mobility hubs is organized by the connected and shared mobility unit. It works in very regular and close contact with other group members (MI1 75). Generally, the idea of creating the sub-working group mobility hubs as a sort of 'task force' combining all relevant stakeholders is considered helpful for successful implementation (MI3 155).

The implementation of mobility hubs in Munich started in 2015 with the first pilots, for instance, at the station Münchener Freiheit, developed by the public transport provider MVG (MVG 2015). Although the MVG organized the first pilots, the city administration decided to take further planning into their responsibility. Since the MVG is the public transport provider in Munich and operates a bicycle-sharing system, close cooperation is needed (MI1 45, 73, MI3 19, 27, 103). The MVG also suggested organizing the mobility hubs over their management scheme but was rejected by the political decision-makers (MI1 112ff., MI3 9, 122ff.). The city administration of Munich intends to keep the implementation of mobility hubs in-house due to economic considerations (MI1 114, 152). Overall, the processes shall be kept relatively "streamlined and cost-effective" (MI1 114). The budget of 6,7Mio. EUR is calculated and guaranteed with the city parliament's acceptance of the mobility plans (MI1 38, Munich, 2021). The sharing strategy describes a modular hub system that lays down a standard design but allows variety in size and facilities (MI1 136, Munich, 2021). Size S hubs include at least two shared modes in combination with a public transport stop. These hubs can be implemented city-wide and should facilitate spontaneous trips in fragmented housing areas. Size M hubs combine at least three services plus so-called add-ons. There can be bike parking, cargo-bike parking, a bike repair station, etc. These hubs are located in relatively central areas of districts, traffic junctions, or popular places. Lastly, Size L hubs include at least four mobility options in combination with public transport and additional add-ons. These hubs are located at important nodal points, strategic locations, and new development areas (Munich, 2021). The location of new mobility hubs will be defined based on the PT system and according to suggestions from district councils, citizens, and providers (MI1 136, Munich, 2021). Also, mobility hubs shall be included in the current planning for reconstruction from the beginning (MI1 136, Munich, 2021).

Regarding the definition of concrete spaces for a mobility hub, the district level gets consulted during the processes (MI1 38, 106ff.). The district councils can offer useful local knowledge and information because they work specifically on the district level; therefore, they might significantly influence the concrete location of single hubs (MI1 105f.). Although they do not have an official veto power, they have a right to the hearing (Anhörungsrecht), and their concerns are usually considered (MI1 105f., MI4 108). This process of participation can be conflictive and time-consuming (see below). The citizen councils are criticized for not being very citizen-friendly since they only reach the organized, politically involved citizens (MI2 52).

Other important departments involved in the mobility hub planning, construction, and maintenance are the following. The planning and construction department (Baureferat) plans and supervises the actual construction of hubs, including aspects like signage, marking, and (digital) pillars. Additionally, it manages the maintenance of mobility hubs internally (MI1 38, 115). The department for public order (Kreisverwaltungsreferat) supports the surveillance and controlling of mobility hubs (MI1 38); it also organizes driving permits and parking licenses. The Park&Ride GmbH, a privatized company managing stationary traffic in Munich, is an essential partner for planning mobility hubs. The Department for Climate and Environment manages the interface with climate protection and electrification aspects. Lastly, the IT Department supports the digital integration of mobility hubs into online platforms (Munich, 2022a, 7f, 2022b). In addition to in-house cooperation, the connected and shared mobility unit is in contact with the platform Shared Mobility and the federal car-sharing association (MI1 65). Another vital cooperation format is the Deutscher Städtetag (Association of German Cities), and the exchange with other municipalities (MI1 65ff., MI2 23)

To build mobility hubs in Munich and extend the network to the surrounding counties (Landkreise) of Munich, a working group on mobility stations meets regularly to inform and coordinate their progress (MI1 73, MI4 35, 38, Munich, 2022b). Members of this group are the shared and connected mobility unit, the MVG, MVV, and employees from other counties. According to the experts, the attempt to develop one coherent mobility hub brand and design for all included counties is appreciated differently. Some counties are interested, while others participate only rarely (MI4 9, 29). Overall, the working group shared mobility, and sub-working-group mobility hub seem helpful in organizing regular exchange amongst involved stakeholders (MI1 58, MI3 111ff., MI4 38).

Regional transport association: MVV

The MVV (Münchener Verkehrs- und Tarifverbund) is the tariff association for public transport. It primarily coordinates income redistribution amongst the mobility providers operating within the MVV area. The MVV is publicly funded and coordinates the public transport in Munich and the eight surrounding counties[6]. In total, there are 172 municipalities involved (MI4 9, MVV, 2022c). Stakeholders are the Federal State of Bavaria, the city of Munich, and the eight counties. The MVV aims to develop a public transport association to mobility association (MI4 82) and harmonize measures of different stakeholders involved (MI4 41). Therefore, the MVV has a small unit responsible for new mobility alternatives. Important working tasks are networking amongst all involved institutions and organizing a jour fix for members to meet regularly and discuss specific topics. Also, it participates in and supports mobility planning. In this function, the MVV takes part in the sub-working group on mobility hubs and supports the development of a standard design for mobility hubs and coordinating its regional integration (MI4 7, 19, 35, 58, 73, 94).

For regional integration of mobility hubs into the different counties, the degree of fragmentation is highly challenging: The counties are responsible for the organization of public transport, whereas the possible organization and implementation of mobility hubs rely on the competence of the municipalities (MI4 45, 77). This results in different degrees of ambition and resources throughout the counties. Another challenge is the unequal availability of administrative resources between the city of Munich

[6] The counties are Bad Tölz-Wolfrathausen, Dachau, Ebersberg, Erding, Freising, Fürstenfeldbruck, München Land and Starnberg.

and the other municipalities of the regional area (MI4 19). While Munich has a mobility department with about 200 employees, some municipalities only have one employee for all mobility-related tasks.

Local public transport provider: MVG

The MVG, Munich's transport operator (Münchener Verkehrsgesellschaft), is part of SWM, the public utility of Munich (Stadtwerke), a privatized company owned by the city of Munich. It is organized as a private company and works profit-oriented. As an energy provider, the SWM is an essential partner for constructing digital pillars and the charging infrastructure (MI3 58). While the MVG is Munich's main public transport provider, many private companies offer bus lines connecting Munich and the Munich metropolitan area (MI4 5). The main task of the MVG is classic public transport, but similar to the MVV the MVG planned to become a mobility provider, ensuring preferably seamless and complete mobility from a user-oriented perspective (MI3 17). As part of the strategy department, the MVG has a unit for mobility development (Mobilitätsentwicklung) that manages sharing and pooling services. It has about 10-12 employees. This unit also developed the first mobility hub at Münchener Freiheit. With the mobility department's political decision to organize mobility hubs in-house, the MVG is only in a supporting role. In cooperation with Nextbike, the MVG is the provider of the MVG-Rad, a mix of free-floating and station-based bike-sharing systems. The city of Munich entrusts the MVG until 2025. It is planned to reevaluate the entrustment in 2024 (Munich, 2022a). Although the bike-sharing system is not profitable, it is considered successful according to its usage (MI3 20ff.).

The responsibility for track-based public transport relies on regional and national actors, which leaves the city and counties of the metropolitan area highly dependent on higher levels of governance in terms of strengthening public transport in this regard (MI5 63, 65, Green Party & SPD/Volt, 2020, p. 15).

The mobility department is also in close contact with other shared mobility providers which operate in Munich. Regarding mobility hubs, the city administration depends on the interest to participate of these providers since it is not engaged in shared mobility services (MI1 53). Also, the mobility department is requested to develop a strategy on how mobility hubs can be implemented in private spaces in cooperation with private property owners (Munich, 2022a); therefore, the contacts towards private investors, developers, and property owners might be strengthened.

9.3.2. Policy Instruments

Local mobility strategy and sub-strategy on shared mobility

As explained above, the city parliament accepted the sub-strategy shared mobility in 2022. It is part of the overall mobility plan (Munich, 2021). It combines administrative, financial, and informative instruments simultaneously and includes goals until 2035. Urban and mobility planning generally faces long planning horizons (MI4 23). The city of Munich follows international climate policies and aims to become climate neutral by 2035. The mobility sectors should contribute to the goal accordingly (Munich, 2021). The sub-strategy aims to accompany monitoring and evaluation to update constantly in an iterative process (Munich, 2021).

Financially, the city of Munich subsidizes the MVG to provide a city-wide bike-sharing system. By organizing the mobility hubs within the city administration, the city also covers this cost on its budget. As mentioned above, the sub-strategy on shared mobility is financed with 15Mio. Euro, including 6,7Mio. Euro for mobility hubs (Munich, 2021). Included in this budget is the in-house maintenance and implementation of mobility hubs. Also, additional staff is calculated for the mobility and construction department to fulfill these tasks. Included in the calculation is an accompanying evaluation in the form of surveys with households or focus group interviews (Munich, 2021). Additionally, the mobility department co-finances a study on shared micro-mobility potentials in Munich and the surrounding region organized by the MVV (Munich, 2022a, 2022b, p. 77). Since shared mobility so far is only financially attractive in dense areas, the city aims to co-finance shared mobility services in the outskirts. To provide a comprehensive system for the whole city, the strategy foresees possibly introduce subsidies for providers up from 2024 (MI1 150, Munich, 2021).

Besides confirming the local mobility plan and the sub-strategy in the city parliament, the current political coalition is committed to realizing the mobility transition in Munich and the extension of mobility hubs (Green Party & SPD/Volt, 2020, 12, 16). The political agreement of the coalition and the mayor of Munich is to redistribute at least 500 public parking spaces per year. The available space can be used to create mobility hubs, implement measures towards climate adaptation, or build up additional charging infrastructure, bike parking, and others (MI1 51, 120, Green Party & SPD/Volt, 2020, p. 16).

In terms of experimental instruments, the experts highlighted the role of research projects (MI1 112, MI3 81ff., MI4 165). From 2016-2021 three research projects were realized to try out the first pilots of mobility hubs. These projects were City2Share, Smarter Together, and Civitas Eccentric. They focused on different urban areas, namely the city center, a location close to the center, and one project at the city's outskirts (MI1 8, MI3 41, Munich, 2022b). The MVV is currently cooperating with the project MoveRegioM financed by the German ministry for education and research. One aspect of the research project is the trial of mobility hubs in rural places (MI4 27, MVV, 2022b).

Excursus: temporary parklets in public space

Experiments with parklets in Munich are not directly linked to mobility hubs. Nonetheless, this seems particularly interesting in the context of experimental governance and the example of the SmartHubs mobility hub nearby the TUM Campus. In the summer of 2021, the city ran a pilot project for parklets in public spaces. Permits were given between the beginning of August and October 2021 and later extended until the end of November. The aim was to test cooperation between initiatives and administration regarding approval and construction requirements. Collecting feedback from parklet builders and users also played a central role. The mobility department commissioned the association Green City e.V. to support the parklet stakeholders in the approval, planning, and construction (Munich, 2022e). Feedback has been positive overall, which the city attributes to the early involvement of residents, the selection of quieter locations, and the creative design of the parklets (Munich, 2022e). Nevertheless, applying for parklets remains a process that will involve a certain amount of effort for the initiators. The city administration plans to examine the possibilities of simplifying the approval process and the possibility of financial support through district bureaus (Munich, 2022e).

The mobility department uses the online webpage “München unterwegs” to provide information on different mobility modes, participation formats, construction areas, and other activities. Also, the city of Munich distributes mobility information packages to new citizens that move to Munich. These “Gescheid unterwegs” (clever on the road, in English) packages contain information on all mobility services available in Munich and include information on mobility hubs. This informational instrument helps new citizens to incorporate multimodal behavior into their new routines from the beginning. The information is available in 8 different languages (Munich, 2022d). Local stakeholders shall be informed actively in the context of planning and implementation of hubs. Therefore, the city administration provides information via direct mail and informational campaign days or other formats (MI1 106).

Other federal and national policy instruments

The federal Carsharing-Law (CsgG) from 2017 aims to support car-sharing and reduce private car use. It first enables municipalities to define designated parking zones only for shared cars in public spaces. Secondly, cities are allowed to establish parking zones for specific car-sharing companies along federal streets. And third, municipalities are permitted to lower or abolish fees on parking zones for shared cars. This administrative instrument facilitates the declaration of designated public parking areas for shared vehicles and was also applied for the mobility stations in Munich (see above, 1.600 additional car-sharing spots shall be defined by 2026).

In addition to the national legislation on car-sharing, the federal state of Bavaria defined station-based car-sharing as the special use of public space (‘Sondernutzung’). Municipalities can designate public spaces for the usage of car-sharing. The selection process has to be publicly announced and discrimination-free. Space can be provided for no longer than eight years (see Art. 18a BayStrWG, MI1 42, Munich, 2022a).

One crucial aspect raised by the experts was the regulation of shared e-scooters and bikes (electric micro-mobility) in Munich (MI1 24ff., MI2 21, MI3 125, MI6 79). In 2019, the German Federal Ministry of Transport and Digital Infrastructure issued the Electric Micro-Vehicles Ordinance (eKFV), which

generally allowed the market introduction of small electric vehicles, such as e-scooters (see also MI1 26). In the following, the German federal states decided to handle e-scooters differently. The state of Bavaria defines the usage of electronic micro-mobility as common utilization of public space ('Gemeingebrauch'); therefore, mobility providers are free to use public space for their business model of free-floating sharing schemes (Munich, 2022b). The city administration of Munich set up a voluntary self-commitment for mobility providers to define aspects like the maximum number of vehicles at one spot and the obligation to remove unused or disturbing vehicles. Also, non-parking zones in very crowded areas are defined and controlled via geofencing. This commitment remains voluntary and is therefore not sanctioned in any case of misconduct (MI1 7, 65, MI2 23, Munich, 2022b). Currently, this regulation is evaluated and might be strengthened and potentially used to incentivize mobility providers to use more station-based approaches at mobility hubs (MI2 23f., team red, 2022).

Other crucial national legislation mentioned by the mobility plan or the experts is the amendment of the law on passenger transport ('Personenbeförderungsgesetz'), which allows municipalities to commission on-demand transportation services and require quality standards (Munich, 2022b). Also, the law on financing municipalities ('Gemeindefinanzierungsgesetz') defines how money can be transferred from the national state to the local level to finance municipal projects in the transport sector (MI6 73).

One expert describes the municipalities as highly dependent on the national and federal state. On the one hand, municipalities should be given more scope of action and, on the other hand, legally define more precisely what specifically they are allowed to decide and do and what not (MI1 55). Another example raised by an expert was the question of how far shared and multimodal mobility services might count into the German term 'Daseinsvorsorge' (service of general interest). Depending on this question is if additional public money can be spent on these topics (MI4 77).

> "Da hat man sich halt vorher nicht so viel Gedanken drüber gemacht, ehrlich gesagt. Und es ist halt schwierig, wenn man keine langfristige Finanzierung für diese Themen hat. Das ist beim ÖPNV alles sehr klar geregelt […]. Aber im Shared-Mobility-Bereich gibt es das halt einfach nicht. Also weder die klare Zuständigkeit noch Förderinstrumente noch Finanzierungspläne" (MI4 78).
>
> "To be honest, we didn't think too much about it beforehand. It's difficult when you don't have long-term financing for these issues. In public transport, everything is very clearly regulated [...]. But in the shared mobility sector, there is simply no such thing; there is neither clear responsibility nor funding instruments" (own translation MI4 78).

This unclear financial situation complicates reliable funding schemes and planning perspectives.

9.4. Ideational dimension

9.4.1. Normative Driver

In Munich, the notion of mobility transition ('Verkehrswende') is actively addressed and mentioned as the overall goal of city politics (MI1 14, MI2 63, MI6 17). The Munich mobility plan lists the main elements of local mobility policies. Next to improving the overall quality of life, high accessibility, and quality of stay, the city aims at a powerful performance regarding inter/multimodal and multi-dimensional mobility. Additionally, the mobility plan names many more goals, such as climate and environmental compatibility, health, social justice, social participation, inclusion, traffic safety, the attractiveness of locations for companies, resilience, economic efficiency, and quality of mobility choices. How far these ambitions can be served goes beyond the report's scope. One expert mentions the "very, very diverse" facets of mobility in the plan (MI1 14). In many contexts, this can lead to conflicts between different goals (see concurrency over public space). The main objective may become fuzzy and highly complex at the same time. As one expert summarizes the manifold ambitions:

> "Because at the end of the day, when we look at transport and mobility, this transition that we want to implement it is a societal transition" (MI6 35).

The overall goal for mobility hubs is to improve comprehensive accessibility of the broadened environmentally-friendly mobility modes. In combination with public transport, mobility hubs can serve as safe and comfortable points of change between different modes of transportation. Therefore, they should enable inter-/ and multimodal mobility behavior. Also, mobility hubs shall improve the quality of traffic safety and barrier-free sidewalks (Munich, 2022b). Experts support this understanding of mobility hubs as physical, reliable, and well-visible entry points into multimodal behavior (MI4 17, 25, 132, MI3 151, MI6 14f.). Mobility hubs should become a part of an "integrated overall system" (MI1 144). Mobility hubs shall be prioritized in public spaces over private car use (Munich, 2022b). Due to the various options, mobility hubs might contribute to upgrading the public space (MI1 118, MI4 134ff.) or improve the livability and quality of stay in Munich (MI1 16, Munich, 2022b) and reduce travel time (Munich, 2022b).

Dominant aspects regarding shared mobility services and multimodal mobility are individuality and flexibility. A suitable shared mobility option should be available everywhere and anytime (Munich, 2022b). The experts underline these points and emphasize the need for comprehensive accessibility (MI1 10, 16, MI2 63, MI4 157). Shared mobility and the expanded environmentally friendly modes ('erweiterter Umweltverbund', walking, cycling, PT, and shared mobility modes) offer a "maximal, saying very very great flexibility" (MI1 34), also in their implementation (MI1 28, 34, 138, MI3 25, MI4 25). Mobility hubs can combine different use cases, such as shopping opportunities, delivery services, or place-making (MI3 151). Mobility hubs are also strongly interlinked with digital integration and MaaS (MI1 30, 144, MI3 9, 151, MI4 17).

Although mobility hubs seem associated with many goals and advantages, they can only unfold a particular impact. The mobility plan defines the potential of shared mobility with 8,3% of the modal split (see above). Additionally, experts raise the concern of overestimated potential of shared mobility. So far, the number of users is relatively low in Munich and Germany in general (MI3 149, MI5 11).

The strategic planning documents of Munich emphasize human-oriented mobility in the city. Individual mobility needs shall be realized as well as possible, regardless of personal background:

> "Dadurch sollen alle individuellen Mobilitätsbedürfnisse mit einem sinnvollen und attraktiven Gesamtangebot schnell, günstig, und bequem erfüllt werden. Soziale Hintergründe, Alter, Geschlecht und die körperliche Verfassung sollen dabei keine Rolle spielen" (Munich, 2022b, p. 15).
>
> "The aim is to meet all individual mobility needs quickly, cheaply, and conveniently with a sensible and attractive package of services. Social background, age, gender, and physical condition should not play a role" (own translation Munich, 2022b, p. 15).

A comprehensive mobility system can only evolve when it does not exclude anyone (Munich, 2022b). One expert also raises the concern of inclusion and social justice. The city administration needs to consider the growing number of elderly who are less trained in using digital services. Also, the usefulness of shared mobility for people with mobility impairments and care workers should be regarded (MI1 142). Since unregulated shared mobility resulted in obstructed sidewalks in many contexts, mobility hubs might also contribute to traffic safety, especially at blocked sidewalks (MI1 24, 136, 140, MS2035 6).

As already mentioned above, the multiple goals in Munich's mobility strategy can result in concurrency over the urban space. Likewise, to other cities, "spaces are simply scarce" in Munich (MI1 136). Of course, many conflicts are not new but evolved over the last decades (MI1 47, 53, 120, 136, MI5 37). However, additional measures towards climate mitigation and adaptation put additional pressure on spaces (MI1 53). Regarding mobility hubs and other measures towards more sustainable mobility modes, city politics allow the redistribution of parking space and traffic lanes (MI129, MI5 37, Green Party & SPD/Volt, 2020, 16, 21). One central argument in the context is the efficiency of space ("Flächeneffizienz"), (MI6 96f., Munich, 2021, 2022b).

> "[I]t is really interesting that they are using this argument of Flächeneffizienz (…), so kind of the efficiency of space. That is actually like an argument that really kind of shows, 'okay, we have a base for pushing out the cars for actually making these dramatic changes that need to be made for reshaping our urban infrastructure" (MI6 97).

As the expert explains, this notion allows for explaining and simplifying changes in the urban infrastructure and applying more pressure on car usage in Munich.

Another central norm in Munich's mobility policies is openness towards providers. As one expert puts it:

> “wir lassen den Anbietern tatsächlich freie Hand, also wer nach München kommen möchte, wir sind da immer sehr offen und wir sprechen immer gerne mit allen Anbietern” (MI1 65).
>
> "we actually give the providers a free hand, so whoever wants to come to Munich, we're always very open about that, and we're always happy to talk to all the providers" (own translation MI1 65).

Instead of applying too much regulation, mobility providers shall be regulated as little as possible (MI2 23). Private companies are close allies and partners for the city administration in general and in implementing the mobility strategy (MI1 152, MI2 23, Munich, 2022b). According to the shared mobility strategy, Munich aims to create appropriate market conditions for expanding shared mobility. Thus, the city strives to create a ‘level playing field’ for discrimination-free and fair market competition (Munich, 2022b).

The scarce financial resources might partly explain Munich's liberal approach towards mobility providers and market mechanisms. According to one expert, Munich is facing the most significant financial crisis since world war II (MI1 152). Therefore, the costs for mobility hubs should be kept as little as possible. This cost efficiency also applies to implementing a regional mobility hub network within the metropolitan area of Munich (MI1 94, MI4 27). The mobility department planned the implementation of mobility hubs streamlined and cost-effective and tried to adjust processes to make it feasible for the administration (MI1 114, MI2 21).

9.4.2. Discursive Negotiations

Next to climate protection, mobility is subject to many political debates in Munich (MI1 16, 138, 142, MI4 140). In Munich, many problems occur in the mobility sector: congestion, bad air quality, high parking pressure, security issues, and blocked sidewalks show a need for action. Generally, the city’s infrastructure appears overwhelmed by the fast growth of the city population and mobility behavior (MI1 138). Still, the highly evolved infrastructure makes starting from scratch impossible and demands measures according to the existing built preconditions (MI6 16).

According to experts, the claims toward mobility policies were prominently discussed during the last election campaign in 2020. The green party became the strongest political party in the city parliament, actively promoting less car use in Munich (MI4 140, MI5 53). Also, in 2021 the mobility department was created and combined all relevant competencies in one administrative institution. This restructuring process had broad political support and followed the urge to facilitate action in the mobility sector (MI3 147). Overall, experts considered creating a new comprehensive mobility department as a positive development (MI3 54, MI5 69). The general aim of mobility policies is to achieve a modal shift from car usage to more environmentally friendly modes (MI1 18, MI3 25, 145, MI5 17). While the overall goal seems to be consensual, positions towards what kind of measures or speed of implementation and priorities are less consensual amongst different groups. Although mobility is one prominent topic, the implementation of mobility hubs is not at the center of attention (MI2 62, MI4 63, MI5 23).

The usage of e-scooters and their parking in public space is prominently discussed in Munich. These modes put additional pressure on the curbside. This discussion is not limited to Munich but reflects public debate in Germany in general. The mobility department reacted by undertaking a study on how to regulate e-scooters. This study describes these modes' possible regulations and potential specifically for Munich (see team red, 2022). Following the results, political and administrative stakeholders discuss additional measures (MI2 21ff.). The political agreement on the shared mobility strategy solved any unclarity about the distribution of responsibility between the mobility department and the MVG (MI1 112). That circumvents potential institutional void.

Although responsibilities are clearly defined in Munich, the implementation of mobility projects – and mobility hubs specifically – is too slow or retarded (MI1 124, MI2 9, MI1 120, MI5 27ff., 33, 69). Experts already expect the city to miss the goal of 200 mobility hubs by 2026 (MI1 120ff., MI2 9). Different factors can help to explain this difficulty and delay. First, the city administration was also affected by political world events, such as the Covid 19 pandemic or supply bottlenecks due to the war in Ukraine (MI1 120). Second, according to experiences from former research projects, finding the actual site for a mobility hub can be very time-consuming (MI3 127). As mentioned, urban space is limited, and mobility hubs are not the only element that requires space. On the other hand, the intense participatory process of involving the local stakeholders and reconciling all interests demands much time. Third, urban development and mobility projects generally need a long time. Experts mention other mobility projects, such as the expansion of tramways in Munich, that are equally delayed (MI3 15, MI4 23, MI5 37). But, in comparison to these measures, the implementation of mobility hubs can be relatively fast, flexible, and less expensive since they can be built around already existing public transport infrastructures and add shared mobility services (MI1 138). Here, mobility hubs could have a relative advantage in achieving faster results than long-term infrastructure projects.

Another crucial factor regarding the implementation of mobility hubs is a tendency to avoid conflict in political debate in the city parliament and at the district level. One expert describes the following phenomenon:

> “es gibt natürlich auch manche Parteien, die gerne das Spiel machen, dass sie dann im Stadtrat immer für die schöne Strategie sind und dann vor Ort jede Einzelmaßnahme bekämpfen […]. Weil es will sich ja keiner nachsagen lassen, dass er gegen Klimaschutz ist und für die autogerechte Stadt, aber man findet ja dann auch immer einen Grund, warum die drei Parkplätze nicht weg dürfen” (MI5 53).
>
> "there are of course some parties that like to play the game that they are always in favor of the nice strategy in the city council and then fight every single measure onsite [...]. Because no one wants to be accused of being against climate protection and for the car-friendly city, but then you always find a reason why the three parking spaces should not be removed" (own translation MI5 53).

So, on the general level, all parties and stakeholders agree to plans, but when it comes to concrete actions, they oppose the necessary measures. According to the observations of one expert, the conservative and liberal parties are showing less interest in supporting public transport. However, there are differences, especially on the local level. Not all politicians follow the rule of the general political guidelines of their political party (MI5 57). Still, in Munich’s city parliament, the conservative party often raises concerns about car drivers' interests (MI5 97).

Munich’s heterogeneity shows on the district level as well. In some cases, district councils thwart or retard important mobility projects of the city administration (MI2 60). This must not necessarily influence the implementation of mobility hubs but could also impact mobility hubs. Especially when those hubs reduce the number of parking spots in a district. The city administration acts consensus-oriented toward the district councils. They avoid debates in general principles and try to implement a working atmosphere on an equal level (MI1 108, MI2 60). On the one hand, the district councils are assumed to know the local context better and might understand the interests of local stakeholders better than the city administration. On the other hand, the city administration tries to focus on specific measures instead of opening discussions on general principles that might be potentially conflictive. Finally, the city administration seems to strive for a cautious approach with only careful changes.

> “wir haben zwar das Commitment, dass wir Parkplätze umwidmen dürfen oder beziehungsweise ja auch bevorzugt Parkplätze dafür nutzen sollen. Aber dann gibt es natürlich die Einschränkung durch weitere Planungsvorhaben. Also wir haben beschränkte Flächen und wir brauchen auch nach wie vor auch noch Parkplätze für private PKW, die wollen wir ja nicht sofort irgendwie alle wegnehmen, sondern, uns ja auch an dieses ganze Vorhaben erst mal ran tasten” (MI1 120)
>
> "we do have a commitment that we are allowed to reallocate parking spaces or preferentially use parking spaces for this purpose. But then, of course, there is the restriction due to further

> planning projects. So we have limited space, and we still need parking spaces for private cars; we don't want to take them all away immediately, we want to get to grips with this whole project first" (own translation MI1 120).

As this quote indicates, conflicts appear over the redistribution of space. Especially mobility services and mobility hubs implemented on former parking spots might cause conflict (MI2 34, 60, MI3 101, MI4 127, MI5 27, 29). Additionally, other conflicts of objectives ('Zielkonflikte') might evolve among other sustainable mobility projects. Since urban space is limited, the enlargement of sidewalks and safe bike lanes can also limit the potential area for mobility hubs. One strategy to avoid this conflict and have quick changes is to start with the "low-hanging fruits" (MI4 127). That means starting with the easy cases, like districts with less parking pressure or free public space and districts with a higher affinity toward shared mobility and factors like that.

Another critical aspect raised by experts is the distribution of push and pull factors (MI4 142, MI5 37, MI6 98). Here, mobility hubs are 'pull factors'; they give additional opportunities to be mobile.

> "Das Problem ist […], dass man sich nicht so traut, Sachen zu verbieten. Also das ist das Problem, alle wollen immer viel Angebot schaffen und wollen immer durch das tolle Angebot […] die Leute dazu bringen, dass sie das freiwillig machen, aber so diese Push-Maßnahmen, da traut man sich nicht so richtig. Weil das halt auch nicht so gut ankommt" (MI4 142).
>
> "The problem is [...] that people don't dare to ban things. So that's the problem, everyone always wants to create a lot of offers and always wants to get people to do it voluntarily through the great offers [...], but with these push measures, one does not really dare. Because that isn't very well appreciated either" (own translation MI4 142).

Here again, the tendency to avoid conflict becomes apparent. Another expert states that push factors are needed to create substantive changes in the regulatory framework and the design of infrastructures.

> "(…) if you look at research and you look at praxis case studies (…) change only takes place if you push. So that means when you create a different regulatory framework, when you reduce parking spots, when you physically change the infrastructure of how cities are built" (MI6 94).

Otherwise, the advantages of inter-/multimodal mobility always need to prove themselves compared to car use. Almost all experts refer to car usage as a reference point (MI1 10, 34, 144, MI2 23, MI4, 7, 25, 154, MI5 69). Without additional push factors, inter-/multimodal mobility needs to compete with car usage regarding comfortability, flexibility, and other factors. This equation is incomplete by not taking societal and environmental externalities into account. The mobility strategy tries to tackle this problem by ensuring that shared mobility is not regulated more strictly than private car use, for instance, in terms of parking space or parking prices (Munich, 2022b).

Experts claim that providing more mobility services is insufficient for achieving a modal shift. In addition to building mobility and raising accessibility of shared mobility services, the expansion of public transport and consequent building of high-quality walking and cycling infrastructure is needed. Also, the city needs support with additional subsidies for sustainable modes, road pricing, and a comprehensive model for parking management (MI2 63, MI4 154, MI5 37).

One discursive difficulty the mobility hubs face is the lack of interest groups for inter-/multimodal mobility. There are few institutions like the VCD in Germany or the federal association of car-sharing providers, but most interest groups focus on one mobility mode (MI6 39). This also applies to the local conditions in Munich. Many interest groups in civil society somehow address mobility hubs, but none deals with the topic specifically or even exclusively (MI5 3). In Munich, the 'Inzell initiative' is an influential network (MI6 53ff.). The Initiative was founded in 1995 by the City of Munich and automobile and motorcycle manufacturer BMW. Stakeholders from the industry, science, and local administration have joined forces to find solutions to the many mobility issues in the Munich region (MVV, 2022a). The largest European traffic club and insurance (ADAC), Siemens, and TU Munich are also among the members. Current projects address, for example, the strengthening of e-mobility and parking space management (Inzell Initiative, 2022).

Here the national level could support municipalities by creating guidelines and visions regarding the mobility transition and how to implement it (MI6 67). It could adapt and update the existing regulatory

frameworks according to new mobility services and technological innovation (see also the example of unclear financial funding schemes of park&ride places).

Beyond creating a comprehensive network in the territory of Munich, the city aims to plan mobility hubs in cooperation with the surrounding counties and municipalities. The MVV holds a central position in the communication and coordination of all stakeholders. Some municipalities gain the impression of being dominated by the city and feel pressured to adopt projects initiated by the city of Munich due to the administrative institutions' uneven financial and human resources. The MVV can act as a neutral institution between all groups and support more mutual coordination (MI4 19ff.). While some counties are ambitious in implementing mobility hubs, others are less interested in it (MI2 9). Generally, rural areas face uneven predispositions with shared mobility. Companies have lower interest in rural areas because the number of potential users is smaller, consequently less profitable (MI6 87).

The last aspect of discursive negotiations is the city's interaction with residents and civil society. The mobility department publishes all information regarding mobility measures on its website 'München unterwegs' (MI1 100). The mobility department provides an official platform for complaints (MI2 52). Local experts stress the importance of citizen participation in implementing mobility hubs (MI1 19, 100, 144, MI6 21ff., 35). Additionally, they emphasize the role of communication and information since alternative modes do not only need to be implemented but used by the people (MI6 35, 42). Citizen participation is a vital part of the mobility strategy:

> "Die Verkehrswende wird nur dann erfolgreich sein, wenn die Bürger*innen und alle weiteren Beteiligten auf dem Weg dorthin mitgenommen werden. Mehr noch: sie sollen gezielt animiert und motiviert werden, diese selbst zu gestalten und voranzutreiben" (Munich, 2021, p. 29).
>
> "The 'Verkehrswende' [mobility transition] will only be successful if the citizens and all other stakeholders are carried along the way. Even more: they should be specifically encouraged and motivated to shape and drive it forward themselves" (Own translation Munich, 2021, p. 29).

The strategy includes different stages of participation: to inform and explain, to give opportunities to suggest own citizen initiatives or proposals and to provide feedback on measures. The mobility department shall include civil society in implementing the mobility strategy. Regarding the shared mobility strategy, participation should raise acceptance and usage of mobility services. By cooperating with mobility providers, the information, education, and standardization of mobility services should enable new users even better to use services and lower barriers (Munich, 2022a).

The mobility department used the international automotive exhibition (IAA) to initiate a public dialogue on future developments in the mobility sector. Citizens were invited to develop their own projects, get informed, and give input to the city administration. In the long term, the mobility department aims to organize a public dialogue on shared mobility. So far, no details are known about this (MI1 100). Besides individual citizens, organized civil society tries to influence political decisions (MI5 17, 75, 101). One influential project was the public petition 'Sauba sog I'. In 2017 the city parliament partly adopted the initiative's claims. They were included in the mobility strategy (MI3 147, Munich, 2021).

Regarding the concrete implementation of mobility hubs, citizens and local stakeholders can influence the hub location. Highly requested locations for mobility hubs shall be considered (Munich, 2022b). According to experts, the mobility department receives active and constructive suggestions for car-sharing potential sites from house communities (MI2 102), which are considered.

Besides the mobility department, the MVV organizes an institutionalized form of participation. The passenger advisory board ('Fahrgastbeirat') included different stakeholders and organizations to provide feedback on projects and the overall functioning of public transport from different user perspectives (MI5 105, MVV, 2023). The advisory board deals with rather general questions about public transport. In addition to these participatory formats, research projects offer opportunities to create additional formats. The MVV takes part in another project called MoveRegioM. These project contexts allow more comprehensive participation beyond the limited resources of everyday business (MI4 73). Experts involved in other projects dealing with mobility hubs confirm the experience of additional resources in the context of research projects (MI1 69, 112, MI3 41, 81).

9.5.Summary

Structural Components

- Institutionalization of local networks and cooperation after first pilots in 2015, institutional changes regarding the organization of mobility hubs
- City administration planning and implementing mobility hubs instead of PT provider MVG, inhouse implementation and maintenance
- Intensive regional and inner-communal coordination, i.a. in a sub-working group on mobility hubs

Policy Instruments

- Mobility plan and shared mobility strategy include a (regional) network of mobility hubs
    - Aim: implementing 100-200 hubs by 2026 and reducing 500 parking spaces per year
    - Already included: designated budget of 6,7Mio EUR for hubs and personal resources
    - Different models of hubs according to spatial and functional context
- Survey on potential regulation of shared micro-mobility; aim to create stronger links with hubs
- Federal Car-Sharing law facilitating car-sharing regulation for municipalities
- Partly unclear funding schemes and definitions for shared mobility services and hubs

Normative Drivers

- Multiple goals associated with mobility transition such like environmental improvement, safety, economic prosperity, quality of stay
- 'Efficiency of space' ("Flächeneffizienz")
- Self-perception of city administration as an 'enabler' for private companies, guideline of as little regulation as possible
- Increase traffic safety and reduce disorder in public space with mobility hubs

Discursive Negotiations

- Focus on creating flexible and various mobility options (pull measure), hesitant push measures
- General consensus on goals, but conflicts in the concrete implementation on-site (conflictive lines along political parties and municipal-district level) and over-prioritization of measures
- Lack of courage for unpopular decisions; conflict and debates on principles are being avoided
- Citizen and district-level participation during the development of mobility plan and partly concrete planning process of hubs

10. MOST IMPORTANT LEARNINGS AND CONCLUSION

Cities across Europe face the challenge of transforming toward a more sustainable urban mobility system. Cities suffer from the negative externalities of individual motorized traffic. These can be congestion, safety issues, bad air quality, and low quality of life that all cities face to different extents. Additionally, all municipalities set ambitious climate mitigation goals, which implicitly or explicitly put additional pressure toward a more sustainable mobility system. One central challenge is the reduction of individual motorized transport towards more sustainable alternatives, such as walking, cycling, and public transport. All examined cities reflect on how to facilitate multimodal mobility behavior. The concept of multimodality has gained increasing attention in mobility policies. Mobility hubs can facilitate the desired last-mile connectivity and multimodal mobility behavior. While Munich and Vienna have already conducted the first pilots and have started to establish a city-wide network of mobility hubs, The Hague and Anderlecht are at the beginning of dealing with mobility hubs.

This report addressed the overall research question: *In which way does the political framework on sustainable and smart urban mobility influence multimodality and mobility hubs in specific*? To answer this question the governance framework given in this report differentiates between organizational and ideational components. Structural components, like actors, their networks and resources, and policy instruments, like local/regional mobility plans, belong to the organizational dimension. Normative drivers, like guidelines for future development and discursive negotiations among stakeholders, are part of the ideational dimension. There is no clear-cut distinction between these dimensions. Primarily they serve as an analytical heuristic and are highly interlinked with one another.

The qualitative content analysis based on semi-standardized expert interviews and content and policy documents shows that each dimension influences the implementation of mobility hubs. The analysis of the four cases shows various factors that influence the planning, implementation, and operation of mobility hubs which will be summarized in the following.

Organizational components

Starting with the organizational dimension shows highly fragmented and complex governance structures around mobility hubs. While local governance is essential in urban mobility, it is also part of multi-level and multi-sector governance and, therefore, dependent on other vertical and horizontal levels of governance. At the same time, municipalities rely on different public and private actors, which demands new forms of cooperation. The four cases can describe many examples of horizontal and vertical interdependencies. On the one hand, different public administration departments must cooperate, from strategic planning and urban development to mobility, construction, energy supply, and signage. On the other hand, mobility providers of public transport and private shared mobility providers need to be involved. Regional transport associations might be able to support and network with the surrounding municipalities, especially in cities surrounded by metropolitan areas (see Munich and The Hague).

In the beginning, new developments and innovations often face an institutional void in the form of unclear institutional arrangements and regulatory frameworks. This setting also applies to mobility hubs. In Vienna and Munich, this challenge was addressed with the first pilots, established in the context of research projects. In the following, responsibilities were defined and equipped with adequate resources. Still, the hierarchical nature of road infrastructure can complicate coherent planning or limit municipal autonomy regarding mobility policies. In all contexts, competencies are fragmented among regional and municipal actors as well as actors on the district level. In many cities, this creates several potential or actual veto players and can delay the implementation of mobility hubs (see Brussels, Munich, and Vienna).

As a solution, working groups with all relevant stakeholders are essential. Preferably such working groups do not only meet regularly to inform and exchange with each other but hold decision-making power to set concrete plans for the implementation. One designated meeting to find common understanding and binding decisions might enable local governance to overcome institutional fragmentation. These working groups would coordinate the concrete, onsite implementation of publicly discussed and politically agreed planning documents, such as local mobility plans or SUMPs. Both Vianna

and Munich started with research projects and first pilots, leading to more institutionalized forms of cooperation. This development emphasizes the role of experimental governance and publicly funded research projects. Close, informal exchanges amongst stakeholders seem especially crucial in the early stages of implementation.

All cities and capital regions face the difficulty of many commuters and visitors coming to the cities by car. Therefore, inner-city solutions do not suffice regarding the mobility behavior of people. This interlinkage leads to additional complexity and interdependency since new sets of actors need to be included in planning processes to integrate policies coherently. Public administrations in bigger cities have more capacities and resources for planning and supervising innovations in the mobility sector, than those in rural areas. Unequal resources can complicate policy integration and regional exchanges amongst stakeholders. Mobility hubs in rural areas face additional complexity regarding competencies. Often, the regional administration is responsible for public transport planning, while the municipal authorities hold the competence over public space. Again, the fragmented structure of the governance system does not reflect the mobility behavior on-site and complicates a coherent approach.

The four case studies show that two resources are crucial for implementing mobility hubs: Public space and funding. Since municipalities mostly decide over the public space, they have a strong lever on affecting mobility. But urban space is limited and highly contested - in all cities, experts point to the relevance of stationary traffic and more ambitious parking management to achieve more sustainable mobility. Still, besides a widespread car-friendly infrastructure, including stationary traffic, urban space is also needed for walking and cycling infrastructure, shared mobility services, delivery zones, social activities, and measures in climate adaptation. Therefore, local authorities must carefully negotiate between these interests and redistribute urban space. The case studies show that this point can be highly conflictive and result in political opposition. The other important resource is funding. Mobility hubs demand financial support for their implementation but also maintenance. Depending on the location of mobility hubs, service providers need subsidies to operate even in economically less attractive areas. Also, appropriate capacities of human resources are required at the responsible institution to plan, implement, and operate mobility hubs.

Regional, national, and EU-level institutions can support local governance in many ways. For instance, with public funding schemes, general guidelines concerning hub design, the development of MaaS applications, or joint planning, booking, and payment applications. One example could be the Dutch national government's common identity document for mobility hubs, providing municipalities across the Netherlands with a uniform hub design guideline. Also, municipalities would profit from harmonized data-sharing regulations. In the context of the SmartHubs project, Deliverable 3.3 explicitly examines aspects of digital integration and physical integration (including signage) at mobility hubs.[7] In terms of public funding, overall flexibility with openness towards innovation is needed. In some cases, the regulatory framework does not fit multimodal mobility hubs but to classical park&ride stations; others do not include shared mobility services or leave uncertainty on its applicability. Funding regulations must be updated regularly to achieve reliability for the planning process.

Regarding policy instruments, mobility hubs can only be one part of a coherent mobility plan, and additional supportive measures are needed. In this context, coherent strategies are essential. With the SUMP guidelines, the European Commission provides an exemplary strategy structure. Changes in the mobility system can unfold consequences in the everyday life of all citizens, making a public discussion about mobility policies crucial. The SUMP guidelines demand citizen participation during the process. Although these guidelines are voluntary in most countries, it is planned to stronger link European funding to these planning documents, which might serve as an additional incentive for cities to follow the guideline. Furthermore, sustainable urban mobility indicators (SUMI) may help to define priorities in planning processes due to the specific contextual factors in a city (such like the geographical or

[7] See Baguet, Jelten (2022): Deliverable 3.3. Degital Integration and Signage at Mobility Hubs. Online: https://www.smartmobilityhubs.eu/data (24.04.2023).

economic situation). To gain acceptance and legitimacy, changes in urban infrastructure measures need to be publicly discussed and explained transparently.

Local experts criticized the lack of implementation and missing targets of mobility plans. Therefore, local mobility plans should define concrete goals, responsibilities, and financial resources for the implementation and indicators of measuring success. Financial support is not limited to the public administration but should also consider mobility providers. The complex system of concessions for public transport providers needs revision in terms of multimodality. Additionally, some shared mobility services need financial support or fair balancing between geographical locations. While central districts can be profitable, more rural areas of a city depend on additional funding besides users' fees. Regarding mobility hubs, Vienna and Munich defined specific numbers of how many hubs will be implemented within the following years. Additional indicators to measure success can be the number of (vulnerable to exclusion) users, the availability of shared mobility services, and their usage or financial factors. On a bigger scale, the success of mobility policies would result in the reduction of private car ownership and a general modal shift towards more public transport and active modes of transportation.

Ideational Components

Considering the ideational dimension of the governance framework, the case studies show that almost all stakeholders and political parties can accept normative claims regarding sustainability. There is a broad consensus that environmentally friendly modes must be strengthened. Mobility hubs and shared mobility are considered supportive of the extended environmental alliance. Still, many additional goals are associated with sustainable mobility, such as improved environment, health, safety or quality of stay. This variety can lead to conflicts between different normative drivers or make normative claims random or fuzzy, as in the case of social justice. Mobility hubs are also judged based on an entrepreneurial perspective. As shared mobility is provided at hubs, these services are considered successful according to their economic performance. Depending on the local organization of mobility hubs, this might lead to the closing of non-profitable mobility hubs even though they might cause improvements for certain people. The business and management dimension of mobility hubs also calls for regulation of procedures under competition law. Municipalities or public transport companies managing public concessions must ensure discrimination-free market access for shared mobility providers. Especially the regulation on shared-micro-mobility variates across European cities and leads to different operational contexts regarding available services at a mobility hub.

With regard to discursive negotiations, many experts described a tendency to avoid conflict by agreeing to general strategic documents and opposing single measures during the implementation process. Hardly surprising is the persistent strong role of car use and car-friendly policies. Car use is omnipresent as a reference point in all cities, so alternative forms of mobility are always compared to car use. Alternatives must prove more comfortable, flexible, and faster than car use while partly taking negative externalities and financial advantages out of the equation. In many municipalities, conflictive discursive positions display along the question of taking back privileges in favor of sustainable mobility modes, such as reducing car parking, including urban vehicle access regulation (UVAR), or redistributing public space. This conflictive line also shows in the actors' constellation. Some experts mentioned limited inter-actor exchanges. In a very simplified dichotomy, there are two conflictive parties: Rather conservative actors oppose significant changes and defend the status quo, whereas change-oriented actors argue for substantial changes in the urban infrastructure and mobility behavior.

The balance between pull and push measures is crucial for transitory processes, but seems to be out of step in many cases. There is a stronger focus on pull than push measures which bears the danger of an implementation gap. According to experts, these are considered less conflictive and easier to implement but cannot suffice alone to generate substantial changes in the urban mobility system. Since public administrations face limited financial resources, planning capacities, and urban space, measures in the mobility sector need to be prioritized. As described, a lack of implementation is widely observed in the mobility sector. This problem also applies to the SmartHubs cases, where overall targets in modal shift or concrete numbers of mobility hubs are missed or – according to local experts – are expected to be. Changes in the urban infrastructure unfold slower than anticipated, or goals are not reached by the defined time. Mobility hubs can have the potential to combine both approaches by reusing car parking spots in favor of mobility hubs. An integrated approach would enable the redistribution of urban space

and promote alternative mobility at once. Additionally, experts mention supportive measures such as parking restrictions, speed reductions, a city tax or other access regulations, or limiting financial incentives for company cars.

To gain acceptance and legitimacy, changes in urban infrastructure measures need to be publicly discussed and explained transparently. Therefore, the SUMP guidelines demand citizen participation during the discussion, planning and implementation process. All local/regional mobility plans included participatory elements during the development process. However, this refers to the general mobility hubs and not necessarily to onsite participation during the hub development. Local experts from Munich and Vienna claim on-site stakeholder involvement to be an important pillar of the development process of mobility hubs. Especially research projects or first pilots give more opportunities to organize participatory events with construction firms, elected district representatives, local shop owners, and residents. The democratic dimension of the integration ladder will be the subject of another SmartHubs Deliverable 6.1 (to be published by April 2024). The role of citizen and stakeholder participation at different stages of the mobility hub planning, implementation and operation process will be examined in detail in that report. Participatory elements organized within the SmartHubs Living Lab (see work package 4) will be studied as well.

Regarding organized civil society, most NGOs and interest groups in the mobility or environmental sector focus on specific mobility modes. In none of the SmartHubs cases, an interest group specified on mobility hubs could be identified. Therefore, mobility hubs do not play a prioritized role in political demands or are even considered less important than other policies.

General conclusion

This report shows the importance of governance if and when changes are made in the urban infrastructure. By systematically examining governance structures in the context of four mobility hubs of the SmartHubs project, this report was able to outline ways in which the political framework on sustainable and smart urban mobility influences multimodality. Urban mobility is a dynamic policy field crucial for cities' sustainable development. Many innovations, like mobility hubs, are being discussed and aimed to implement. However, changes manifest slowly or are limited by undefined responsibilities, organizational fragmentation, and interdependencies. Policy documents need clear goals and sufficient resources and partly show a lack of implementation. Various overlapping or contradicting normative drivers and discursive disagreement in terms of priorities or space distribution differentiate the implementation of mobility hubs. To especially overcome the lack of implementation, further research on governance questions would be desirable. This report contributes to a better understanding of structural and ideational factors that influence the governance framework of mobility hubs based on empirical cases. It enriches scientific knowledge on smart mobility governance and offers a four-dimensional analytical framework based on PAA to approach mobility hubs with a coherent Multi-Level-Governance perspective. This knowledge can enable practitioners to identify and address these factors proactively.

11. ACKNOWLEDGEMENTS

The support of all reviewers and knowledgeable and helpful interviewees is gratefully acknowledged.

12. REFERENCES

9292 (2022, December 12). Travel planner & e-tickets train, bus, metro, tram & boat. Retrieved from https://9292.nl/en/about-9292/services/mobile

Akse, R., Thomas, T., & Geurs, K. (2021). Mobility and accessibility paradigms in Dutch policies: An empirical analysis. *Journal of Transport and Land Use*, *14*(1). https://doi.org/10.5198/jtlu.2021.2097

Amoroso, S., Castelluccio, F., & Santoro, N. (2012). Sustainable mobility: "exchange poles" between transport networks and urban structure. In M. Pacetti, P. G., C. A. Brebbia, & G. Latini (Eds.), *WIT Transactions on Ecology and The Environment, The Sustainable City VII* (pp. 955–966). WIT PressSouthampton, UK. https://doi.org/10.2495/SC120802

Anderlecht (2018). Plan stratégique transversal: Commune d'Anderlecht. Retrieved from https://www.anderlecht.be/sites/default/files/medias/Files/politique/BROCHURE%20PLAN%20STRATEGIQUE%20FR-V4.pdf

Anderlecht (2023, January 5). Contrat local de mobilité Cureghem. Retrieved from https://www.anderlecht.be/fr/contrat-local-de-mobilite-cureghem

Aono, S. (2019). Identifying Best Practices for Mobility Hubs: Prepared for TransLink. Retrieved from https://summalab.nl/wp-content/uploads/2021/03/Aono-S.-2019-Identifying-Best-Practices-for-Mobility-Hubs_-UBC-Sustainability-Scholar.pdf

Arsenio, E., Martens, K., & Di Ciommo, F. (2016). Sustainable urban mobility plans: Bridging climate change and equity targets? *Research in Transportation Economics*, *55*, 30–39. https://doi.org/10.1016/j.retrec.2016.04.008

Arts, B., & Leroy, P. (Eds.) (2006). *Environment & policy: v. 47*. *Institutional dynamics in environmental governance*. Dordrecht: Springer. Retrieved from http://site.ebrary.com/lib/alltitles/docDetail.action?docID=10145207 https://doi.org/10.1007/1-4020-5079-8

Arts, B., & van Tatenhove, J. (2004). Policy and power: A conceptual framework between the 'old' and 'new' policy idioms. *Policy Sciences*, *37*(3-4), 339–356. https://doi.org/10.1007/s11077-005-0156-9

Bache, I., Bartle, I., Flinders, M., & Marsden, G. (2015). Blame Games and Climate Change: Accountability, Multi-Level Governance and Carbon Management. *The British Journal of Politics and International Relations*, *17*(1), 64–88. https://doi.org/10.1111/1467-856X.12040

Bandelow, N. C., Lindloff, K., & Sikatzki, S. (2016). Governance im Politikfeld Verkehr: Steuerungsmuster und Handlungsmodi in der Verkehrspolitik. In O. Schwedes, W. Canzler, & A. Knie (Eds.), *Handbuch Verkehrspolitik* (pp. 165–187). Wiesbaden: Springer. https://doi.org/10.1007/978-3-658-04693-4_8

Banister, D. (2008). The sustainable mobility paradigm. *Transport Policy*, *15*(2), 73–80. https://doi.org/10.1016/j.tranpol.2007.10.005

Banister, D., & Hickman, R. (2013). Transport futures: Thinking the unthinkable. *Transport Policy*, *29*, 283–293. https://doi.org/10.1016/j.tranpol.2012.07.005

Beliris (2022). Qui sommes-nous ? Retrieved from https://www.beliris.be/qui-sommes-nous/

Benz, A. (2009). *Politik in Mehrebenensystemen* (1. Aufl.). *Lehrbuch: Vol. 5*. Wiesbaden: VS Verl. für Sozialwiss.

Berking, H., & Löw, M. (Eds.) (2008). *Interdisziplinäre Stadtforschung: Vol. 1*. *Die Eigenlogik der Städte: Neue Wege für die Stadtforschung*. Frankfurt/M.: Campus Verlag.

Biermann, F. (2014). *Earth system governance: World politics in the anthropocene*. *Earth system governance*. Cambridge, Massachusetts: The MIT Press. https://doi.org/10.7551/mitpress/9780262028226.001.0001?locatt=mode:legacy

Biermann, F., & Kim, R. E. (Eds.) (2020). *Architectures of Earth System Governance*. Cambridge University Press. https://doi.org/10.1017/9781108784641

Biermann, F., Pattberg, P., van Asselt, H., & Zelli, F. (2009). The Fragmentation of Global Governance Architectures: A Framework for Analysis. *Global Environmental Politics*, *9*(4), 14–40. https://doi.org/10.1162/glep.2009.9.4.14

Biermann, F., & Rakhzun, E. K. (2020). Architectures of Earth System Governance: Setting the Stage. In F. Biermann & R. E. Kim (Eds.), *Architectures of Earth System Governance* (pp. 1–34). Cambridge University Press.

BMK (2021). *Mobilitäsmasterplan 2030 für Österreich: er neue Klimaschutz-Rahmen für den Verkehrssektor*. Nachhaltig - resilient - digital. Wien.

Borrás, S., & Radaelli, C. M. (2011). The politics of governance architectures: creation, change and effects of the EU Lisbon Strategy. *Journal of European Public Policy*, *18*(4), 463–484. https://doi.org/10.1080/13501763.2011.560069

Bratzel, S. (1999). Conditions of success in sustainable urban transport policyPolicy change in 'relatively successful' European cities. *Transport Reviews*, *19*(2), 177–190. https://doi.org/10.1080/014416499295600

Brussels (2021). The Government of the Region. Retrieved from https://be.brussels/about-the-region/the-government-of-the-region

Brussels (2022a). Contexte bruxellois. Retrieved from https://environnement.brussels/citoyen/outils-et-donnees/etat-des-lieux-de-lenvironnement/contexte-bruxellois#mobilite-et-transports-en-region-bruxelloise

Brussels (2022b). The regional competences. Retrieved from https://be.brussels/about-the-region/the-regional-competences

Brussels Mobility (2021). *Good Move: Gewestelijk Mobiliteitsplan 2020-2030.*

Brussels Mobility (2022a). About Brussels Mobility. Retrieved from https://mobilite-mobiliteit.brussels/en/about-brussels-mobility

Brussels Mobility (2022b). Good Move: The Regional Mobility Plan 2020-2030. Retrieved from https://mobilite-mobiliteit.brussels/en/good-move

Buschle, C., Reiter, H., & Bethmann, A. (2021). The qualitative pretest interview for questionnaire development: outline of programme and practice. *Quality & Quantity.* Advance online publication. https://doi.org/10.1007/s11135-021-01156-0

Cambio (2022). Cambio carsharing Brussels. Retrieved from https://www.cambio.be/en-bxl/node/756

Chini, M. (2022). Anderlecht will completely redesign Brussels 'Good Move' traffic plan. Retrieved from https://www.brusselstimes.com/brussels/296834/anderlecht-will-completely-redesign-brussels-good-move-traffic-plan

Coenegrachts, E., Beckers, J., Vanelslander, T., & Verhetsel, A. (2021). Business Model Blueprints for the Shared Mobility Hub Network. *Sustainability*, *13*(12), 6939. https://doi.org/10.3390/su13126939

COMOUK, & SHARE-North project (2021). *Mobility Hubs: The Problem-Solving Approach to Congestion and Parking: City of Bremen Case Study.*

Cresswell, T. (2010). Towards a Politics of Mobility. *Environment and Planning D: Society and Space*, *28*(1), 17–31. https://doi.org/10.1068/d11407

Dacko, S. G., & Spalteholz, C. (2014). Upgrading the city: Enabling intermodal travel behaviour. *Technological Forecasting and Social Change*, *89*, 222–235. https://doi.org/10.1016/j.techfore.2013.08.039

Denzin, N. K. (2017). *The research act: A theoretical introduction to sociological methods*. New York, London: Routledge Taylor & Francis Group. https://doi.org/10.4324/9781315134543

Deschouwer, K. (2012). *The politics of Belgium: Governing a divided society* (2. ed., fully rev. and updated.). *Comparative government and politics*. Basingstoke: Palgrave Macmillan.

Deutsch, V., Beckmann, Klaus, J., Gertz, C., Gies, Jürgen, Holz-Rau, Christian, & Huber, F. (2016). *Integration von Stadtplanung und ÖPNV für lebenswerte Städte: Belange des ÖPNV müssen in die strategische Stadt- und Verkehrsplanung einfließen*. Berlin.

Docherty, I. (2018). New Governance Challenges in the Era of 'Smart' Mobility. In G. Marsden & L. Reardon (Eds.), *Emerald Points. Governance of the Smart Mobility Transition* (pp. 19–32). Bingley: Emerald.

Docherty, I. (2020). Crafting Effective Policy Instruments for 'Smart Mobility': Can Multi-level Governance Deliver? In A. Paulsson & C. Hedegaard Sørensen (Eds.), *Shaping Smart Mobility Futures: Governance and Policy Instruments in Times of Sustainability Transitions* (pp. 57–73). Bingley: Emerald Publishing Limited.

Docherty, I., Marsden, G., & Anable, J. (2018). The governance of smart mobility. *Transportation Research Part a: Policy and Practice*, *115*, 114–125. https://doi.org/10.1016/j.tra.2017.09.012

Durnova, A., Fischer, F., & Zittoun, P. (2016). Discursive Approaches to Public Policy: Politics, Argumentation, and Deliberation. In B. G. Peters & P. Zittoun (Eds.), *Contemporary Approaches to Public Policy* (pp. 35–56). London: Palgrave Macmillan UK. https://doi.org/10.1057/978-1-137-50494-4_3

Dutch Railways (2022). Stations as hubs. Retrieved from https://www.ns.nl/en/about-ns/strategy/station-as-hub.html

EHUBS (2020). Belgium's Flanders Region will invest more than €100 mln on mobility hubs. Retrieved from https://www.nweurope.eu/projects/project-search/ehubs-smart-shared-green-mobility-hubs/news/belgiums-flanders-region-will-invest-more-than-100-mln-on-mobility-hubs/

Eising, R., & Kohler-Koch, B. (Eds.) (1999). *Routledge / ECPR studies in European political science: Vol. 12*. *The transformation of governance in the European Union*. London, New York: Routledge. https://doi.org/10.4324/9780203165188

Eltis (2023). City database. Retrieved from https://www.eltis.org/mobility-plans/city-database

European Commission (2019). The European Green Deal. Retrieved from https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF

European Commission (2020a). *Sustainable and Smart Mobility Strategy –putting European transport on track for the future: COM(2020)789 final*. Retrieved from European Commission website: https://eur-lex.europa.eu/resource.html?uri=cellar:5e601657-3b06-11eb-b27b-01aa75ed71a1.0001.02/DOC_1&format=PDF

European Commission (2020b). Trans-European transport network (TEN-T) - revised guidelines. Retrieved from https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12532-Trans-European-transport-network-TEN-T-revised-guidelines_en

European Commission (2020c, December 9). *Annex: Sustainable and Smart Mobility Strategy – putting European transport on track for the future*. Retrieved from European Commission website: https://eur-lex.europa.eu/resource.html?uri=cellar:5e601657-3b06-11eb-b27b-01aa75ed71a1.0001.02/DOC_2&format=PDF

European Commission (2021). *The New EU Urban Mobility Framework: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions*. COM(2021) 811 final.

European Commission (2022). EU Mission: Climate-neutral and smart cities. Retrieved from https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/climate-neutral-and-smart-cities_en

European Court of Auditors (2020). *Sustainable urban mobility in the EU: No substantial improvement is possible without Member States' commitment* (Special report No. 06). Luxembourg: [Publications Office of the European Union].

European Environmental Agency (2019). Greenhouse gas emissions by aggregated sector. Retrieved from https://www.eea.europa.eu/data-and-maps/daviz/ghg-emissions-by-aggregated-sector-5#tab-dashboard-02

European Union (2019). *Methodological manual on territorial typologies: 2018 edition*. Luxembourg.

European Union (2022). 100 climate-neutral and smart cities: Meet the cities.

Finnemore, M., & Sikkink, K. (1998). International Norm Dynamics and Political Change. *International Organization*, *52*(4), 887–917. https://doi.org/10.1162/002081898550789

Fischer, F. (2003). *Reframing public policy: Discursive politics and deliberative practices*. Oxford, New York: Oxford University Press. Retrieved from https://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=176953

Flick, U. (2022). *The SAGE Handbook of Qualitative Research Design*. London: SAGE Publications Ltd. https://doi.org/10.4135/9781529770278

Flyvbjerg, B. (2006). Five Misunderstandings About Case-Study Research. *Qualitative Inquiry*, *12*(2), 219–245. https://doi.org/10.1177/1077800405284363

Gebhardt, L., Krajzewicz, D., & Oostendorp, R. (2017). Intermodality – key to a more efficient urban transport system? In T. L. Lindström (Ed.), *Eceee 2017 Summer Study - consumption, efficiency and limits: 29 May-3 June 2017, Belambra Les Criques, Toulon/Hyères, France* (pp. 759–769). Stockholm, Sweden: eceee Secretariat.

Gebhardt, L., Krajzewicz, D., Oostendorp, R., Goletz, M., Greger, K., Klötzke, M., . . . Heinrichs, D. (2016). Intermodal Urban Mobility: Users, Uses, and Use Cases. *Transportation Research Procedia*, *14*, 1183–1192. https://doi.org/10.1016/j.trpro.2016.05.189

George, A. L., & Bennett, A. (2005). *Case studies and theory development in the social sciences*. *BCSIA studies in international security*. Cambridge, Massachusetts, London, England: The MIT Press.

Gertz, C., Flämig, H., Gaffron, P., & Polzin, G. (2018). Stadtverkehr. In O. Schwedes (Ed.), *Verkehrspolitik* (pp. 293–322). Wiesbaden: Springer Fachmedien Wiesbaden. https://doi.org/10.1007/978-3-658-21601-6_14

Geurs, K., & Münzel, K. (2022). A multidimensional mobility hub typology and inventory: SmartHubs Deliverable D 2.1. Retrieved from https://www.smartmobilityhubs.eu/_files/ugd/c54b12_819c85702a6442c6bebb18538fb93516.pdf

Göbel, A. (2019). Klimaklage in den Niederlande - Ein historisches Urteil. Retrieved from https://www.deutschlandfunk.de/klimaklage-in-den-niederlande-ein-historisches-urteil-100.html

Gomez-Mera, L., Morin, J.-F., & van de Graaf, T. (2020). Regime Complexes. In F. Biermann & R. E. Kim (Eds.), *Architectures of Earth System Governance* (pp. 137–157). Cambridge University Press.

GoSEStran (2020). *Mobility Hubs: A Strategic Study for the South East of Scotland/SEStran region*. Report. Retrieved from steer; Transport Scotland website: https://sestran.gov.uk/wp-content/uploads/2020/05/SEStran-Mobility-Hubs-Strategic-Study-Final-Report.pdf

Gössling, S., & Cohen, S. (2014). Why sustainable transport policies will fail: EU climate policy in the light of transport taboos. *Journal of Transport Geography*, *39*, 197–207. https://doi.org/10.1016/j.jtrangeo.2014.07.010

Green Party, & SPD/Volt (2020). *Mit Mut, Visionen und Zuversicht: Ganz München im Blick: Koalitionsvertrag 2020_2026.*

Gudmundsson, H. (2004). Making concepts matter: sustainable mobility and indicator systems in transport policy. *International Social Science Journal*, *55*(176), 199–217. https://doi.org/10.1111/j.1468-2451.2003.05502003.x

Hached, W., & L'Hostis, A. (2022). *Mobility hubs, a lever for more sustainable mobility? MOBI-MIX insight report*. Retrieved from https://www.polisnetwork.eu/document/mobi-mix-insight-report-on-mobility-hubs/

The Hague (2018). Coalitieakkoord 2018 - 2022: Den Haag, Stad van Kansen en Ambities. Retrieved from https://denhaag.raadsinformatie.nl/document/6514256/2/RIS299794+Coalitieakkoord+2018+2022

The Hague (2020a). *Haagse visie Smart Mobility: Optimale inzet van innovatie voor de Haagse reiziger*. Retrieved from https://denhaag.raadsinformatie.nl/document/9624298/1/RIS306913_Bijlage

The Hague (2020b). Participatie Haagse mobiliteitstransitie: In gesprek met de stad over de toekomst van verkeer en vervoer. Retrieved from https://denhaag.raadsinformatie.nl/document/9131646/2#search=%22RIS306126%22

The Hague (2021a). The Hague in numbers. Retrieved from https://www.denhaag.nl/en/municipality-of-the-hague/the-hague-in-numbers.htm

The Hague (2021b). Jaarrapportage deelfietsen en deelscooters. Retrieved from https://denhaag.raadsinformatie.nl/document/10387351/2/RIS309484+Jaarrapportage+deelfietsen+en+deelscooters+%28tweewielers%29+Den+Haag

The Hague (2021c). The municipal organisation. Retrieved from https://www.denhaag.nl/en/municipality-of-the-hague/municipal-organisation/the-municipal-organisation.htm

The Hague (2021d). *Strategie mobiliteitstransitie Den Haag 2022 - 2040.*

The Hague (2021e). *Voorstel van het college inzake Strategie mobiliteitstransitie Den Haag 2022-2040*. Retrieved from https://denhaag.raadsinformatie.nl/document/10801100/2/RIS310664+Voorstel+van+het+college+inzake+Strategie+mobiliteitstransitie+Den+Haag+2022+-+2040

The Hague (2022). Vergadering Gemeenteraad 20-01-2022. Retrieved from https://denhaag.raadsinformatie.nl/vergadering/883233#ai_6505236

The Hague, & MRDH (2018a). *Schaalsprong openbaar veroer Den Haag en regio*. Retrieved from Metropoolregio Rotterdam - Den Haag website: https://binckhorstbereikbaar.nl/wp-content/uploads/2020/11/Schaalsprong-OV-Den-Haag-en-regio.pdf

The Hague, & MRDH (2018b). *Schaalsprong openbaar vervoer Den Haag en regio*. Retrieved from Metropoolregio Rotterdam - Den Haag website: https://binckhorstbereikbaar.nl/wp-content/uploads/2020/11/Schaalsprong-OV-Den-Haag-en-regio.pdf

Hajer, M. (1995). *The politics of environmental discourse: Ecological modernization and the policy process*. Oxford: Clarendon Press.

Hajer, M. (2003). Policy without polity? Policy analysis and the institutional void. *Policy Science*, 175–195.

Hecking, C. (2003). *Das politische System Belgiens*. Wiesbaden: Springer Fachmedien Wiesbaden GmbH.

Hely (2023). Hely. All your shared mobility in one app. Retrieved from https://www.hely.com/?lng=en

Hietanen, S. (2014). *'Mobility as a Service' – the new transport model?* (EuroTransport No. 2).

Holden, E., Banister, D., Gössling, S., Gilpin, G., & Linnerud, K. (2020). Grand Narratives for sustainable mobility: A conceptual review. *Energy Research & Social Science*, *65*, 1–10. https://doi.org/10.1016/j.erss.2020.101454

Holz-Rau, C. (2018). Verkehr und Verkehrswissenschaft. In O. Schwedes (Ed.), *Verkehrspolitik* (pp. 115–139). Wiesbaden: Springer Fachmedien Wiesbaden. https://doi.org/10.1007/978-3-658-21601-6_6

Howlett, M. (2021). Looking at the 'field' through a Zoom lens: Methodological reflections on conducting online research during a global pandemic. *Qualitative Research*, 146879412098569. https://doi.org/10.1177/1468794120985691

HTM (2022). Our board. Retrieved from https://www.htm.nl/over-htm/ons-bestuur

Ibsa (2022). Anderlecht. Retrieved from https://ibsa.brussels/chiffres/chiffres-cles-par-commune/anderlecht

Inzell Initiative (2022). Inzell Initiative. Retrieved from http://sob-inzellinitiative-190110.webflow.io/

Karner, A., London, J., Rowangould, D., & Manaugh, K. (2020). From Transportation Equity to Transportation Justice: Within, Through, and Beyond the State. *Journal of Planning Literature*, *35*(4), 440–459. https://doi.org/10.1177/0885412220927691

Kask, Õ. (2021). *Hub programme Groningen and Drenthe: State of hubs, governance and future outlook*. Research report #2 within the SMiLES research programme work package A.3.

Kern, K. (2019). Cities as leaders in EU multilevel climate governance: embedded upscaling of local experiments in Europe. *Environmental Politics*, *28*(1), 125–145. https://doi.org/10.1080/09644016.2019.1521979

Knodt, M. (2002). Regions in Multilevel Governance Arrangements: Leadership versus Partnership. In J. R. Grote & B. Gbikpi (Eds.), *Participatory governance: Political and societal implications* (pp. 177–196). Opladen: Leske + Budrich.

Knodt, M., & Große Hüttmann, M. (2012). Der Multi-Level Governance-Ansatz. In H.-J. Bieling & M. Lerch (Eds.), *Theorien der europäischen Integration* (pp. 187–206). Wiesbaden: Springer Fachmedien Wiesbaden.

Knodt, M., & Schoenefeld, J. J. (2020). Harder soft governance in European climate and energy policy: exploring a new trend in public policy. *Journal of Environmental Policy & Planning*, *22*(6), 761–773. https://doi.org/10.1080/1523908X.2020.1832885

Köhler, J., Geels, F. W., Kern, F., Markard, J., Onsongo, E., Wieczorek, A., . . . Wells, P. (2019). An agenda for sustainability transitions research: State of the art and future directions. *Environmental Innovation and Societal Transitions*, *31*, 1–32. https://doi.org/10.1016/j.eist.2019.01.004

Kronsell, A., & Mukhtar-Landgren, D. (2020). Experimental Governance of Smart Mobility: Some Normative Implications. In A. Paulsson & C. Hedegaard Sørensen (Eds.), *Shaping Smart Mobility Futures: Governance and Policy Instruments in Times of Sustainability Transitions* (pp. 119–135). Bingley: Emerald Publishing Limited. https://doi.org/10.1108/978-1-83982-650-420201007

Lah, O. (2019). Trends, Drivers, and Pathways for Sustainable Urban Mobility. In O. Lah (Ed.), *Sustainable Urban Mobility Pathways: Policies, Institutions, and Coalitions for Low Carbon Transportations in Emerging Countries* (pp. 1–22). San Diego: Elsevier. https://doi.org/10.1016/B978-0-12-814897-6.00001-6

Leroy, P., & Arts, B. (2006). Institutional Dynamics in Environmental Governance. In B. Arts & P. Leroy (Eds.), *Environment & policy: v. 47. Institutional dynamics in environmental governance* (pp. 1–20). Dordrecht: Springer.

Liefferink, D. (2006). The Dynamics of Policy Arrangements: Turning Round the Tetrahedron. In B. Arts & P. Leroy (Eds.), *Environment & policy: v. 47. Institutional dynamics in environmental governance* (pp. 45–68). Dordrecht: Springer.

Loges, B. (2021). Von der Normenforschung zu den Normenforschungen – Metatheoretische Reflexionen zur Einheit und Vielfalt eines Forschungsfeldes. In S. Engelkamp, K. Glaab, & A. Graf (Eds.), *Kritische Normenforschung in den Internationalen Beziehungen* (pp. 33–68). Nomos Verlagsgesellschaft mbH & Co. KG.

Lucas, K. (2012). Transport and social exclusion: Where are we now? *Transport Policy*, *20*, 105–113. https://doi.org/10.1016/j.tranpol.2012.01.013

Lyons, G. (2018). Getting smart about urban mobility – Aligning the paradigms of smart and sustainable. *Transportation Research Part a: Policy and Practice*, *115*, 4–14. https://doi.org/10.1016/j.tra.2016.12.001

Manderscheid, K. (2014). Formierung und Wandel hegemonialer Mobilitätsdispositive. *Zeitschrift Für Diskursforschung*. (1), 5–31. Retrieved from https://moodle.studiumdigitale.uni-frankfurt.de/moodle/pluginfile.php/157863/mod_resource/content/1/Manderscheid%202014%20-%20Formierung%20und%20Wandel%20hegemonialer%20Mobilit%C3%A4tsdispositive.pdf

Marsden, G., Docherty, I., & Dowling, R. (2020). Parking futures: Curbside management in the era of 'new mobility' services in British and Australian cities. *Land Use Policy*, *91*, 104012. https://doi.org/10.1016/j.landusepol.2019.05.031

Marsden, G., & Reardon, L. (Eds.) (2018a). *Emerald Points*. *Governance of the Smart Mobility Transition* (First edition). Bingley: Emerald. Retrieved from https://www.emeraldinsight.com/doi/book/10.1108/9781787543171

Marsden, G., & Reardon, L. (2018b). Introduction. In G. Marsden & L. Reardon (Eds.), *Emerald Points. Governance of the Smart Mobility Transition* (pp. 1–15). Bingley: Emerald.

Matrakova, M. (2021). Interview Techniques. In J.-F. Morin, C. Olsson, & E. Ö. Atikcan (Eds.), *Research methods in the social sciences: An A-Z of key concepts* (pp. 149–154). Oxford, New York, NY: Oxford University Press.

May, A. D. (2013). Urban Transport and Sustainability: The Key Challenges. *International Journal of Sustainable Transportation*, *7*(3), 170–185. https://doi.org/10.1080/15568318.2013.710136

Messner, D., & Nuscheler, F. (2000). Politik in der Global Governance-Architektur. In R. Kreibich & U. E. Simonis (Eds.), *Wissenschaft in der Verantwortung. Global change - Globaler Wandel: Ursachenkomplexe und Lösungsansätze - Causal Structures and Indicative Solutions* (pp. 171–188). Berlin: Berlin-Verl. Spitz.

Mijksenaar (2022). De identiteit voor hubs: Handboek voor inrichting van en wayfinding voor deelmobilitieit- en hublocaties. Retrieved from https://www.mobiliteitshubs.nl/thema/stedelijke-hubs/documenten/211-de-identiteit-voor-hubs

Miramontes, M., Pfertner, M., Rayaprolu, H. S., Schreiner, M., & Wulfhorst, G. (2017). Impacts of a multimodal mobility service on travel behavior and preferences: user insights from Munich's first Mobility Station. *Transportation*, *44*(6), 1325–1342. https://doi.org/10.1007/s11116-017-9806-y

MO.Point (2022a). Mobility Point Bruno-Marek-Allee. Retrieved from https://www.mopoint.at/brunomarekallee/

MO.Point (2022b, November 21). MO.Point | Aktuelles. Retrieved from https://www.mopoint.at/aktuelles/

Modijefsky, M. (2022). Stricter rules for e-scooters: New law in Brussels goes further than the Belgian one. Retrieved from https://www.eltis.org/in-brief/news/stricter-rules-e-scooters-new-law-brussels-goes-further-belgian-one

Mosley, L. (2013). *Interview Research in Political Science*. Ithaca: Cornell University Press. Retrieved from http://gbv.eblib.com/patron/FullRecord.aspx?p=3138479

MRDH (2018). *CO2 mobility reduction Rotterdam Hague Region.*

MRDH (2021). *Impacts of the Sustainable Mobility Program: Pass-through of the MRDH's regional package of measures.*

MRDH (2022). Wie zijn we. Retrieved from https://mrdh.nl/wie-zijn-we

Munich (2020). *Mit Mut, Visionen und Zuversicht: Ganz München im Blick: Koalitionsvereinbarung für die Stadtratsperiode 2020 – 2026.*

Munich (2021). *Mobilitätsstrategie 2035: Entwurf einer neuen Gesamtstrategie für Mobilität und Verkehr in München Beschluss über die Finanzierung ab 2021.*

Munich (2022a). *Beschluss Sharing Strategie.*

Munich (2022b). *Einstieg in die Teilstrategie Shared Mobility: Etablierung von Mobilpunkten und Angebotsausweitung in München.*

Munich (2022c). Mobilitätsstationen. Retrieved from https://muenchenunterwegs.de/angebote/mobilitaetsstationen

Munich (2022d). München - meine neue Stadt: Mit Leichtigkeit ans Ziel. Retrieved from https://muenchenunterwegs.de/angebote/infopaket

Munich (2022e). Parklets 2021: Erkenntnisbericht. Retrieved from https://muenchenunterwegs.de/content/1251/download/parklets-2021-bericht-2021-final.pdf

Munich (2022f). Statistische Daten zur Münchner Bevölkerung: Wer und wie viele sind München? Retrieved from https://stadt.muenchen.de/infos/statistik-bevoelkerung.html

Munich (2022g). Über das Mobilitätsreferat. Retrieved from https://stadt.muenchen.de/infos/portrait-mobilitaetsreferat.html

MVV (2022a). Inzell-Initiative. Retrieved from https://www.mvv-muenchen.de/mvv-und-service/die-mvv-gmbh/projekte/inzell-initiative/index.html

MVV (2022b, December 12). MoveRegioM: Umweltfreundliche und sichere Mobilität für die Stadt und die Region München. Retrieved from https://www.mvv-muenchen.de/mvv-und-service/die-mvv-gmbh/projekte/moveregiom/index.html

MVV (2022c, December 12). Der MVV-Verbundgedanke. Retrieved from https://www.mvv-muenchen.de/mvv-und-service/der-mvv/der-verbundgedanke/index.html

MVV (2023). Der MVV-Fahrgastbeirat. Retrieved from https://www.mvv-muenchen.de/mvv-und-service/der-mvv/fahrgastbeirat/index.html

Nullmeier, F., & Kuhlmann, J. (2022). Introduction: A Mechanism-Based Approach to Social Policy Research. In J. Kuhlmann & F. Nullmeier (Eds.), *Causal Mechanisms in the Global Development of Social Policies* (pp. 3–29). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-91088-4_1

Pangbourne, K., Mladenović, M. N., Stead, D., & Milakis, D. (2020). Questioning mobility as a service: Unanticipated implications for society and governance. *Transportation Research Part a: Policy and Practice*, *131*, 35–49. https://doi.org/10.1016/j.tra.2019.09.033

Pangbourne, K., Stead, D., Mladenovic, M., & Milakis, D. (2018). The Case of Mobility as a Service: A Critical Reflection on Challenges for Urban Transport and Mobility Governence. In G. Marsden & L. Reardon (Eds.), *Emerald Points. Governance of the Smart Mobility Transition* (pp. 33–48). Bingley: Emerald.

Paulsson, A., & Hedegaard Sørensen, C. (2020). Smart Mobility and Policy Instruments: Broadened Definitions and Critical Understandings. In A. Paulsson & C. Hedegaard Sørensen (Eds.), *Shaping Smart Mobility Futures: Governance and Policy Instruments in Times of Sustainability Transitions* (1-16). Bingley: Emerald Publishing Limited.

Plehwe, D. (2008). Transformation europäischer Governance im Bereich Verkehrspolitik. *Integration - Vierteljahreszeitschrift Des Instituts Für Europäische Politik*, *31*(3), 290–306.

Ponti, M., Boitani, A., & Ramella, F. (2013). The European transport policy: Its main issues. *Case Studies on Transport Policy*, *1*(1-2), 53–62. https://doi.org/10.1016/j.cstp.2013.07.002

Prainsack, B., & Pot, M. (2021). *Qualitative und interpretative Methoden in der Politikwissenschaft. utb Politikwissenschaft: Vol. 5584*. Wien: Facultas.

Railforum (2021, January 4). About us | Railforum. Retrieved from https://www.railforum.nl/over/about-us

Rehme, M., Richter, S., Temmler, A., & Götze, U. (2018). Urbane Mobilitäts-Hubs als Fundament des digital vernetzten und multimodalen Personenverkehrs. In H. Proff & T. M. Fojcik (Eds.), *Research. Mobilität und digitale Transformation: Technische und betriebswirtschaftliche Aspekte* (pp. 311–330). Wiesbaden: Springer Gabler.

Rivier (2022). Brengt mobiliteit samen. Retrieved from https://rivier.io/

Rover (2022). Over Rover. Retrieved from https://www.rover.nl/vereniging/over-rover

Ruhrort, L. (2020). Reassessing the Role of Shared Mobility Services in a Transport Transition: Can They Contribute the Rise of an Alternative Socio-Technical Regime of Mobility? *Sustainability*, *12*(19), 1–24. https://doi.org/10.3390/su12198253

Ruprecht Consult (2019). *Guidelines for Developing and Implementing a Sustainable Urban Mobility Plan: Second Edition*. Retrieved from https://www.eltis.org/sites/default/files/sump_guidelines_2019_interactive_document_1.pdf

Sack, D. (2014). Mehrebenenregieren in der europäischen Verkehrspolitik. In W. Canzler, A. Knie, & O. Schwedes (Eds.), *Handbuch Verkehrspolitik* (Vol. 27, pp. 1–17). Wiesbaden: Springer Fachmedien Wiesbaden. https://doi.org/10.1007/978-3-658-04777-1_9-1

Sack, D. (2016). Mehrebenenregieren in der europäischen Verkehrspolitik. In O. Schwedes, W. Canzler, & A. Knie (Eds.), *Handbuch Verkehrspolitik* (pp. 189–210). Wiesbaden: Springer. https://doi.org/10.1007/978-3-658-04693-4_9

Schmitter, P. C. (2002). Participation in Governance Arrangements: Is there any reason to expect it will achieve "Sustainable and Innovative Policies in a Multi-Level Context"? In J. R. Grote & B. Gbikpi (Eds.), *Participatory governance: Political and societal implications* (pp. 51–69). Opladen: Leske + Budrich.

Schreier, M. (2012). *Qualitative content analysis in practice* (First published 2012). London: Sage.

Schwanen, T., Banister, D., & Anable, J. (2011). Scientific research about climate change mitigation in transport: a critical review. *Transportation Research Part a: Policy and Practice*, *45*, 993–1006. Retrieved from https://aura.abdn.ac.uk/bitstream/handle/2164/3264/Schwanen_et_al_TRA_revised2_submitted.pdf;jsessionid=59145B7DA79E4EBA8D17D48906155D84?sequence=1

Schwedes, O. (2023). *Transport in capitalism: Transport policy as social policy*. *Sociology*. Bielefeld: transcript Verlag. Retrieved from https://www.degruyter.com/document/doi/10.1515/9783839464519/pdf https://doi.org/10.1515/9783839464519

Shaheen, S., & Chan, N. (2016). Mobility and the Sharing Economy: Potential to Facilitate the First- and Last-Mile Public Transit Connections. *Built Environment*, *42*(4), 573–588. https://doi.org/10.2148/benv.42.4.573

SHARE-North project (2022, December 12). New concept in Flanders "Mobihubs", Interreg VB North Sea Region Programme. Retrieved from https://northsearegion.eu/share-north/news/new-concept-in-flanders-mobihubs/

Sheller, M. (2018). *Mobility justice: The politics of movement in the age of extremes* (First published.). London, Brooklyn, NY: Verso.

Sonnberger, M., & Graf, A. (2021). Sociocultural dimensions of mobility transitions to come: introduction to the special issue. *Sustainability: Science, Practice and Policy*, *17*(1), 174–185. https://doi.org/10.1080/15487733.2021.1927359

STIB-MIVB (2022). Mission, vision et responsabilité sociétale. Retrieved from https://www.stib-mivb.be/article.html?_guid=10e6fbbe-3c83-3410-448a-bda5dd8921f8&l=fr

Stone, J. (2014). Continuity and Change in Urban Transport Policy: Politics, Institutions and Actors in Melbourne and Vancouver since 1970. *Planning Practice & Research*, *29*(4), 388–404. https://doi.org/10.1080/02697459.2013.820041

Storme, T., Casier, C., Azadi, H., & Witlox, F. (2021). Impact Assessments of New Mobility Services: A Critical Review. *Sustainability*, *13*(6), 1–20. https://doi.org/10.3390/su13063074

Swyngedouw, E. (2004). Globalisation or 'glocalisation'? Networks, territories and rescaling. *Cambridge Review of International Affairs*, *17*(1), 25–48. https://doi.org/10.1080/0955757042000203632

Swyngedouw, E. (2005). Governance Innovation and the Citizen: The Janus Face of Governance-beyond-the-State. *Urban Studies*, *42*(11), 1991–2006. https://doi.org/10.1080/00420980500279869

Team red (2022). *Evaluierung der verkehrlichen Wirkungen von E-Tretrollern: Untersuchung im Auftrag der Landeshauptstadt München*. Endbericht. Berlin.

Tracy, S. J. (2010). Qualitative Quality: Eight "Big-Tent" Criteria for Excellent Qualitative Research. *Qualitative Inquiry*, *16*(10), 837–851. https://doi.org/10.1177/1077800410383121

Tschoerner, C. (2016). A Governance Approach to Sustainable Mobility. In G. Wulfhorst & S. Klug (Eds.), *Sustainable Mobility in Metropolitan Regions: Insights from the Interdisciplinary Research for Practice Application* (pp. 19–31). Wiesbaden: Springer VS. https://doi.org/10.1007/978-3-658-14428-9_2

Van Bree, L., & Brakema, M. (2022, September 14). Ze zijn er eindelijk uit: Den Haag heeft een coalitieakkoord. *Omroep West*. Retrieved from https://www.omroepwest.nl/nieuws/4623059/ze-zijn-er-eindelijk-uit-den-haag-heeft-een-coalitieakkoord

Van Meegdenburg, H. (2022). Process Tracing. In P. A. Mello & F. Ostermann (Eds.), *Routledge Handbook of Foreign Policy Analysis Methods* (pp. 405–420). London: Routledge. https://doi.org/10.4324/9781003139850-31

VCÖ (2018). In neun Wiener Bezirken ist trotz Bevölkerungswachstum Zahl der Autos seit 2005 gesunken. Retrieved from https://vcoe.at/presse/presseaussendungen/detail/20181109-pkw-bestand-wien

Vennesson, P. (2013). Case studies and process tracing: theories and practices. In D. Della Porta & M. Keating (Eds.), *Approaches and methodologies in the social sciences: A pluralist perspective* (5th ed., pp. 223–239). Cambridge, New York: Cambridge University Press. https://doi.org/10.1017/CBO9780511801938.013

Verlinghieri, E., & Schwanen, T. (2020). Transport and mobility justice: Evolving discussions. *Journal of Transport Geography*, *87*, 102798. https://doi.org/10.1016/j.jtrangeo.2020.102798

Vienna (2015). *STEP 2025 - Thematic Concept: Urban Mobility Plan Vienna*. Wien.

Vienna (2018). *Leitfaden Mobilitätsstationen // Leitfaden Mobilitätsstationen: Die Umsetzung von Mobilitätsstationen in Stadtentwicklungsgebieten am Beispiel Zielgebiet Donaufeld, Wien. // Die Umsetzung von Mobilitätsstationen in Stadtentwicklungsgebieten am Beispiel Zielgebiet Donaufeld, Wien*. *Werkstattbericht: Vol. 179*. Wien: Stadt Wien, Stadtentwicklung und Stadtplanung (MA 18) und Stadtteilplanung und Flächennutzung (MA 21).

Vienna (2021). Hanke/Sima: Stadt Wien startet Ausbau-Turbo: 100 WienMobil Stationen bis 2025. Retrieved from https://www.wien.gv.at/presse/2021/10/20/hanke-sima-stadt-wien-startet-ausbau-turbo-100-wienmobil-stationen-bis-2025

Vienna (2022a). Bevölkerungsstand Statistiken. Retrieved from https://www.wien.gv.at/statistik/bevoelkerung/bevoelkerungsstand/

Vienna (2022b). *Smart Klima City Strategie Wien: Der Weg zur Klimamusterstadt*. Wien.

Wallace, H., & Reh, C. (2020). An Institutional Anatomy and Five Policy Modes. In H. Wallace, M. A. Pollack, C. Roederer-Rynning, & A. R. Young (Eds.), *The new European Union series. Policy-making in the European Union* (8th ed., pp. 67–105). Oxford: Oxford University Press.

Wien.ORF (2021). Verkehr: WienMobil: Stadt plant 100 Stationen. Retrieved from https://wien.orf.at/stories/3126619/

Wiener, A. (2009). Enacting meaning-in-use: qualitative research on norms and international relations. *Review of International Studies*, *35*(1), 175–193. https://doi.org/10.1017/S0260210509008377

Wiener Linien (2021a). Rückblick 2020, Ausblick 2021. „Greener Linien“ und Stadt Wien investieren 503 Millionen Euro in Öffi-Ausbau – 2021 ganz im Zeichen des größten Klimaschutz-Projekts. Retrieved from https://www.wienerlinien.at/r%C3%BCckblick-2020-ausblick-2021

Wiener Linien (2021b). Wiener Linien ziehen positive Bilanz zu Öffi-Jahr 2021: Trotz anhaltender Coronakrise positiver Trend zu den Öffis erkennbar. Retrieved from https://www.wienerlinien.at/jahresr%C3%BCckblick-2021

Wiener Linien (2022). WienMobil Stationen. Retrieved from https://www.wienerlinien.at/wienmobil/stationen

Zimmermann, K. (2008). Eigenlogik der Städte – Eine politikwissenschaftliche Sicht. In H. Berking & M. Löw (Eds.), *Interdisziplinäre Stadtforschung: Vol. 1. Die Eigenlogik der Städte: Neue Wege für die Stadtforschung* (pp. 208–230). Frankfurt/M.: Campus Verlag.

13. ANNEX I: INTERVIEW GUIDELINE

SmartHubs project – Guideline for Expert Interviews

Prof. Dr. Antonia Graf & Julia Hansel, University of Münster

Contact: Julia Hansel, Julia.hansel@uni-muenster.de

Background SmartHubs and Task 2.4

The SmartHubs project examines mobility hubs as part of intermodal mobility and shifting towards inclusive, sustainable urban mobility and accessibility. The main objective is to assess if a co-designed, user-centric development can enable mobility hubs to support the mobility transition. SmartHubs will examine, develop, and apply research methods and tools in SmartHubs Living Labs in Brussels, Rotterdam / The Hague, Munich, Vienna, and Istanbul. The interviews in work package 2, task 2.4, aim to elaborate on the governance framework of the hubs in the living labs (LLs).

Theoretically, the governance framework in task 2.4 draws on the so-called governance arrangements (see for instance, Arts, Tatenhove 2004; Leroy, Arts 2006; Swyngedouw 2005). Based on these theoretical considerations, data will be gathered via expert interviews in four units: 1) structural components, 2) policy instruments, 3) normative drivers, and 4) discursive negotiations.

Methodological background

Expert interviews aim at generating additional local knowledge from insiders within the living labs. Based on Leroy and Arts (2006), one can understand mobility hubs as multi-level, multi-sector, and multi-actor governance constructions. Therefore, experts from different fields and governance levels will be interviewed. Following the notion of society-centered research (Verlinghieri, Schwanen 2020), the crucial role of the state is still recognized but supplemented by considering a broader range of actors, practices and knowledges, such as businesses or NGOs. The texts (transcripts) will be analyzed with a content analytical proceeding based on Schreier (2012) with the help of the software MAXQDA.

- We conduct semi-structured interviews.
- Flexibility of the guideline: Due to the specific experts and institutions, the interview guideline will be adjusted accordingly, not all questions will be asked in every interview.
- There are 30 interviews calculated, each will last about 60min. In each case 4-6 interviews will be conducted.
- If possible, all interviews will be recorded and transcribed (continuously).
- Interviews will be conducted in English, if possible. Alternative languages are German and French.

Data privacy and consent form

- The experts are asked to sign a declaration of consent to use the transcript of the interviews for scientific purposes and the writing of a project report.
- The interviewer ensures that data protection guidelines of the local university are followed.

Questions

Information on Expert

Which institution / company / NGO are you working for?

What is your position and how long do you work in your position and in this field in general?

In which way does your work correlate with the SmartHub and the LivingLab (LL)?

What are the priorities of your institution for regarding mobility?

In which way or based on what indicators and criteria do you think your work will be considered as successful or unsuccessful?

Actor, Resources and Networks

What role does the concept of multimodality, and the implementation of mobility hubs play in your institution?

Which resources does your institution dispose of (Resources might include financial, human, legal resources, etc.)

Which dependencies influence your work and what are major constraints?

Who are partners in your work regarding the planning / implementation / operation of the mobility hubs?

In the context of mobility hubs, which official networks are you members of?

How far are these networks valuable for your work?

Do you have contact or even cooperate with civil society groups, citizens or users?

Did you ever experience open dissensus or conflicts within your institution or with other stakeholders?

Policy instruments / planning documents

Could you name the legal framework(s) of your work?

Do you work with planning documents? Could you name them?

About policy instruments, how does the implementation work? What are the biggest barriers in the implementation?

If relevant: Local situation in the SmartHub

Think of the existing built infrastructure in XY: How does it influence the process of setting up and operating a mobility hub?

What is the desired outcome for SmartHub?

Local mobility policies and public debate

Again, think of the existing built infrastructure in the city / region: How does it influence the process of promoting multimodal mobility and operating a mobility hub?

Is the mobility transition subject of public debate in your city / region / country?

What goals are associated with the planning / building of the mobility hubs in your city / region?

Are there other political goals associated with mobility transition?

Final remarks and additional thoughts

Think about your colleges and work environment, does a person come into your mind, that might be able to contribute additional input on the questions or specific aspects of the interview question?

Is there anything you would like to add? Do you feel we missed something important on the topic?