



Understanding Planning Practices for Active Intermodality

A Comparative Case Study between Stuttgart/Germany and
Gothenburg/Sweden from a Collaborative Perspective

Student: Hannah Heubeck
Urban Studies: Masters (Two-Years) Thesis
Supervisor: Robert Hrelja
Spring Semester 2024

Summary

Nowadays, cities are facing air and noise pollution due to the high amount of motorized transport. This impacts the inhabitants' health negatively. Thus, scholars and planners suggest a shift towards a more sustainable urban transport scheme, including the integration of biking and walking with public transport. This is part of active intermodality – the combination of at least two modes in one single trip – which is crucial for facilitating that shift successfully. This results in the aim of this thesis which is to understand planning practices for active intermodality and aims at answering the research question: How can active intermodality be improved?

This thesis is a comparative case study of Stuttgart/Germany and Gothenburg/Sweden. Their comparison will offer valuable insights into the planning processes due to their differing organizational and legal structures. To answer the research questions, the methods used were a literature review to understand the relevance and term of intermodality; a policy document analysis to see if the planning processes in both cities include intermodal measures and to find out who is responsible; and lastly, qualitative semi-structured interviews with responsible planners to further understand the implementation of active intermodality. The literature highlights that active intermodality can be best planned through an integrative planning approach, because many actors are involved. Therefore, the theory of collaboration was used to analyze the collaboration between planners in both cities.

Both Stuttgart and Gothenburg aim for a more sustainable and intermodal transport network which is reflected by their policies. The approach to reach that goal is different in each city because Stuttgart's planning system is rather top-down while the planners in Västra Götaland/Gothenburg have more freedom of choice. Despite those differences, both cities highlight the importance of collaboration when it comes to planning for active intermodality. In line with the documents, interviews with planners confirmed that intermodal measures are covered by the planning process, yet the collaborative structures differ immensely. Moreover, the analysis of the interviews identified two barriers that the planning processes for active intermodality in both cities are facing. The first barrier is the planning systems that hardly allow comprehensive planning processes for intermodality, because both cities are still caught up in old administrative structures that oftentimes favor the cars. To overcome this, the theoretical framework suggests stronger leadership and mandates to establish a better collaboration. Despite the fact that there is an overall agreement of all actors that intermodal measures are necessary, priorities regarding the implementation of such measures differ among them. This calls for a joint problem definition and joint action to reach a better understanding of each other, according to the theory. Although planners face the same barriers, solutions are handled differently: planners in Stuttgart focus on discussing case-by-case in case a certain measure is not already covered yet while planners in Västra Götaland/Gothenburg are trying to establish collaborative structures to find a solution in the long-run.

To conclude, this thesis demonstrates that collaborative planning for active intermodality is crucial for its successful implementation and improvement. The theoretical framework gave a valuable insight in what can be improved in collaboration to further facilitate active intermodality, however, the limits of the theory are regulations the planners have to stick to.

Keywords:

Active Intermodality, Integrated Land-Use and Transport Planning, Public Transport, Biking, Walking

Table of Contents

ACKNOWLEDGEMENTS	V
ILLUSTRATIONS.....	VI
1. INTRODUCTION.....	7
2. METHODS	10
2.1 LIMITATIONS	13
3. LITERATURE REVIEW.....	14
3.1 PUBLIC TRANSPORT AND PLANNING.....	14
3.2 INTERMODALITY AND PLANNING	15
3.3 ACTIVE INTERMODALITY AND PLANNING	17
3.4 SHORT SUMMARY.....	18
4. THEORY OF COLLABORATION	19
5. RESULTS.....	22
5.1 POLICY DOCUMENT ANALYSIS	22
5.1.1 <i>The German Case: Stuttgart</i>	22
5.1.2 <i>The Swedish Case: Gothenburg</i>	30
5.1.3 <i>Summary and Comparison</i>	37
5.3 PLANNING PRACTICES.....	39
5.3.1 <i>What Barriers could be identified?</i>	40
5.3.2 <i>Summary and Comparison</i>	46
6. CONCLUSION	50
6.1 POLICY RECOMMENDATIONS.....	51
6.2 FURTHER RESEARCH	51
REFERENCES.....	53
APPENDIX.....	59
STATUTORY DECLARATION.....	61

Acknowledgements

I would like to thank my supervisor Robert Hrelja for our countless meetings and his constant feedback on my research process. I am also very thankful to K2, where I could write my thesis among transport researchers that gave me a valuable insight into the world of academic research and inspired me in different ways. A special thanks goes to the VTI governance cluster which I was able to attend a few times while I was writing my thesis. I would also like to thank Jens Alm from VTI who made it possible to have an insight into his research project “Integrating biking with public transport” which my thesis was mainly based on. Furthermore, I would like to thank him for connecting me to planners that I interviewed for my thesis.

I would also like to thank Daniel Johnson for his careful correction of the grammar of this thesis as well as Alan and Kim for their feedback on the overall readability and conciseness of it.

Illustrations

Tables

Table 1: List of Interviewees.....	12
------------------------------------	----

Figures

Figure 1: Framework of the Theory of Collaboration.....	20
Figure 2: The German Planning System	22
Figure 3: Map of Stuttgart.....	24
Figure 4: Public Transport Network in the Inner-City of Stuttgart.....	25
Figure 5: Modal Split of Stuttgart.....	26
Figure 6: Planning Process for Public Transport in Stuttgart	28
Figure 7: The Swedish Planning System	30
Figure 8: Local/Regional Public Transport Planning.....	31
Figure 9: Map of Gothenburg	32
Figure 10: Public Transport Network in Gothenburg	33
Figure 11: Modal Split of Gothenburg.....	33
Figure 12: Planning Process for Public Transport in Gothenburg	35

1. Introduction

Cities all over the world are facing air pollution and congestion due to a high share of motorized transport within their borders (Pazzini et al. 2022). A reduction of especially car traffic and shift to more sustainable modes would go hand in hand with less noise and air pollution as well as less negative impact on the environment. Those aspects pose a threat on the health of the cities' residents. More sustainable modes of transport could reduce emissions and thus increase urban livability (Gössling 2013). Such modes encompass all non-motorized alternatives, walking, biking and taking public transportation being the most important ones to tackle motorized traffic. This would further increase livability as inhabitants would not be exposed to any kind of pollution, therefore bettering their health (Sagaris et al. 2017; Willing et al. 2017). Furthermore, cars are mostly parked and take up space that could be used otherwise. Especially in bigger cities, where the population is expected to grow, lots of space could be used differently if it were not for cars. Moreover, inhabitants would benefit from a shift to more active transport modes due to a more active lifestyle. With the climate crisis on the doorstep, transport planners have become more and more aware of the downsides of motorized traffic (Pazzini et al. 2022). Therefore, transport planners have started to focus on sustainable modes of transport such as biking, walking and public transportation, as they are seen as the most promising modes for a shift to more sustainable transport networks in cities.

In order to be a serious competitor for motorized traffic, sustainable modes such as walking, biking and public transport need to be more attractive, more accessible, and comfortable (Pazzini et al. 2022). According to Oostendorp et al. (2019), factors such as mixed land-use patterns, higher population density or a variety of different modes of transport could encourage inhabitants to combine different modes instead of only taking the car (Oostendorp et al. 2019). Additionally, more travel options would be given through a combination of those modes, meaning that they could bike to a station or bus stop, for example. Most of all, public transport plays a major part in urban transport networks in most European big cities and therefore should be encouraged. A solution could be a better integration of modes such as walking and biking to cover the last-mile to a bus stop or train station which would further encourage many inhabitants to choose public transport as a feeder mode over the car. Thus, a shift from car traffic to a more sustainable transport network would be encouraged. Furthermore, less car traffic relieves cities through freeing up streets and parking lots which could then be used differently (Oostendorp et al. 2019). The combination of different kinds of modes of transport in one single journey is called intermodality, which requires more than just a well-functioning public transport system, as Oostendorp et al. (2019) points out.

Intermodality is per definition the usage of two or more modes of transport within one trip (Willing et al. 2017). It improves quality of life as well as urban life because intermodal trips tend to motivate inhabitants to leave their cars or bikes parked at a train station, therefore also improving their health by potentially choosing more active modes of transport (Pazzini et al. 2022). Apart from taking the car, more active modes of transport could solve the last-mile problem, especially in cities with higher population density and a well-connecting street

network where inhabitants do not face obstacles when trying to reach a train station or bus stop. Thus, intermodality – a seamless journey using different modes – has the potential to serve as a solution to the problem mentioned above by shifting car traffic to a combination of more sustainable modes of transport. Thus, the thesis focuses on active modes of transport such as walking and biking combined with public transport.

As pointed out by Oostendorp et al. (2019), intermodality isn't just a question of transport, but also of space (Oostendorp et al. 2019). Different factors play into a successful integration of intermodal trips that need to be considered. For example, a well-established street and bike network is needed to combine walking and biking with public transport, or parking facilities need to be offered near bus stops and train stations. Typically, different modes are planned by different organizations or departments. In order to integrate them successfully, a cooperation is needed. Especially in times of deregulation and privatization where private stakeholders are suddenly involved in public issues, cooperation is needed between all parties to provide seamless intermodal journeys. First and foremost, it is extremely necessary for land-use and transport planning departments to be included (Waddell 2016). Therefore, cooperation between those actors needs to be understood and eventually improved upon.

So far, little research has been done into understanding the interplay between land-use and transport planning departments as well as with other relevant actors regarding the planning of active intermodal journeys. Mostly, factors have been described that could encourage intermodality. This thesis is an attempt to understand planning practices of active intermodality both in theory and practice. Literature points out that some kind of cooperation is needed because a single player would not be able to reach the goal of implementing intermodality, however, little has been done to understand collaborative planning practices and how they facilitate or hinder active intermodality. Therefore, the aim of this thesis is to understand the collaboration between planners in Stuttgart/Germany in comparison with Gothenburg/Sweden, to point out barriers and how they can be overcome by using the theory of collaboration. Thus, the research question of this thesis is: how can active intermodality be improved?

First, a literature research will be done to further understand the term intermodality, its role in the urban transport network and to research planning practices that are needed to successfully implement intermodality. Since intermodality is about to be a big part of public transport, a transport policy document analysis will be done to understand the definition of intermodality in each city and to understand how it is planned for. The *Sustainable Urban Mobility Plan* for Stuttgart and the *Transport Provision Programme* for Västra Götaland will be mainly used, together with some additional planning documents based on those two plans. To complement the transport policy analysis, interviews with relevant planners will fill the information gap to deeper understand planning practices of active intermodality.

The steps described above are based on the following research question in the following order:

1. How is active intermodality defined in literature?
2. How is active intermodality defined and who is responsible for the planning of it in each city?
3. How is active intermodality actually planned for? What are the barriers and how can they be overcome?

The data will then be used to discuss planning practices in Stuttgart and Gothenburg against the background of their respective planning system, the literature research, the theory of collaboration, and the transport policy documents to understand each respective planning approach, potential barriers and how they can be overcome to plan more effectively for active intermodality and eventually, improve it.

2. Methods

Three different methods were used to research planning practices for active intermodality. Firstly, a literature review was done to further understand intermodality and what is needed for a more successful implementation of it. Secondly, a policy document analysis was done to understand the cities' definition of intermodality and how it is planned for as well as to place public transport planning in the context of their own planning system. Lastly, there is a risk that the documents will not provide enough information and therefore, qualitative semi-structured interviews with responsible planners in different departments were conducted to further understand how planning regarding intermodality is actually done.

The cases of this thesis are Stuttgart in Germany and Gothenburg in Sweden. Both cities are the capitals in their state and county, Stuttgart in the state of Baden-Württemberg and Gothenburg in the Västra Götaland County and act on a similar administrative level. Additionally, the number of inhabitants in those cities is approximately the same, with Stuttgart having a higher population density since Gothenburg's municipal area is twice as big as Stuttgart's. More importantly, Stuttgart and Gothenburg focus on the integration of biking and walking with public transport to facilitate a shift to a more sustainable transport network, thus have similar goals regarding intermodality. A comparison between the two cities is especially interesting because of their differences in legal and organizational structures that affect the planning process in different ways. Therefore, their comparison could provide more knowledge on the topic.

Literature Review

To understand and further define the term active intermodality, its relevance and supporting planning practices, three Google Scholar searches in exclusively English were carried out. Suitable articles are based on keywords such as urban mobility or passenger transport.

Firstly, the keywords "public transport" AND "planning" were used for the first search and seven articles were found and read. Understanding current urban public transportation planning processes point out that especially intermodal journeys are becoming more and more important in sustainable urban public transport planning. The review also showed that little was done to improve intermodal journeys despite their relevance. Therefore, a second Google Scholar search using the keywords "intermodality" AND "planning" was done to understand the measures taken for intermodality. Nine articles were read to highlight measurements taken to further define the term intermodality. It is highlighted that especially active intermodal journeys – meaning biking and walking – have a great potential as feeder mode to public transport and should therefore be better planned for. Lastly, a Google Scholar search using the keywords "active intermodality" AND "planning" was done to define the term active intermodality and to further understand contemporary planning practices regarding the integration of walking and biking with public transport. Five articles were read that mention that planning for active intermodality is more complex as it involves the connection of different active modes of transport.

Policy Document Analysis

According to the literature, integrated land-use and transport planning is crucial when it comes to intermodality, among other things. As the focus of this thesis is on active intermodality,

especially on the integration of biking and walking with public transport, transport planning documents were read to understand the definition of intermodality and how it should be planned based on those documents. Therefore, this analysis requires to investigate documents of each city that are significant in the planning for sustainable transport. Thus, the *Sustainable Urban Mobility Plan (SUMP)* in Stuttgart and the *Transport Provision Programme* in Gothenburg were of relevance and used for this analysis. Those documents describe measures taken for sustainable transport such as integrating biking and walking with public transport. Therefore, those documents served as a first insight into the planning for active intermodality. The *SUMP* was read in German and the Transport Provision Plan was read in Swedish, therefore, quotes from those documents were translated into English by the author. Both documents contain information on how public transport is planned for as well as other aspects that are currently important when planning for public transport. This thesis is an attempt to understand the integration of biking and walking with public transport, which is why the starting point is analyzing those documents. Based on them, a network map was drawn to pinpoint responsible actors in the planning process that were contacted as first interviewees in the next step. Lastly, the cities of Stuttgart and Gothenburg were compared based on the information given in the documents but also against the background of their planning systems. It is important to understand the overall planning system in each country, and to place transport planning within the system to eventually identify important factors that impact the planning process. Therefore, an overview of the general planning practices was given to serve as a background to understand responsibilities of different actors.

Interviews

The last method used were interviews which gave deeper information on planning practices regarding active intermodality in Stuttgart and Gothenburg.

5 semi-structured interviews were conducted virtually between 09th of April – 23rd of April 2024 and lasted between 45 and 60 minutes. The interviews were supported by an interview guide to get further information on the view of intermodality of each Interviewee as well as a deeper understanding of its planning processes (see interview guide in Appendix). The interviews covered questions regarding the Interviewee's own role in their organization, how they are involved in planning processes for intermodal measures, the collaboration within their own organization and with other actors as well as facilitating and hindering factors of the collaboration. The interviews were qualitative semi-structured interviews with planners working in different departments and organizations, responsible for public transport (see table 1 on page 12). Interviews with Swedish planners were conducted in English, interviews with German planners were conducted in German. Therefore, quotes from interviews held in German were translated into English when they were used in this thesis.

<i>Interviewee</i>	<i>Organization</i>	<i>Role</i>
1	Office of Urban Planning and Renewal/Stuttgart	Head of the Department
2	Västtrafik/Gothenburg	Planner working with Bicycle-related Questions
3	Västra Götalandsregionen/Gothenburg	Regional City Planner
4	Västtrafik/Gothenburg	City Development/City Planner
5	Office of Civil Engineering/Stuttgart	Head of the Department

Table 1: List of Interviewees

A first selection of Interviewees was based on the documents. The *Sustainable Urban Mobility Plan* of Stuttgart stated that the Office of Urban Planning and Renewal and Stuttgarter Straßenbahn AG (SSB AG) are mainly working with public transport, while the *Transport Provision Programme* of Gothenburg said that Västtrafik, Västra Götalandsregionen and the City of Gothenburg are responsible for public transport. Interviewees from these organizations were contacted first before using a snowball system and asking them about other involved actors that weren't described in the plans. Even though SSB AG was contacted in the first round, no response was received. Therefore, SSB AG could not be interviewed. The specific Offices of Civil Engineering in Stuttgart and City Building in Gothenburg were contacted after the first interviews, as they were recommended. Unfortunately, no response was received from the Office of City Building in Gothenburg in the second round and therefore, could not be interviewed. Furthermore, the traffic authority in Stuttgart could not be interviewed – after a recommendation by the Office of Civil Engineering – due to time constraints.

The interviews were recorded with the approval of the Interviewees. The interview data was treated confidentially, saved on the laptop for further transcriptions, names were blackened, especially in the transcriptions. Transcripts were not added to the appendix to ensure the Interviewees anonymity, as several heads of offices were interviewed. Important for the transcription was the meaning of said things rather than the language used which is why a simple transcribing system was used. In the following analysis and discussion, a gender-neutral language was used to make the Interviewees gender unrecognizable. The transcripts were analyzed by printing them out and using codes manually. The codes were based on the theoretical background and important aspects of the literature review regarding intermodality and collaboration. This first deductive coding approach was complemented by an inductive coding approach, building categories not only on the theoretical background but also on things said by Interviewees. There was no software used because the number of interviews could be handled manually. This qualitative content analysis was used to analyze the data given in the interviews.

2.1 Limitations

One crucial limitation of this thesis and to its scope is time constraints. Therefore, only a part of the entire planning process was attempted to be analyzed, even though understanding the entirety of a system would shed more light on the issues discussed in this thesis. More information could have been added to this analysis but unfortunately, Interviewees could not be reached. Furthermore, certain aspects, such as funding or politics, have not been investigated, even though they were mentioned several times by Interviewees to play an important role in the overall planning process. Focusing on those aspects would have been beyond the scope of this thesis. Moreover, interviews were transcribed and analyzed, but due to the lack of time this thesis was restricted by, simple methods were used to do so.

3. Literature Review

A total of 21 articles was read using the keywords public transport, intermodality and active intermodality to understand the definition of the term as well as common planning practices. This chapter will be divided into the subchapters Public Transport and Planning, Intermodality and Planning as well as Active Intermodality and Planning.

3.1 Public Transport and Planning

First of all, it is important to understand why intermodal journeys have become so important in contemporary urban transport planning. Therefore, seven articles were read regarding planning for public transport to understand the crucial role intermodality is playing nowadays. While highlighting different measures that improve the modal split of public transport in cities, six out of seven articles stress the importance of connecting different modes of transport to facilitate sustainable urban transport after focusing on one specific measure (Manaugh et al. 2015; Wong et al. 2018; Geurs 2018; Waddell 2016; Litman 2017; Newman et al. 2016). One article focuses on the environmental impact of urban motorized traffic and suggests alternatives to decrease pollution, for example (Nieuwenhuijsen 2016).

Firstly, the articles stress problems the current transport system faces. Cities struggle with environmental problems due to the high amount of motorized traffic, therefore trying to find solutions to decrease pollution (Manaugh et al. 2015; Waddell 2016). One solution is to improve quality and connectivity of transport systems by paying more attention to the last-mile problem and its coverage (Litman 2019). Therefore, Newman et al. (2016) state that “*transport is the maker and breaker of cities*” (Newman et al. 2016), calling for an overlap of different modes of transport. Important for an overlap to work is accessibility, which the studies of Manaugh et al. (2015), Geurs (2018) and Wong et al. (2018) focus on. Accessible bus stops and train stations could encourage people to take them more frequently. Especially walking and biking can be used as a feeder mode to solve the last-mile problem to bus stops and train stations while reducing CO₂ emissions (Litman 2019). Factors encouraging the integration of these modes with public transport are a high population density, mixed land-use and transfer points (Newman et al. 2016). Therefore, an integrated planning approach is emphasized by Waddell (2016), Litman (2019) and Nieuwenhuijsen (2016). Furthermore, Waddell (2016) stresses the need for land-use and transport departments to work closely intertwined in order to integrate sustainable modes with public transport to tackle environmental issues in urban areas

As almost all authors have stated, connecting different modes of transport facilitates sustainable modes of transport through a variety of measures, shifting away from motorized transport means through an integrated planning approach. This is exactly why so-called intermodal journeys became more important, to better air quality, reduce noise, and increase livability in cities. Despite the relevance of intermodal journeys, none of the articles discusses in detail how to carry out a scheme towards the integration of intermodality in current urban transport networks. To fill the gap of not knowing how to integrate seamless intermodal journeys, another Google Scholar search was done to understand how intermodality has been planned for so far in practice.

3.2 Intermodality and Planning

The first Google Scholar search has proven the importance of intermodal journeys. The question remains, how is intermodality planned for best and which measures are important to take? Therefore, a second Google Scholar search focused on “intermodality” and “planning”. This section is to shed light on planning practices of intermodality as well as its measures taken in the urban context. Terms such as integration, accessibility, connectivity, and street design recur the most and are mostly focused on by articles dealing with improvements of intermodality in the urban area. Therefore, this section is divided into the subcategories integration, accessibility, connectivity, street design and how they are best planned for, according to the literature.

Integration

The term integration refers to the technical integration and thus, combination of different modes of transport in online-platforms and apps to improve seamless intermodal journeys. The problem behind a fragmented public transport system is usually high costs of tickets for different parts of the journey as well as time-consuming travels. Willing et al. (2017) addresses the question of how information providers can cooperate and include all modes of transport, thereby improving intermodal transport behavior by taking walking and biking into account (Willing et al. 2017). Therefore, the article suggests that mobility platforms should continue to work on integrating all means of transport in one app in order to save time and costs for travelers.

Accessibility

Accessibility describes the access to and from public transport as well as the distance and travel time to a specific location (Oostendorp et al. 2019). For example, well accessible bus stops, and train stations are more likely to be found in neighborhoods with a well-established street network that integrates biking and walking and makes it possible for users to access public transport quickly and safely. The study of Oostendorp et al. (2019) found that, among other things, that good access to bus stops and train stations contributes positively to the use of public transport (Oostendorp et al. 2019). Using Berlin as an example, it was shown that the accessibility of various locations depends heavily on the part of town. The worse the accessibility, the more likely a car is used. This is due to the fact that with generally poorer connections, longer distances have to be overcome to get to bus stops or train stations. Moreover, the study showed that with good connections and accessibility, intermodal journeys are on average faster than unimodal journeys. Furthermore, Bell (2019) stresses the overall importance of accessibility and usability of links between different modes of transport and between train stations and bus stops which should be a focus when planning for intermodal journeys (Bell 2019). Generally, levels of intermodality are higher in denser regions and therefore, accessibility and attractiveness of public transport.

Connectivity

Good connectivity stands for a minimization of transfers, availability of information for the entire route and the adaptation of schedule and network (Allard & Moura 2016). Allard & Moura

(2016) focus on improving passenger connectivity and emphasize that research largely relates to access, policies, and transfer time (Allard & Moura 2016). They conclude that passenger connectivity can be strengthened primarily with consistent land-use and transport policies. This requires more collaboration between planners and an efficient distribution of financial resources among different modes of transport. In addition to Allard & Moura (2016), Bernal (2016) also emphasizes that with improved connectivity, waiting and walking time can be reduced and overall, different means of transport can be better integrated (Bernal 2016; Goletz et al. 2020).

Street Design

Street design refers to the physical design of the street network connecting and surrounding bus stops and train stations as well as the design of intermodal facilities (Pazzini et al. 2022; Bernal 2016). Physical design elements include access to emergency services, station layouts and design of platforms, waiting areas, staff facilities and toilets or signage, just to name a few. For example, Pazzini et al. (2022) suggest that by increasing the level of service around (intermodal) transport nodes, public transport could be improved overall (Pazzini et al. 2022). Furthermore, the design and implementation of intermodal transfer nodes depend heavily on the population density, the modal split and the location. In general, Bernal (2016) and Allard & Moura (2016) emphasize that physical design is one of the pillars of intermodality (Allard & Moura 2016; Bernal 2016). Design elements should primarily minimize the walking distance and time and ensure safety and security, which also play an essential role.

An Integrated Planning Approach

All articles read have in common that they recommend an integrated planning approach when it comes to the planning for intermodality (Litman 2019; Geurs 2018; Olvera et al. 2015). Ideally, planners from land-use and transport planning departments need to work together to ensure the physical integration of different means of transport in the urban landscape (Olvera et al. 2015; Allard & Moura 2016). An example of this is provided by the article of Olvera et al. (2015), who study the travel behavior of residents in Lomé/Togo. Due to a relatively weak government, there is hardly any integrated planning of land use and transport, which means that changing modes of transport is quite expensive and inconvenient, making it less user-friendly. The paper proposes to strengthen the government and to draw up a binding transport policy. Additionally, Allard & Moura (2016) argue from the opposite perspective and emphasize that an integrated transport policy could potentially strengthen the cooperation between various actors by setting a common goal (Allard & Moura 2016). Goletz et al. (2020) take a third perspective and stress that the integration of different means of transport needs be strengthened so that public transport can benefit from it entirely (Goletz et al. 2020). Additionally, Steiner & Irnich (2020) suggest that the integration of for example e-scooters, offered by private providers, could also cover the last-mile (Steiner & Irnich 2020). This mobility-on-demand solution needs to be considered by public authorities in the modern context of transport planning.

This subchapter stresses the need for an integrated land-use and transport planning approach to cover all parts of an intermodal trip. Responsible planning departments need to work together,

and that cooperation needs to be improved. Furthermore, aspects such as integration, accessibility, connectivity and street design are crucial to further improve intermodality through apps, consistent transport and land-use policies, well-connecting street networks or well-designed intermodal facilities. Articles mention that especially walking and biking should be integrated, as they contribute the most to a more sustainable transport network in combination with public transport. Active intermodality – the combination of public transport with either biking and/or walking – was barely mentioned in articles used for this subchapter, despite its relevance. For this reason, the next part of this literature review will focus on planning for active intermodality.

3.3 Active Intermodality and Planning

The previous Google Scholar search has brought to light that the integration of active means of transport is crucial for improving a sustainable transport network, yet unnoticed for the most part. Therefore, a third Google Scholar search attempts to understand how active intermodality is planned for. Crucial to improving public transport is its integration with walking and bicycling. Thus, the articles focus on measures that can be implemented to improve intermodal trips that involve walking and biking (Griffin & Sener 2016). Active modes are gaining more and more importance (Bennaya & Kilani 2023). With better conditions for pedestrians and cyclists, a modal shift to a more sustainable transport could be facilitated and motorized traffic reduced, according to Maltese et al. (2021). Therefore, this part of the literature review will be divided into two sections, namely walking and biking.

Walking

Various measurements could improve walking as a mode of transport and lead to a higher share of pedestrians, one of them being infrastructure intervention and to improve and extend sidewalks (Maltese et al. 2021). Another way to improve walking conditions is to reduce the distance to destinations through a higher population density and mixed land-use within a city. Car free zones could be implemented to further improve urban walkability, for example. Overall, Maltese et al. (2021) stated in their study that the built environment together with density or street connectivity have a big impact on peoples' travel behaviour on foot. Additionally, the thesis of Shrestha (2022) adds the factor accessibility of destinations which is important when it comes to the overall structure of the built environment. Intermodal systems are important when counteracting the negative influence of pollution and traffic and therefore, new guidelines are needed to integrate walking with public transport and thus to improve accessibility and traffic safety (Bennaya & Kilani 2023; Mozos-Blanco et al. 2018). An integrated planning could ensure a well-connected street network to encourage walking.

Biking

Measures to improve bikeability in cities are similar to the ones crucial for walking. Mixed land-use, density, street connectivity, availability of bike lanes and tracks as well as accessibility to places is key when planning for an integration of biking (Maltese et al. 2021; Shrestha 2022). But unlike walking, biking faces different barriers (Griffin & Sener 2016). Safe and secure parking facilities near train stations and bus stops need to be provided, the ownership of a bike is needed, and overall safety on streets and exposure to weather conditions pose as

barriers to biking. These barriers need to be overcome. The studies of Bennaya & Kilani (2023) and Griffin & Sener (2016) highlight the importance of the integration of bike sharing systems at transit stations, giving its users the opportunity to use them as feeder mode. Furthermore, Shrestha (2022) points out that safe parking facilities are very important as well as a safe, direct, comfortable, and attractive bike infrastructure. His study suggests a positive correlation between safe bicycle parking facilities and the willingness of people to bike to a station. Additionally, the catchment area is wider if such facilities are near bus stops or train stations. Shrestha's (2022) article highlighted the need for a collaborative intermodal planning approach to further encourage the implementation of such measures.

The articles have shown that integrating walking and biking with public transport could solve the last-mile problem. A well-connected and safe bike network as well as availability of sidewalks are needed, together with secure bike parking facilities and mixed land-use patterns. The articles suggest an integrated planning approach to ensure the combination of those modes and to be able to plan long-term for intermodality.

3.4 Short Summary

The literature review has shown that intermodal trips are needed to successfully shift to a more sustainable urban transport network. High population density, mixed land-use and a well connecting street network are decisive factors to facilitate seamless intermodal journeys. Accessibility of bus stops and train stations, their connection to destinations and other modes, an integrated transport network where different modes overlap, and a well-established street-design are elements that make up intermodality. Walking and biking play an especially crucial role in covering the last-mile, relieving the city from even more car trips. A well-connected network of sidewalks and bicycle lanes as well as bicycle parking is needed to plan successfully for their integration with public transport. An integrated planning of land-use and transport has been highlighted throughout the literature that can be best used to increase intermodality in cities. All modes need to be holistically investigated and therefore, cooperation is needed between relevant planners and actors in land-use and transport planning departments.

Little has been done in research to understand the interplay between land-use and transport planning, despite their importance regarding the implementation of an intermodal transport system. To fill that gap and to further understand how active intermodality is planned for in practice, a comparative case study of Stuttgart and Gothenburg was carried out regarding current planning practices for active intermodality. The literature review has shown that there is a need to better understand cooperation which is why the theory of collaboration was used to shed more light on the collaboration between the different actors. By theorizing the working-together process, it can be deeper understood and eventually, improved.

4. Theory of Collaboration

The literature review has shown that an integrated planning approach is crucial in order to achieve seamless active intermodal journeys. An integrated planning approach requires cooperation between relevant actors such as municipal authorities like transport and land-use planning departments, private stakeholders and other companies and therefore, needs to be further researched and understood.

Cooperation is defined as a process where individuals work together to reach a shared goal (Schalk & Curşeu 2010). To increase effectiveness within an organization, cooperation is key to achieve a common objective that otherwise could have not been achieved alone. Literature shows that the higher the level of cooperation, the more likely it is to successfully reach a goal. Commonly, cooperation is described as a process within an organization or company. But the times of globalization, privatization and deregulation require new types of cooperation and organization (Thomson et al. 2009; Pettersson & Hrelja 2020). Ways of cooperation are not only needed anymore within an organization, but between them. For example, public sectors such as land-use or transport planning departments nowadays face the issue of controlling an entire public transport or infrastructure network when planning public projects, where outsourced processes are led by private stakeholders and other companies (see section 5.1.1 The German Case: Stuttgart and 5.1.2 The Swedish Case: Gothenburg for a description of the German and Swedish case). This new development, the transition from government to governance, demands new forms of control.

In case of intermodality, different actors are responsible for different parts of the journey (Cannon et al. 2024). Land-use and transport planning departments as well as private stakeholders are involved to reach the goal of seamless intermodal journeys. Therefore, a new theoretical angle is needed to study their form of cooperation.

The establishment of an organizational network by strengthening inter-organizational ties is commonly described as collaboration. Collaboration is as a process where different organizations interact to create new organizational structures to reach a common shared goal (Thomson et al. 2009; Wood & Gray 1991).

Nonetheless, the term collaboration is difficult to define as there is no consensus among researchers regarding a clear definition of the term (Thomson et al. 2009). Similar terms could be partnership, alliance, network, or inter-organizational relations (Huxham 2003). Those terms describe a ‘working-together’ process and are used in all kinds of disciplines and from different theoretical perspectives. Most commonly, interpretation of those terms is based on the subject that is being researched, and little overlap can be found in articles using the same term, according to Huxham (2003) (Huxham 2003).

Therefore, the term collaboration calls for a clear definition and differentiation from other terms. Pettersson & Hrelja (2020) studied the term and suggested a theoretical background based on studies of interorganizational relations, organizational behavior, collaborative planning and governance as well as business (Thomson et al. 2009; Pettersson & Hrelja 2020). This is rooted in the fragmentation of governance nowadays, where decision-making processes appear to be decentralized and dispersed among different organizations and administrative levels (Pettersson & Hrelja 2020).

Thus, collaboration is a process rather than a set situation and recognized as an important and facilitating factor of long-term decision making (Cannon et al. 2024). To understand planning practices for intermodality, practitioners and researchers stress the importance of recognizing collaboration as a crucial part of the planning process (Hrelja et al. 2016). Therefore, parameters are needed to define collaboration.

Generally, literature agrees that key points such as common aims, organization, trust and norms are crucial for a successful collaboration (Huxham 2003; Thomson et al. 2009). Nevertheless, Hrelja et al. (2016) stressed three different qualities to encourage and facilitate collaboration step by step after summarizing existing literature on collaboration:

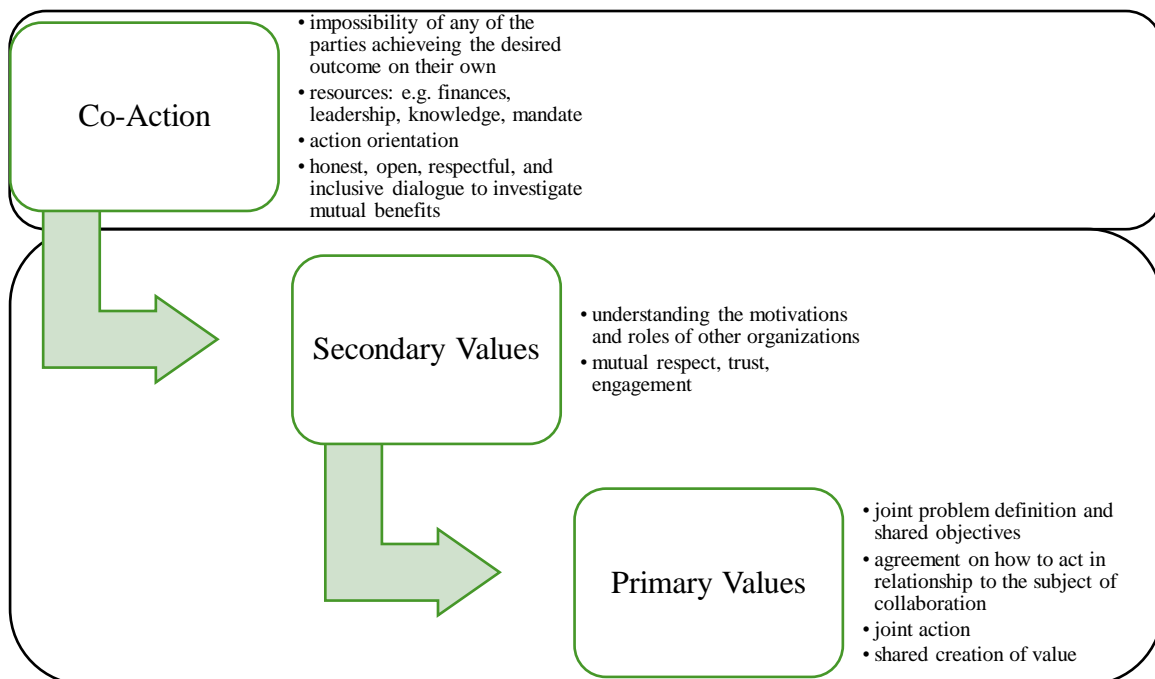


Figure 1: Framework of the Theory of Collaboration, adapted from Hrelja et al. (2016)

As the figure 1 above shows, forming a successful collaboration is a step-by-step learning process. Those steps are closely intertwined and rely on each other, although each part is strengthened over time. To build a functioning collaborative organization, it is crucial to establish leadership and mandate which are needed to structure the organization and to define roles of each participant. Collaboration oftentimes has a messy dynamic with unforeseen conflicts because issues are dealt with differently, and therefore, it is important to know and understand each other's role and work towards the shared goal (Hrelja et al. 2016). The shared goal needs to be defined by a joint problem definition, which can be formulated easier if the mentioned aspects are met. Additionally, joint action and an agreement of how to act jointly is given, too, once actors understand each other's role. This facilitates finding a solution for conflicts which is crucial for collaboration, as conflicts are bound to arise (Pettersson & Hrelja 2020). Although collaboration can be defined and improved on different levels, there are clear limits to what can be achieved through collaboration due to policies and regulations of the participating actors.

The theory of collaboration will be used in this thesis to investigate collaborative planning practices in favor of intermodality in Stuttgart/Germany and Gothenburg/Sweden. Empirical data was collected in the form of interviews with planners responsible for public transport in both cities. Interview questions with regard to their collaboration, for example, do they have a shared goal, is there a clear definition of responsibilities, what are the hindering and facilitating factors, were asked to analyze the collaboration between them against the background of the theory described above. Finally, the theory will be used to suggest how barriers within the collaborating planning process can be overcome to improve active intermodality in each city.

5. Results

In this chapter, the collected data will be presented and analyzed against the background of the literature review and the theory of collaboration. Firstly, a policy document analysis will be carried out and secondly, interviews will be conducted with relevant planners. Thirdly, an analysis of the material provided by the literature review, planning systems and theory of collaboration will be done.

5.1 Policy Document Analysis

At first, the German case of Stuttgart will be presented, and then the case of Gothenburg. A short explanation of how the planning systems work will be given, followed by a description of the transport planning process in each respective city. Then, the concept of intermodality in each document will be investigated as well as planning practices for it. Responsible actors will be pinpointed that will serve as first potential Interviewees in the next step. Lastly, the planning documents will be compared against the background of the literature review.

5.1.1 The German Case: Stuttgart

The German Planning System is hierarchically organized on different planning levels and regions which closely interact with each other (Umweltbundesamt 2020). The focus is on developing a general spatial plan by considering the general spatial layout on each level and regional area (see figure 2 below). Additionally, the development of different sector plans regarding for example traffic planning or housing complements those general spatial plans on each level. Furthermore, special attention must be paid to the different levels of the German planning system because of the significance of its hierarchy: each level must follow and adapt the spatial plan from the level above but can in return give feedback and cooperate on developing a new plan.

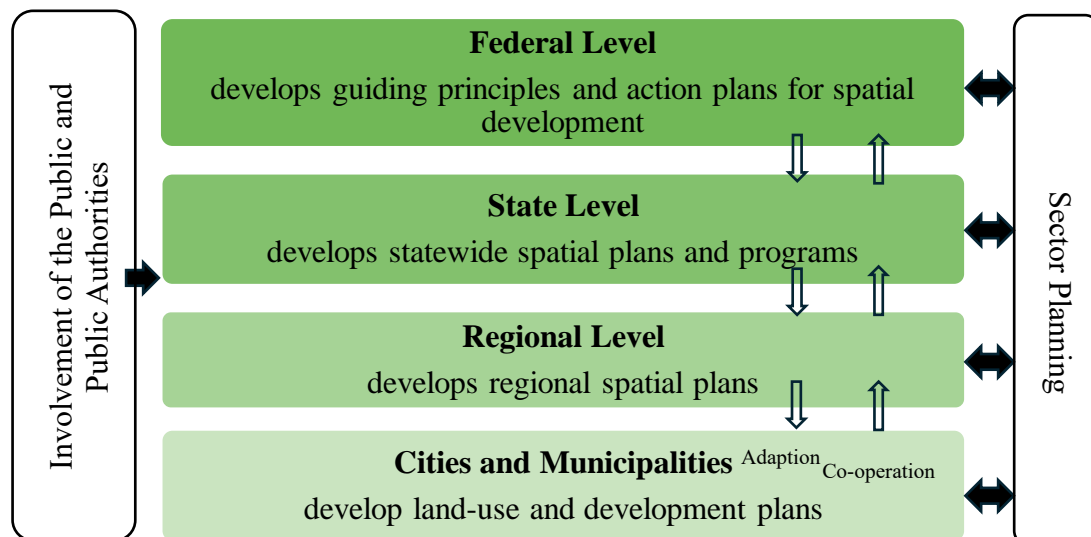


Figure 2: The German Planning System, adapted from Umweltbundesamt (2014)

The following paragraphs roughly explain how the German planning system is hierarchically structured and how the different levels relate to each other.

At the federal level, the Federal Ministry of Housing, Urban Development and Building Industry is responsible for spatial planning, in cooperation with other related departments. The so-called Regional Development Act tasks and principles of spatial planning as well as general regulations for spatial plans and their regulations on federal and state levels. The law serves as a framework for spatial planning in Germany. In addition, the instruments such as plans and proposals are made available that can be used by cities and municipalities to further implement those general spatial plans. Through this, the overall aim is to contribute to a more sustainable environment and promote climate protection on a state and municipal level. The next level below is the state level. Each state develops spatial plans for the entire state and for sub-regions based on the federal Regional Development Act (Umweltbundesamt 2020). These spatial plans are binding and define concrete stipulations and principles for the development of the respective area and refer to, for example, the settlement system or transport system management. The regional level is the following level below, where regional spatial plans further specify the goals and principles of the federal and statewide spatial planning documents in each region. Those plans are usually implemented by regional associations. The next level, and the lowest level in the German planning hierarchy is the municipal level, where municipalities and cities operate. They develop plans which reflect the intended urban development for the entire city or municipality area (Stuttgart n.d.d). This affects housing, transport or recreation areas and is therefore central for sustainable development. Construction projects are planned in more detail and written down in development plans that are based on the respective land-use plans. The entire process is called Urban Land-Use Planning and is indispensable as an instrument of urban planning legislation since it prepares the construction and other usage of the land in accordance with the building code.

This master thesis is going to investigate traffic planning at the municipal level which is why the following section will give an overview of the sector planning "municipal traffic planning". Any type of sector planning has to take into account the general spatial planning documents as well as technical regulations (Umweltbundesamt 2014).

Sector Planning: Municipal Traffic Planning

The task of municipal traffic planning is to open up areas for transport, to renew and redesign transport routes, to increase safety and to plan urban public transport (Umweltbundesamt 2022). Municipal traffic planning usually follows a sustainable mobility concept with the aim of reaching an attractive city or region. Therefore, the focus is to reduce noise and contribute to cleaner air. Such a concept is provided by the European Commission's and is called the *Sustainable Urban Mobility Plan* (SUMP). The establishment of a *SUMP* is not a legal obligation in Germany, but it is a prerequisite for many (federal) subsidies. It requires integrated transport planning including all forms of mobility to create attractive places and better accessibility. Therefore, the focus of current traffic planning is its integration with mixed land-use planning combined with bike- and pedestrian friendly infrastructure (Umweltbundesamt 2022). In addition, planning based on the guiding principle "city and regions with short distances" is meant to counteract the typical spatial separation of urban functions in German cities and thus, to promote more sustainability in the transport sector. Suggested measures include traffic calming, roundabouts, or improving parking space management.

The German Example: Stuttgart

Stuttgart has been the state capital of the state of Baden-Württemberg since 1952 and forms the upper center of the metropolitan region, which is home to over 2.7 million inhabitants (Stuttgart n.d.e). Stuttgart has about 615,000 inhabitants, its urban area covers 207km² and the population density is 2.850 inhabitants per square meter (see figure 3 below). This means that the population density is higher than in other large German cities (Oehler et al. 2014). The city's catchment area extends beyond the administrative borders of the regional federation and has a radius of about 40-50km, which includes almost 3.5 million inhabitants. From an economic point of view, Stuttgart is regarded as an economic and technological center and is home to companies such as Mercedes Benz Group AG, Robert Bosch GmbH or Porsche AG.

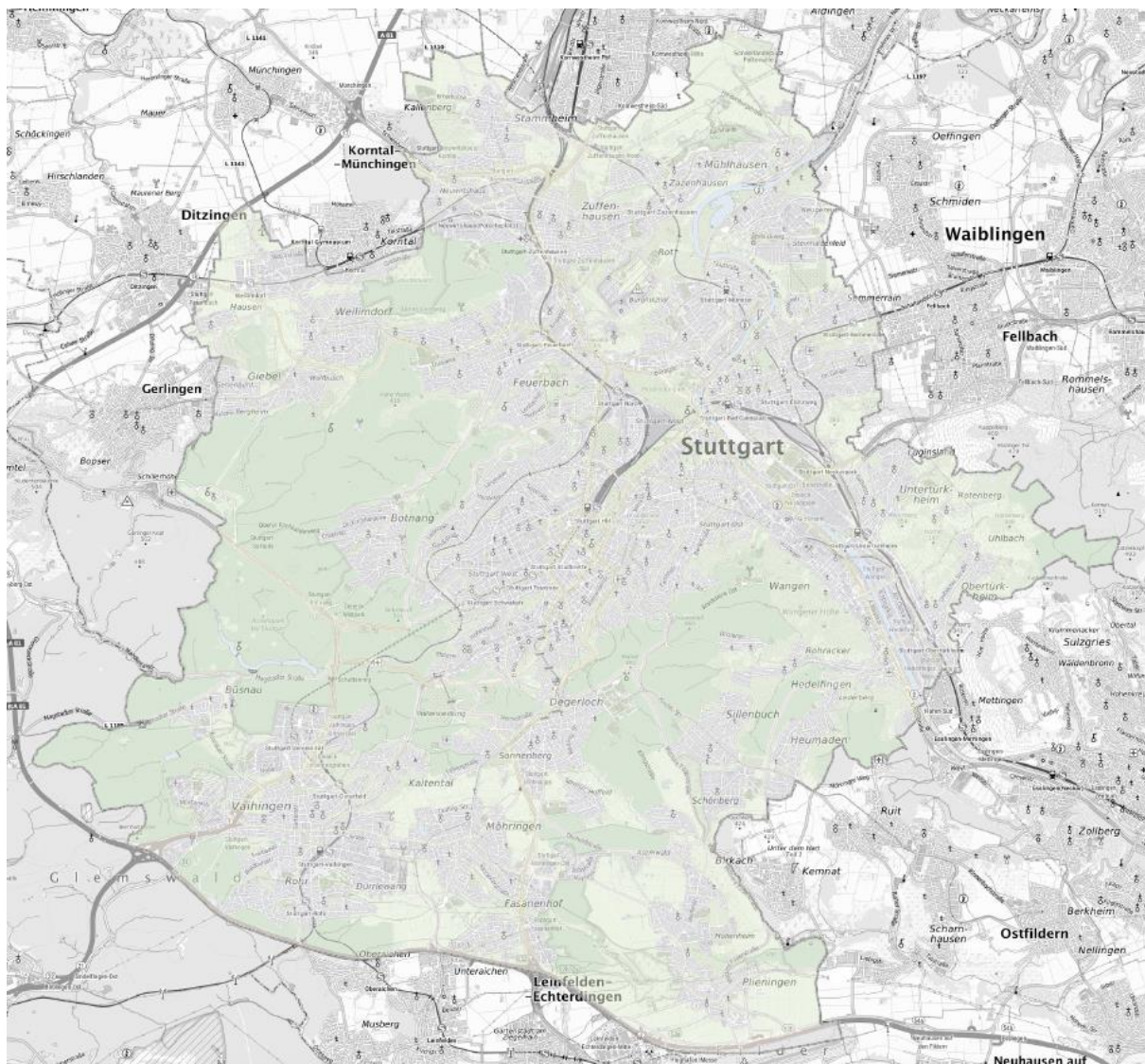


Figure 3: Map of Stuttgart (Stuttgart n.d.f)

Cityscape. The city center of Stuttgart is located in the expansive Neckar basin and guarded by towering slopes, which are about 500m above sea level, therefore double as high as the city's location. The Neckar Valley is traditionally home to wine- and fruit-growing, the north of Stuttgart is industrial, the Neckarhafen harbor is home to industrial areas and the Flieder Plain in the south of the city are characterized by agricultural areas which are subject to dynamic

growth and urbanization processes. Due to Stuttgart's location in a basin, air pollution is quite high, whereby urban motorized traffic contributes significantly to the pollution in the air (Oehler et al. 2014). Compounding is the deteriorated air exchange, which is due to the geographical location of the city.

Traffic and Transport. Just like many other German cities, Stuttgart is characterized by the former guiding principle of a car-friendly city, which led to the implementation of many traffic axes in the city that have a high separational effect (Oehler et al. 2014). Additionally, many inner-city tunnels are designed for motorized traffic. With regard to public transport, the city uses the traditional regular services of busses, subway and trams which complement each other (Stuttgart 2021). The backbone of public transport is formed by regional trains, suburban trains as well as light rail. A total of 36 railway lines and 68 bus lines operate, serving 199 railway stops and 431 bus stops (as of December 2019). Figure 4 below gives an example of suburban trains (green line), the bus (red line) and subway network (blue line) in the Inner-city of Stuttgart.

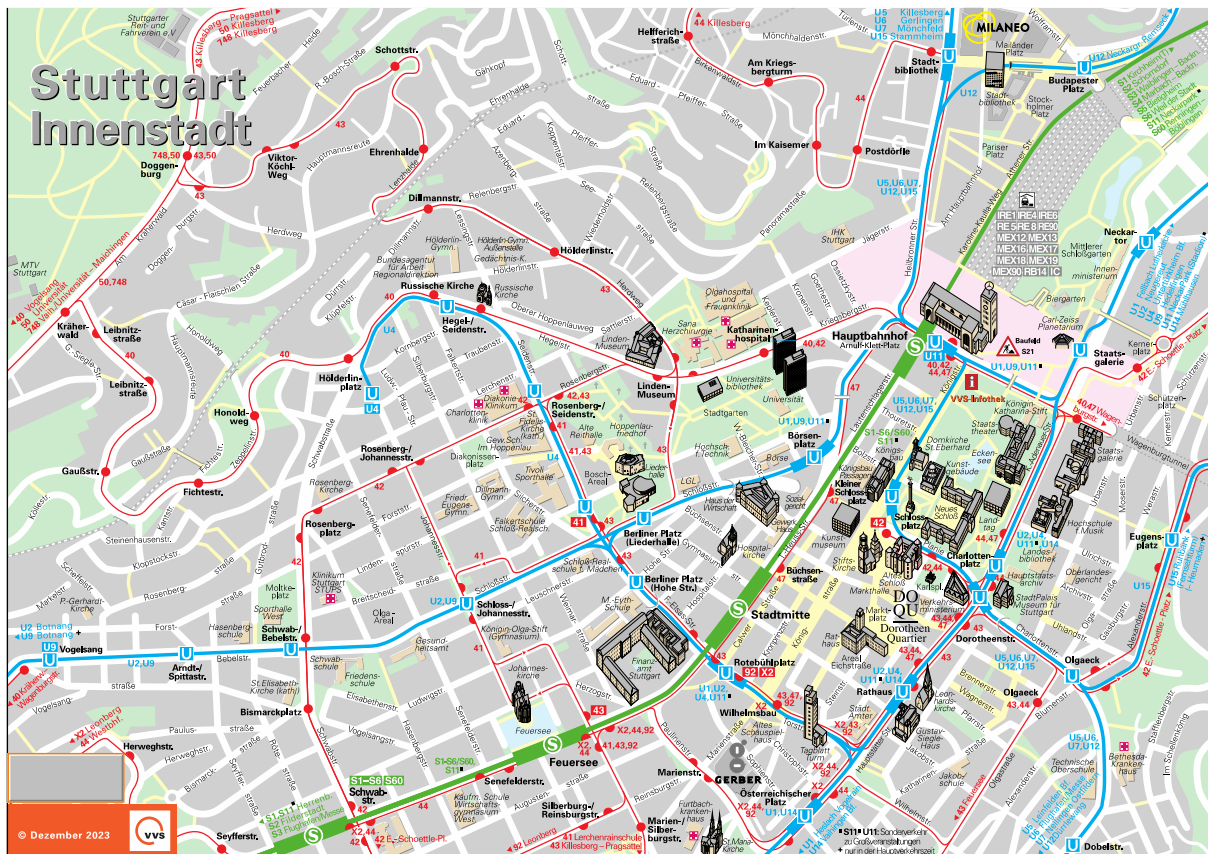


Figure 4: Public Transport Network in the Inner-City of Stuttgart (VVS 2023)

Over the past few decades, the bicycle network was expanded, speed 30-zones were set up, protective strips were extended on main roads and one-way streets opened for cyclists (Oehler et al. 2014). The city center, on the other hand, has large pedestrian zones. Additionally, the *Stäffele*, Stuttgart’s famous steps, are a great peculiarity of the city, as they run radially along the slopes as stairways and provide pedestrians with faster connections. The overall challenge of the city is the topographical conditions with their elevations, which make it particularly difficult for cyclists. A transition from a car-dependent city to a more sustainable city with decentralized and polycentric structures is becoming more and more important against the background of the overall increase of the age of the population in Stuttgart. Figure 5 to the right shows the modal split of Stuttgart as of 2019.

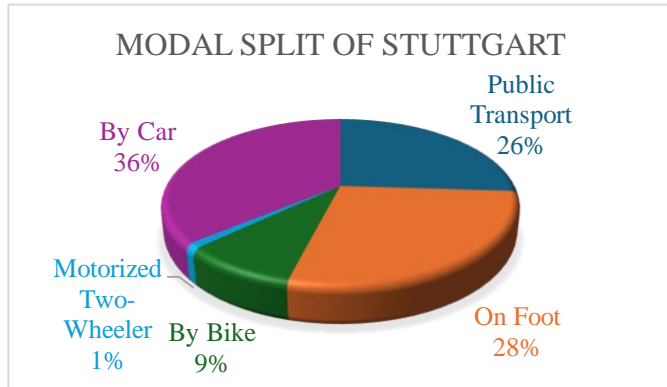


Figure 5: Modal Split of Stuttgart, adapted from Wondratschek (2019)

Administration. The administration of the city of Stuttgart is divided into districts, each led by a different mayor and seven departments which are assigned offices and (municipally) owned companies as well as associate companies (Stuttgart n.d.c). The city council is the main body of the city, represents citizens and is elected every five years. (Stuttgart n.d.b). The chair of the municipal council is the lord mayor.

Urban Public Transport Planning in Stuttgart

According to the German Passenger Transport Act from a legal point of view, the cities and counties are responsible for public transport (Stuttgart 2021). In addition, the Law on Planning and Organization of Local Public Transport applies specifically in Baden-Württemberg, which further strengthens the role of the city of Stuttgart as the responsible authority. Therefore, the last instance of the decision-making process on (local) transport plans is the city council, which, for example, took note of the *SUMP* in 2014 or approved the local transport plan in 2016. Stuttgart’s local public transport system is operated by Stuttgarter Straßenbahn AG¹ (SSB AG), a municipally owned company of the city of Stuttgart. Since January 2019, it has been entrusted with public transport for a period of 22 years. In financial terms, public subsidies such as the Municipal Transport Financing Act are granted based on the Public Service Remit. Funding from the federal government is needed to cover the expenses on infrastructure construction. Furthermore, the city council is responsible for granting SSB AG more funding for the further expansion of the public transport network. Additionally, municipally owned companies such as SSB AG are subject to the “Public Governance Corporate Codex”, which was passed by the city council in 2011 and applies to the city as well as to most of its companies (Stuttgart n.d.a). Stuttgart has thus committed itself to ensuring good, responsible corporate governance for its own companies - such as the SSB AG. It must be oriented above all on the economic success of the companies as well as on the common good (Stuttgart 2011).

¹ Stuttgarter Straßenbahn AG could not be interviewed

In line with the guidelines of the European Commission, Stuttgart has been subject to the *SUMP* since 2014, which is to cover the time horizon up to 2030 (Oehler et al. 2014). The concept was developed by the Office of Urban Planning and Renewal with the participation of all offices and institutions responsible for urban mobility issues. Public participation was quite high during the drafting process, so that in March 2014 the concept was finally taken note of by the city council. Transport planning is in an area of tension between the environment, society and economic concern and is therefore planned in an integrative manner. Therefore, the regional and local transport plan, the land-use plan, the air pollution and noise reduction plan, the climate protection concept as well as the urban development concept were taken into account. Unlike previous master or transport plans, the focus of the *SUMP* is on an integrative concept, which considers not only the transport situation alone but also the environment or urban design. The overall objectives here are to improve the quality of living, promote economic development and make urban transport more sustainable to improve air quality and reduce noise pollution. Additionally, the masterplan for sustainable and emission-free mobility as well as the action plan from 2023 and the local transport plan (3rd update) of Stuttgart emerge from the *SUMP* and define more concrete measures to achieve the goals set (Stuttgart 2018; Stuttgart 2021; Stuttgart 2023).

In the following paragraph, the actors responsible for the planning and implementation of public transport in Stuttgart and their roles will be explained. This work is primarily based on the *SUMP* as well as the planning documents resulting from the concept such as the master plan (Stuttgart 2018) and the action plans. Furthermore, the land-use plan and the local transport plan were used to better understand the integration of different actors.

Responsibilities of Planners, Organizations and Stakeholders

The structure of the city administration shows that the city has various companies on its own or outsourced. As mentioned above, SSB AG is a municipally owned company of Stuttgart and subsidiary of the subgroup Stuttgarter Versorgungs- und Verkehrsgesellschaft mbH (SVV) (SSB AG 2023). The city of Stuttgart itself is an associate of the SVV, which is why it holds a 100% stake in SSB AG. Both SSB AG and SVV are chaired by the lord mayor of Stuttgart. SSB AG was commissioned by the Office of Urban Planning and Renewal for a time period of 22 years. Figure 6 on page 28 shows the simplified planning process for public transport that is relevant for this thesis.

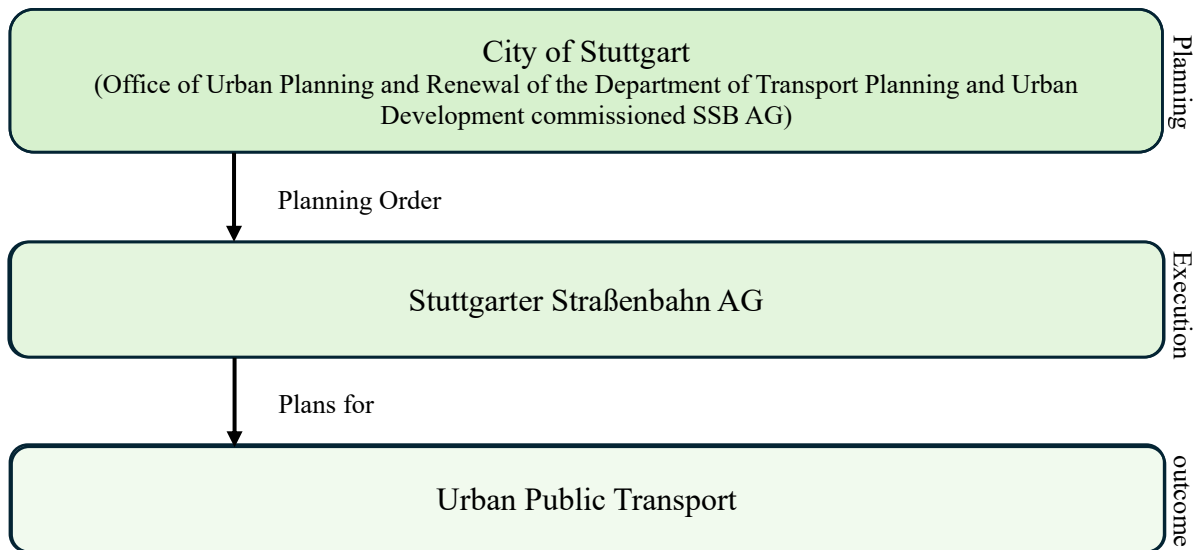


Figure 6: Planning Process for Public Transport in Stuttgart (SSB AG 2023; Stuttgart 2022)

The SSB AG is responsible for public transport light rail and buses on behalf of the city (SSB AG n.d.a). Furthermore, it is responsible for the provision and maintenance of vehicles, operating facilities, and infrastructure as well as for the administration and utilization of company-owned land (SSB AG n.d.b). For this reason, it has recognized the public corporate governance codex and conducts business in accordance with it. SSB AG employs its own bus and light rail drivers and is the owner of the light rail infrastructure as well as in the possession of line permits for bus and light rail lines (SSB AG 2023).

Representation and Definition of Intermodality in Planning Documents

Overall, the *SUMP* and its adjacent plans mention intermodality (or multimodality) in very similar contexts: mostly, it is about making the provision of information more user-friendly, integrating sustainable and active means of transport better, hiring mobility managers for better coordination and improving parking spaces (Oehler et al. 2014; Stuttgart 2018; Stuttgart 2021; Stuttgart 2023). None of those plans clearly define how this is to be achieved but emphasize that these are important steps towards achieving a sustainable transport system.

The provision of information is to be improved by implementing the so-called polygo app, which in addition to public transport can also be used for the city library and other public institutions and is unique in Stuttgart.

“(With the polygo-app), a shift to more sustainable transport modes is facilitated and therefore, the goal of a long-term change of the modal split towards a more sustainable transport network” says the *SUMP* (Oehler et al. 2014, p. 44).

Additionally, the employment of mobility managers is intended to enforce soft measures such as information, communication, or coordination of activities of different partners. The responsibilities of a mobility manager have to be clearly defined in order to build up information networks and involve partners in tasks.

“In the area of city planning and city development, mobility management should encourage sustainable modes of transport and integrate them in the overall planning process” (Oehler et al. 2014, p. 44).

An integral part of the work of a mobility manager is the combination of different modes, which is referred to as the *intermodal chain of ways* (German: intermodale Wegekette) in the German *SUMP* (Oehler et al. 2014). Furthermore, the *SUMP* suggests the extension of bike parking and the incorporation of pedelecs within the already existing municipal bike-sharing system. Biking should be promoted overall, with bikes being allowed on trains, an extended bike network and public relations should be strengthened to inform the public of the upcoming changes. Ideally, a bike-sharing system is connected to the overall public transport system to ensure a more efficient accessibility. For the public transport network, the goal is to have an efficient and fast system that connects different parts as fast as possible without accidentally planning for disadvantages in other parts of the city. This needs to be examined from case to case. Additionally,

“Traffic-calmed zones are suggested when planning a new district” and “the design of public spaces is to improve safety and security (...). (Moreover) bus stops, train stations and public spaces need to be accessible” by foot and bike (Oehler et al. 2014 p. 64).

Overall, especially the connection of bikes to public transport and raising awareness to the public is mentioned in the *SUMP* of Stuttgart. As the plan is already an outcome of the co-operation of different departments of the city administration, it goes in line with what the literature suggests as being very helpful in planning for intermodality. To conclude, measures that are described as being helpful for an overall intermodal transport network in literature are met, however, intermodality is not planned as a whole, although most measures supporting intermodality are mentioned.

How is Intermodality Planned for?

There is no intermodality-package that is planned for, but different measures which are described to be important for intermodality in the literature. For example, the master plan – which was drawn up based on the *SUMP* to specify it – describes bundles of defined measures such as the promotion of biking or walking. Although those bundles define which offices are involved in the planning process, it is hardly described how co-operation and collaboration looks like explicitly (Stuttgart 2018). Regarding the integration of different modes of transport, it is repeatedly pointed out that planning authorities need to co-operate with all organizations and departments of relevance (Umweltbundesamt 2020) through development concepts, networks, and other cooperation structures. But those concepts, networks and structures are defined nowhere. Intermodality is playing an important role in the overall planning for public transport in Stuttgart, but the question remains how those co-operational structures are built and work. Thus, the question is left unanswered and will be dealt with in the following chapter by conducting interviews with responsible planners.

5.1.2 The Swedish Case: Gothenburg

The Swedish Planning System is organized on different levels (see figure 7 below) (Nordregio n.d.). 12 public authorities implement policies on the national level, among them the Swedish National Board of Housing, Building and Planning and the Swedish Transport Administration, for instance. On this level, no planning instruments, or land-use plans (except for Stockholm and Halland) exist guiding regional and local planning. The Planning and Building Act, implemented by the Swedish National Board of Housing, Building and Planning, is regulating planning processes and serves as a basis for the municipalities' responsibility for spatial planning within their borders. County Administrative Boards operate on the county level and are tasked to monitor the enforcement of national policies at the county and local level to ensure that they are in line with national regulations (Nordregio n.d.). Additionally, regional councils are political bodies led by elected representatives and are responsible for public services such as public transport, health care or cultural aspects. On the local level, municipalities are responsible for local planning where two planning documents are important (Nordregio n.d.). The municipal comprehensive plan is guiding land-use developments and serves as a description of long-term strategic development within the municipality, yet not legally binding. The comprehensive plan goes hand in hand with regional and national goals and their regulations. The Detailed Development Plan, on the other hand, is legally binding and regulates the use of land and water within the municipal borders.

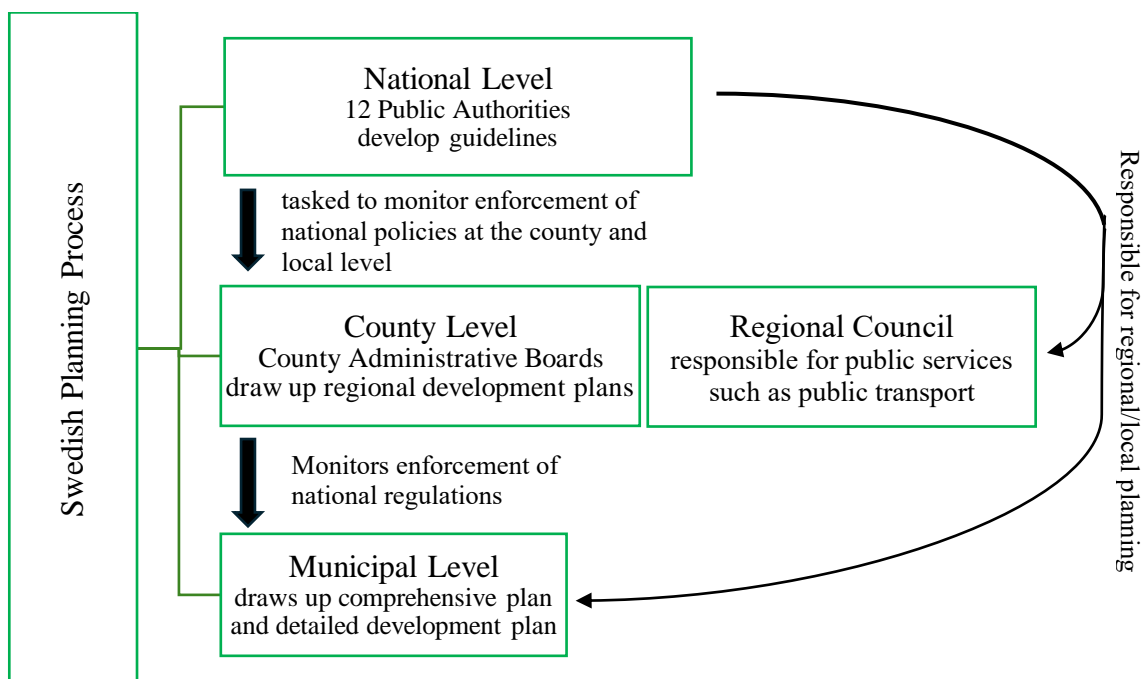


Figure 7: The Swedish Planning System (Nordregio n.d.; Boverket et al. 2022)

This master thesis focuses on the transport planning aspects which is why the planning process of local/regional public transport planning in Sweden is further described in detail in the paragraph below.

Local/Regional Public Transport Planning

Transport Planning follows the general planning process described above. Responsible for a transport infrastructure plan and based on directives provided by the national government, the Swedish Transport Administration, one of the 12 public authorities, draws up such plans (EU Urban Mobility Observatory 2019). Those plans are decided by the national government. The Swedish Transport Administration is also responsible for regional transport plans which are usually formulated together to make sure they are in line. Those regional plans are decided by the regional government, who contribute to the plan-making, but are limited due to their budget. On the regional level, transport provision programmes are drawn up by the regional council County Administrative Boards play a regulatory and supervisory role. Those transport provision programmes are not legally binding but need to be drawn up by civil servants and finally decided by politicians. They cover public transport, indicating that public transport is dealt with on a regional level. Regional councils usually commission transport operators to execute public transport plans within their respective county. On the municipal level, transport strategies are drawn up by cities and municipalities, but they are not a legislative requirement. Usually, they are updated every 8-10 years and go in line with the comprehensive plans, although describing transport issues more in detail. Figure 8 below roughly shows the planning process for and behind local/regional public transport planning.

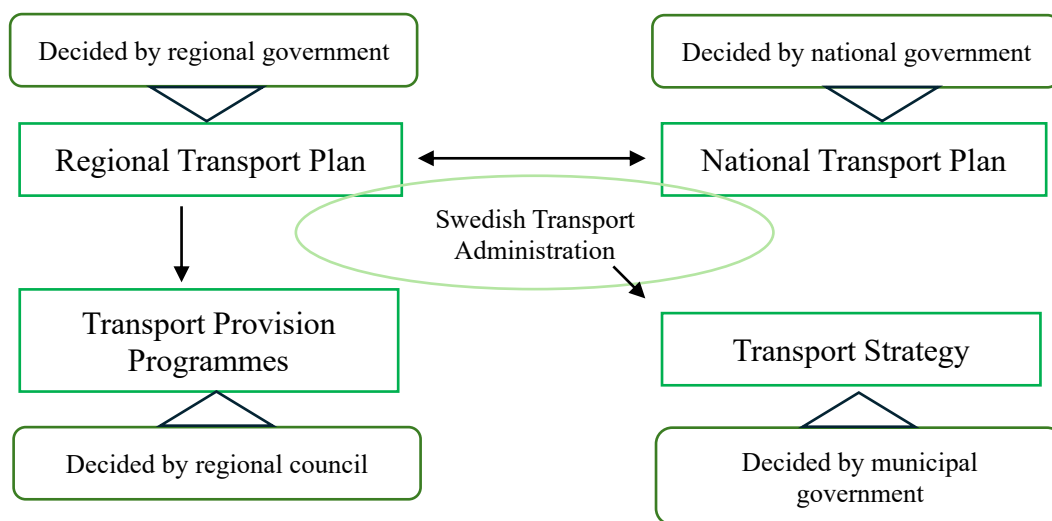


Figure 8: Local/Regional Public Transport Planning (Boverket et al. 2022; Trafikverket 2024)

Additionally, the Swedish Transport Administration, the Swedish Association of Local Authorities and Region and the Swedish National Board of Housing, Building and Planning develop guidelines, presented in a handbook (Boverket et al. 2022), to provide help with transport-related questions (Trafikverket 2024). Instructions based on the handbook encourage planning approaches for a more sustainable transport network, based on the EU Commissions guidelines for *Sustainable Urban Mobility Plans*. The overarching goal is to minimize motorized traffic and provide more space for public transport and other sustainable transport modes (Boverket et al. 2022). The handbook prioritizes accessibility through the transport system, land-use and telecommunication systems. Furthermore, it emphasizes the need to provide all kinds of modes of transport and to make them all competitive. A similar handbook has been developed by the Swedish Transport Administration for the regional level, called

Handbook for Regional Traffic Strategic Work (Trafikverket 2023). It concretizes the other handbook and is adjusted to the respective region. Municipalities can make use of the handbook and adjust it to their own environment and needs. Overall,

“The overarching objective of Swedish transport policy (Govt. bill 2008/09:93) is to “ensure a socioeconomically efficient provision of transport, sustainable for the long term, for citizens and businesses throughout the country”. The overarching objective is supported by a functional objective and a consideration objective.”

- Transport Strategy for a Close-Knit City (Göteborgs stad 2014)

This thesis is focusing on Gothenburg and therefore, investigates planning documents on the regional and local level. The following subchapter will introduce Gothenburg, planning procedures in Västra Götaland and the city of Gothenburg and lastly, will analyze the regional transport provision programme.

The Swedish Example: Gothenburg

The city of Gothenburg is the second largest city in Sweden, located on the west coast and the capital of Västra Götaland region (see figure 9 below) (Göteborgs stad 2014).

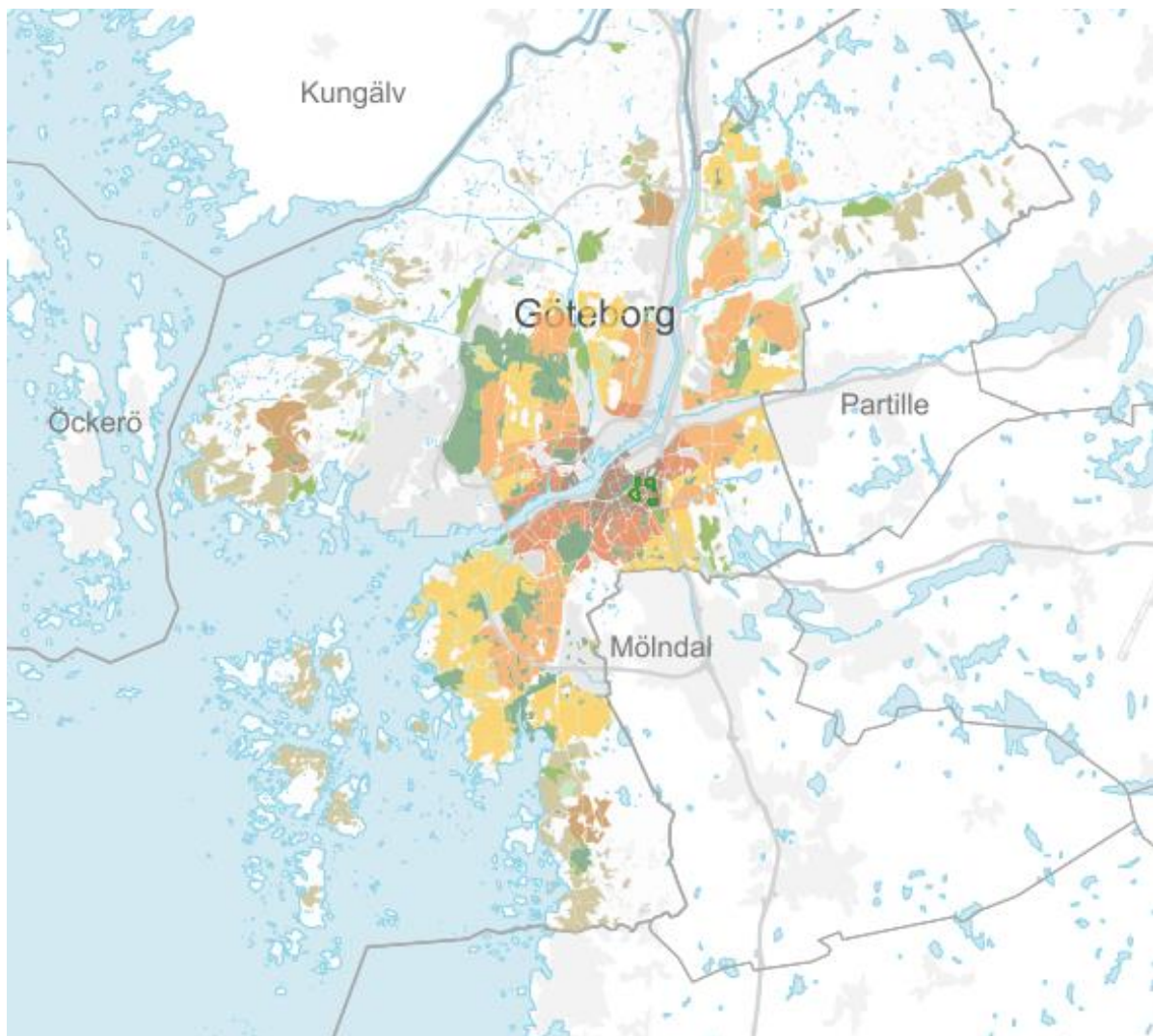


Figure 9: Map of Gothenburg (Göteborgs stad 2022)

Gothenburg's urban area covers a total of 718km² including water and urban areas, the city has approximately 600,000 inhabitants with a population density of 1.333 per square kilometer (Göteborgs stad n.d.a; Göteborg stad 2024a). Additionally, around 1 million people live in its metropolitan area (Pettersson et al. 2021). The city is home to Scandinavia's largest port and large industrial corporations within transport- and logistics-related activities, such as Volvo or Ericsson (Blomgren 2020; Göteborgs stad 2014). Therefore, the city is very significant in the country's economy. The orange color scheme symbolizes city districts, and the green areas represent parks and green areas.

Cityscape. Gothenburg is located along the ocean, with a large archipelago built in front (Göteborgs stad 2014). Since 2021, the city is organized in four main districts, namely Nordost, Centrum, Sydväst and Hisingen (Göteborgs stad n.d.b). Furthermore, the city is shaped by large traffic flows in Gothenburg which could potentially be perceived as barriers. Therefore, new sustainable modes of transport are

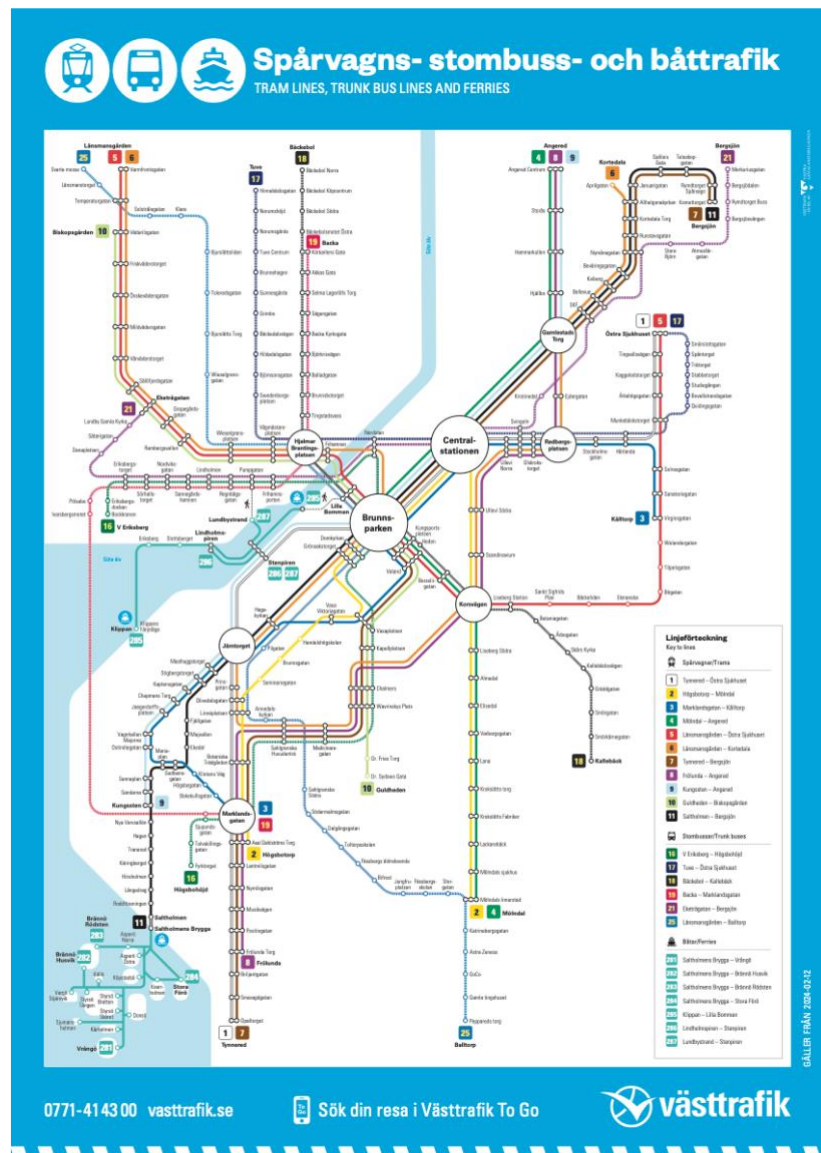


Figure 10: Public Transport Network in Gothenburg (Västtrafik 2024)

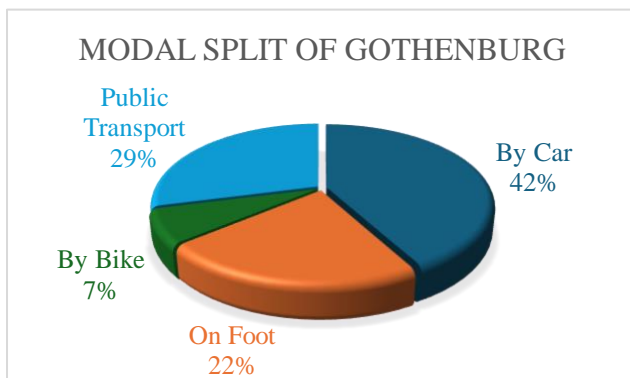


Figure 11: Modal Split of Gothenburg (Göteborgs stad 2014b)

needed (Göteborgs stad 2014). This is especially important as the population in Gothenburg ages who need a well-connected transport network to get around. *Traffic and Transport.* Gothenburg has a well-developed public transport system with 11 tram lines, 28 regular and express bus lines, 8 ferry routes serving the archipelago and 3 commuter trains (Curtis et al. 2019). The public transport network in Gothenburg covers the municipalities of

Mölndal and Partille, as shown in figure 10 above and thus, are planned together (Västtrafik 2024). Big parts of the city were built when there was plenty of space to give each mode of transport their own part of the road, following the principle of separating different types of traffic (Göteborgs stad 2014). Therefore, infrastructure in Gothenburg is oftentimes oversized and gives the opportunity to create denser spaces by taking away space for car traffic. The transport system produces a third of Gothenburg emissions, which is why the city is investing in finding other mobility solutions to motorized individual transport. Therefore, the new transport strategy is shaped by the environment and climate strategy, aiming for an overall more sustainable and active transport network (Västra Götalandsregionen 2022). The modal split as of 2023 of Gothenburg is illustrated in the figure 11 on page 33 (Göteborgs stad 2024b).

Administration. Gothenburg is organized in different union administrations and municipal companies (Göteborgs stad n.d.c). The city management office, on behalf of the municipal board, is responsible for the overall monitoring and controlling of the administrations and companies. Göteborgs Stadshus AB is the parent company of the Gothenburg city corporate group. The highest body within the city's administration is the municipal council, followed by the municipal board which oversees the implementation and evaluation of what the municipal council decides.

Urban Public Transport Planning in Gothenburg

As written in the Public Transport Act, regional authorities are in charge of public transport (Västra Götalandsregionen 2024a). In Västra Götaland and therefore for Gothenburg, Västra Götalandsregionen is in charge of public transport. It commissioned Västtrafik in 2012, the public transport operator, to deal with public transport in the entire region. As executing company, Västtrafik collaborates with Gothenburg and the other municipalities to ensure an overall good and connecting transport network in the region. Through this, Gothenburg (and other municipalities) have the opportunity to contribute with their own standpoints on urban public transport matters within their borders (Västra Götalandsregionen 2019; Göteborgs stad 2014). The valid planning document as of today is the transport provision programme 2021-2025, drawn by Västra Götalandsregionen and in line with the handbook as well as county and national regulations. It serves as a long-term transport strategy for the entire region and is rethought annually (Västra Götalandsregionen 2023). Västra Götalandsregionen, a political body and led by politicians, is the highest instance of the decision-making process and responsible for the extension of and the investment in public transport. Infrastructure for public transport is usually financed by Västra Götalandsregionen, tax money and ticket revenues (Göteborgs stad 2014; Västra Götalandsregionen 2019). Citizens of the region have an influence on the planning for public transport by voting in regional elections.

On the municipal level, Gothenburg has drawn up a guiding document for the development of public transport, called "Transport Strategy for a Close-Knit City – Gothenburg 2035" and will be in force for the next 20 years (Göteborgs stad 2014). The strategy elaborates the transport elements of the Comprehensive Plan and serves as support for transport-related decisions. Furthermore, as transport- and urban planning needs to be done from a holistic perspective, meaning that strategy has been developed in an integrated way with the help of the development planning strategy and the green strategy. The document includes the neighboring municipalities of Mölndal and Partille as well, which underlines the need for collaboration with other

municipal authorities and Västtrafik. The strategy emphasizes the need for a new planning concept, thus complementing the current planning concept “Access through rapid mobility” with “Access through short distances”, meaning that cycling, walking and public transport is increasingly becoming important as a means of transport.

Responsibilities of Planners, Organizations and Stakeholders

The development of public transport in Gothenburg is done by Västra Götalandsregionen, Västtrafik and the city of Gothenburg (Västra Götalandsregionen 2024b). Within the regional council, the Infrastructure and Public Transportation Board is the leading body in the areas of infrastructure and transport (Västra Götalandsregionen 2024a). Their main task is the strategic work in those areas. The regional administration is administrative above the regional council and the leading political body of it. Its role is to be informed of their work, although it isn't directly involved.

On the executional level of those strategies and plans, Västtrafik works intensively with Gothenburg (and other municipalities) to provide a well-connected public transport (Västra Götalandsregionen 2021). Additionally, it is involved with city planning processes in Gothenburg as that goes hand in hand with a successful provision of public transport. Furthermore, together with the contracted transport companies, Västtrafik decides on bus and train routes as well as bus stops and train stations against the background of the overall goals defined by Västra Götalandsregionen. The figure below shows an overview of the involved actors in public transport planning in Gothenburg (see figure 12 below):

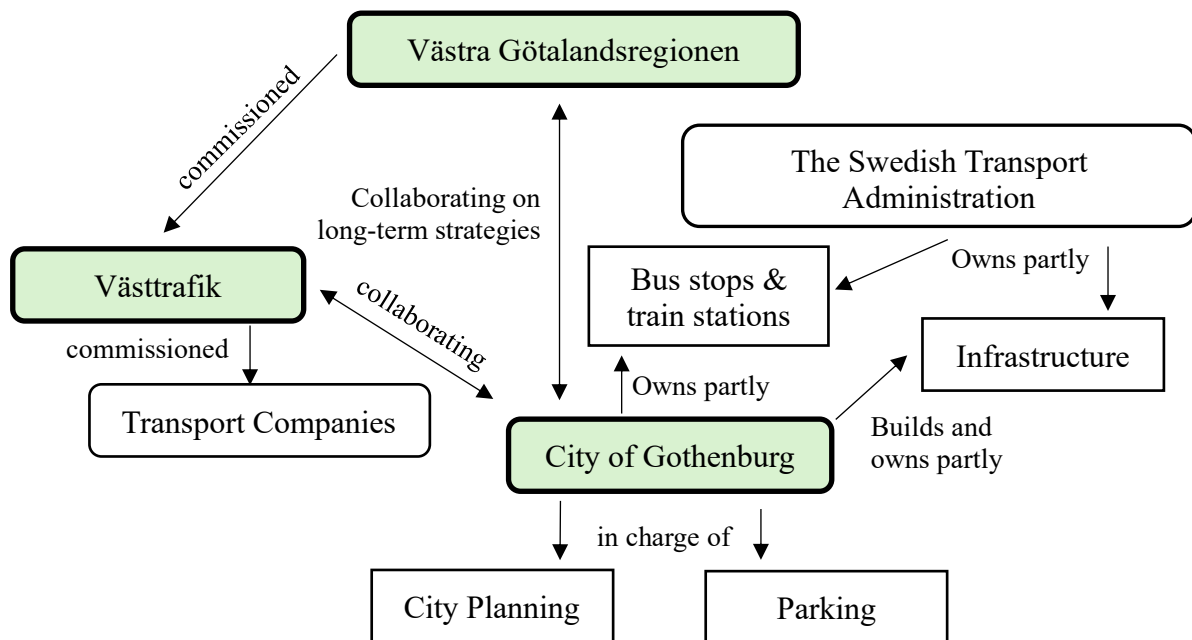


Figure 12: Planning Process for Public Transport in Gothenburg (Västra Götalandsregionen 2021)

Forms of collaboration between those actors was decided in 2011 (Västra Götalandsregionen 2021). The development of public transport lies with Västra Götalandsregionen, but Gothenburg is responsible for transport programs, e.g. for student or senior tickets, and so on. Furthermore, both Västra Götalandsregionen and Gothenburg are working on long-term

strategies to improve public transport. According to the transport provision programme, there is an on-going dialogue between Västtrafik and Gothenburg with a contact person each for that topic. Through this, Västtrafik is involved in the early stages of the planning process. Moreover, there is an annual meeting on public transport issues where politicians and citizens are welcomed, too. On a regional level, the four subregional public transport councils as well as all municipalities and Västra Götalandsregionen meet twice a year to discuss the current state of public transport, coordinated by municipal associations.

Representation and Definition of Intermodality in Planning Documents

A recurring term that matches with the definition of intermodality in the literature review in those planning documents and strategies is *combined mobility* (kombinerad mobilitet) and *whole journey* (hela resan) which pose as a main goal for the upcoming years (Västra Götalandsregionen 2023). Focus of the whole journey perspective is on the collaboration between the Västra Götalandsregionen, the Swedish Transport Administration, municipalities, and other organizations to ensure the integration of different modes of transport as well as the transport-planning process in a wider scope, including land-use planning (Västra Götalandsregionen 2021).

“It is important to work from a whole-journey perspective with the residents’ various needs (...), (and) cooperation between relevant organisations, municipalities and the Swedish Transport Administration is decisive for the result” (Västra Götalandsregionen 2021, p. 14).

Therefore, a strategic planning approach is needed that encompasses different parts of city planning. Combined mobility, on the other hand, describes the planning for an integrated app or platform, where tickets can be bought for different kinds of modes of transport as well as for other types of mobility services such as bike-sharing. Combined mobility is planned to contribute to better accessibility to public transport in the long run.

“The aim is that combined mobility should in the long run contribute to increasing the accessibility of the public transport system, make it easier to travel and reduce the travelers climate impact” (Västra Götalandsregionen 2021, p. 27)

Apart from that, the overall goal of the transport provision programme is better accessibility through for example bike and car parking facilities, street design to encourage walking to the bus stop or station, and an overall *“increase (of) the proportion of trips by public transport, biking and walking”* (Västra Götalandsregionen 2021, p. 2). Additionally, the plan is to have *“a new traffic concept (...) for bike and car parking”* (Västra Götalandsregionen 2021, p. 37). When it comes to public transport, it is stated that it is important to have punctual trains and busses to ensure good accessibility and connectivity. With that comes the great potential of biking and walking when reaching bus stops and train stations. Moreover, areas around public transport need to be attractive and designed according to the residents’ needs.

To conclude, intermodality is mostly defined by the two terms *combined mobility* and *whole journey*, meaning that integrated planning practices and an app for all kinds of transport and

mobility services is the focus. The planning document goes in line with what the literature review suggests is important for intermodality.

How is Intermodality Planned for?

Measurements mentioned above are mostly supposed to be planned for through an integrative approach, which is highlighted in the document. The main actors in planning for public transport, namely Västra Götalandsregionen, Västtrafik and Gothenburg, need to collaborate to ensure a well-connected and accessible public transport network that integrates other modes of transport (for example as feeder mode) as well. “*Västra Götalandsregionen and Västtrafik need to collaborate with municipalities to continue to take active roles in the development of combined mobility in Västra Götaland*” (Västra Götalandsregionen 2021, p. 28). Furthermore, a “*dialogue between Västtrafik and the municipalities (...) is important so that transport and city planning can go hand in hand*” (Västra Götalandsregionen 2021, p. 28). Additionally, when it comes to the integration of bike-sharing systems in apps, this is handled by Västra Götalandsregionen in collaboration with Västtrafik and Gothenburg. To further understand how intermodality is planned for, interviews will be conducted in the following chapter with planners in charge of public transport.

5.1.3 Summary and Comparison

Both cities are in the same initial situation: they want to make transport in their city more sustainable. In doing so, they rely on the guidelines of the EU Commission, more precisely aspects of the *SUMP*. With the help of new guidelines, Stuttgart as well as Gothenburg want to fight air pollution (mostly due to car traffic), climate change and facilitate better access to public transport, also to make public transport more accessible for their aging population. Therefore, the aim is to provide more support for sustainable modes of transport such as cycling or walking as well as their combination.

The German system is very hierarchical in comparison with the Swedish planning system, with different, clear responsibilities over a certain geographical area on each level. As figures 2 and 7 show, regions and municipalities in Sweden have more freedom of choice as they are responsible for their own territory – and made responsible for their own territory by the government. German cities and municipalities have to follow plans and regulations implemented on the levels above, therefore have less freedom of planning.

With regard to figures 6 and 12 that show the planning practices of public transport in Stuttgart and Gothenburg, planning in Gothenburg is more interactive, with the region, city and public transport company being in contact regarding different aspects of the planning process. While responsibilities are defined, there is more interaction between different actors rather than a top-down approach like in Stuttgart. Furthermore, the *SUMP* plan drawn up in Stuttgart covers a certain period of time, suggesting that little adjustments can be made, while overall sticking to the same plan. The most important planning document in Västra Götaland, however, drawn up by the regional authority that is subordinate to a political body, is being updated every mandate period, allowing bigger changes. On the other hand, there is no capacity in German authorities to rewrite plans so often.

In both cases, the planning for public transport is intertwined with the city- and land-use planning departments. In Stuttgart, those offices are part of the municipal administration and land-use and public transport planning is done within the same office. In Gothenburg, the public transport operator is involved in city planning processes in the early stages, as well, suggesting that those planning processes are intertwined, too. Therefore, as all plans suggested, an integrated approach between land-use and transport planners is aimed at. Even though intermodality isn't defined in any documents, the planning approach in both cities is like literature suggests integrated, although parts of intermodality is referred to as *Wegekette* in German or *hela resan(dekedjan)/kombinerad mobilitet* in Swedish documents. Mostly and in both cities, those terms describe the technical integration of a variety of public transport modes in an app to facilitate taking different modes of transport in one journey as well as connecting different modes, not necessarily combining walking and biking with public transport. Justified is this by saying that making tickets to all kinds of transport modes available will draw people that use them.

Planning processes behind the specific terms in each city are described vaguely. In Stuttgart, the *SUMP* points out that some sort of collaboration is needed between different offices and companies while describing responsibilities for certain aspects of intermodality in the masterplan. Almost all actors are part of the city administration, with the exception that public transport is outsourced to SSB AG. In Gothenburg, however, planning processes are described more precisely in smaller planning areas, reflecting that municipalities are in charge of land-use and transport planning processes in Sweden. Unlike Stuttgart, public transport in Gothenburg is planned by the regional council which requires collaboration between different planning authorities. This is shown in the transport provision programme, where different responsibilities regarding the planning for public transport is described and dispersed among different authorities. Thus, it can be said that the system shapes the collaboration in both countries.

To conclude, both cities are aiming for the same results but in very different ways due to the systems they work in. Although neither of the cities plan for intermodality as a whole, measures described as being important by the literature are covered. Due to the planning systems, the German planning system being a rather top-down system that doesn't allow much planning freedom but has everything regulated instead, and the Swedish system that gives cities more freedom of planning, but has more authorities involved that need to collaborate. It has to be added that the *SUMP* for Stuttgart mainly covers single measures and does not focus as much on collaborative planning practices as the transport provision programme for Gothenburg. The reason for this might be the necessity of collaborative practices: Stuttgart has regulations and processes defined for each measurement (and the city is responsible for them all) while the Swedish system requires more collaboration. Regardless of the planning system, the policy document analysis of both cities has shown that collaboration is crucial when it comes to the planning for intermodality, because land-use and transport aspects are important to combine. That is only possible when the actors responsible for those parts collaborate.

5.3 Planning Practices

The policy document analysis has shown that the *SUMP* in Stuttgart as well as the transport provision programme in Gothenburg meet the measures described as being important in the literature. Overall, the focus is on the implementation of an app that includes all kinds of transport, biking and the combination of all modes as well as the integration of biking and walking with public transport through an integrative planning approach. For example, planners in Stuttgart define the term intermodality as follows: Interviewee 1, who is a city planner in Stuttgart and was part of the team that drew up the *SUMP* says that “*Intermodality is a topic that is present in every planning process*” and “*it is about connecting different modes of transport*” such as “*(car- and bike-) sharing offers (...) at transport nodes*”. In line with this, Interviewee 5, head of the Office of Civil Engineering, adds that “*part of that are mobility hubs (...) where electromobility such as pedelecs as well as bikes stations and garages for all kinds of vehicles*”. Both agree that the implementation and integration of biking and walking with public transport is one of the most important points on the agenda to a more sustainable urban transport network. However, the polygo-app that entails all modes of transport in Stuttgart has not been mentioned because SSB AG is responsible for it and could not be interviewed, although it plays an important role in the document (polygo n.d.). In Gothenburg, planners share a similar definition of intermodality, and commonly refer to it as “*combination of journeys*” or “*whole journey chain*” (Interviewee 3). Interviewee 2, who works for Västtrafik, highlighted the importance of combined mobility that is “*a digital platform (designed) to use all other transport modes, so all modes that are available*”. Additionally, what is planned for in the future and becoming more relevant is “*the combination of different transport modes, especially bikes or biking with public transport (...) (as well as) micro mobility*”. Interviewees 3 and 4 agree that integrating biking with public transport is one of the main aims to further implement intermodality in its entirety while also adding “*walking and scooters*” (Interviewee 4).

Overall, the planners’ perspective on active intermodality matches its definition in the plans. Throughout the interviews, Interviewees elaborated their point of view and gave more detailed information on how active intermodality is seen. Therefore, the question remains, is everything planned for in practice that is described in the documents and confirmed by planners as being important for active intermodality? This question will be answered in the following paragraph.

Aspects of Intermodality covered by the Planning Processes

Different offices that are part of the city administration as well as the city council need to approve the plans that the Offices of Urban Planning and Renewal and Civil Engineering draw up in Stuttgart (Interviewee 5). Although they all play different roles within the planning process and are concerned about different aspects, they all agree that the usage of different modes in one single trip is crucial for a sustainable, intermodal urban transport network. Therefore, bike and pedestrian traffic has become important in recent years and thus, the city council freed up more funding for those modes. An integrated planning approach is aimed at to reach those goals (Interviewee 5). Interviewee 1, who works for the Office of Urban Planning and Renewal added that

“There is (...) the use of different modes of transport (...) and we are working on a concept (...) on how to integrate different modes better. One aspect is transport nodes where people can change between modes”. They continue: “we (their office) develop bike and pedestrian networks and decide on how to integrate them with public transport, if there is a bus stop or train station. (...) That is the main point, to think about those two modes of transport when planning for urban transport”.

In Gothenburg, the situation looks similar. Currently, the focus is on finding a solution for a better integration of biking with public transport in the entire region. A study to investigate possibilities in creating a new planning process is therefore done at the moment (Interviewee 3). On the municipal level, Gothenburg plans for bicycle and pedestrian traffic – and sometimes in collaboration with Västtrafik – for bicycle parking (Interviewee 2). To ensure a well-integrated public transport network within the city, Västtrafik collaborates with the Office of City Building and Urban Environment. This is done by involving Västtrafik early on in the process as micro mobility became more important (Interviewee 4). Interviewee 4 gives an example of how Västtrafik can have an impact on intermodal issues:

“We talk with (the municipality) in the earliest phases of the planning (process). (...) So therefore, (we) (Västtrafik) can reserve parking spaces for bikes instead for cars (...). We talk about that a lot to make them understand it is an important part of the system.”

The interviews with planners confirmed what the comparison of the policy documents already brought to light: the different systems lead to a different composition of actors that plan for intermodal aspects of the transport network. Despite the fact that planning processes differ, they cover all aspects of intermodality that are deemed important according to the literature. However, planners in both cities point out that it is not yet clear of how to plan for intermodality as a whole without focusing on only one measure at a time. *“Many actors are involved (in the planning for active intermodality) that need to work together to complete the puzzle”*, says Interviewee 4 who works for Västtrafik. This suggests that, although there is a clear shift towards a more active intermodal transport network in Stuttgart and Gothenburg, collaborative planning practices regarding active intermodality face barriers. Therefore, the following subchapter will analyze the data retrieved from the interviews against the background of the theoretical framework to answer the question: what barriers can be identified and how can they be overcome to improve active intermodality?

5.3.1 What Barriers could be identified?

This chapter has shown what is done to facilitate active intermodality and by whom, biking and walking integrated with public transport being in the center of attention. Although a lot is covered and planners focus on active modes, two barriers to the collaborative planning could be identified. The question remains, how can they be overcome? This subchapter will give a presentation of the barriers that occur when planning for active intermodality, the reason for

their occurrence and how they can be overcome in relation to the theoretical framework of this thesis. Two barriers ²could be identified based on the interviews.

1. Barrier: Planning systems lack interfaces needed for a successful long-term integration of biking and walking with public transport

In Stuttgart, for example, there are no clear structures on how to collaborate when it comes to mobility hubs. Even though the responsibilities are clear when building bike racks near stations, there are “*no sustainable structures (for building a building that combines different transport modes)*”, says Interviewee 5, head of the Office of Civil Engineering (Interviewee 5). Integrating biking and walking with public transport, on the other hand, is already integrated in the planning process when it comes to transport nodes – “*responsibilities here are clear*” (Interviewee 5). Additionally, Interviewee 5 says that it is oftentimes a problem after implementing pop-up solutions for bike traffic to find someone responsible. “*A fast and cheap solution (for pop-up measures) seems good, but in the long run, we need to make sure to not disregard the quality of it*”. The question remains, who is responsible after implementing such measures? They are a crucial part of an active urban intermodal transport network and oftentimes the easiest ones to implement. Therefore, this barrier makes it challenging for planners to plan for active intermodality.

In Västra Götaland, the region wants to integrate biking with public transport on a systematic level. This affects Gothenburg, not only because cycling is planned for by the municipality. There, cycling is seen as something that needs to be dealt with by the Swedish Transport Administration, the regions and the municipalities to cover the entire region successfully (Interviewee 3).

However, Interviewee 3, who works for Västra Götalandsregionen, says that “*they didn't have a very defined role and that's what we are trying to establish or investigate: what is their role, what is our role, if you want to have a system some day?*”.

Most commonly, projects are done on a regional level to try out different options. For example, integrating biking with public transport is a current project together with VTI, the Swedish National Road and Transport Research Institute, to find solutions for a better integration and to learn. “*Is Västtrafik going to work with the integration of biking or was it just a pilot study, and that we don't know*” (Interviewee 3).

In Gothenburg as well as in Stuttgart, the current planning system serves as a barrier to planning for active intermodality, because measurements need to be implemented that cross organizational boundaries and demand new structures. While Stuttgart is struggling with mainly mobility hubs that don't come naturally with clear responsibilities and pop-up solutions that lack maintenance after implementing, planners for public transport in Gothenburg struggle with a successful implementation of projects in the long run as well as with planning processes

² The structure of chapter 5.3.1 was inspired by Cannon et al. (2024).

for mobility hubs. *“It is very hard to find collaboration that works in the long run in this unclear landscape of responsibilities”* (Interviewee 4).

Why has it occurred?

Those barriers occur due to the lack of defined structures and outdated documents in Stuttgart.

“Our planning process is subject to legal restraints (...), (because) our road traffic law is from the 60s and that gives climate protection, that needs to be done, too little freedom and that is something that slows the process down. If we had more freedom, we would face less obstacles when planning for climate protection”, says Interviewee 1, city planner in Stuttgart.

Planning for sustainable means of transport falls under the climate protection, and especially in Stuttgart, where the focus is on bike and pedestrian traffic, planners struggle to compete with the car. This leads to a challenging starting point to work for intermodality in the first place. Due to the law, collaborative planning practices in Stuttgart are immensely impacted by a legal framework, that planners *“need to follow (...), because they have to and (not because they stand behind it)”* (Interviewee 1). Old ways of thinking are still present, especially when it comes the implementation of bike infrastructure and stations at the expense of the car. Interviewee 1 says that *“a controversial question is, just like in any other city, taking away 10 parking spaces for cars (in favor of bikes). That is (an example of) on-going discussions in every municipality (including Stuttgart)”*. Prioritizing car traffic is still very much present in the planners’ minds which hinders successful planning for active intermodal measures, not only because urban space is limited.

Similar to that, Interviewee 2 who works for the public transport operator in Västra Götaland says that in their system,

they *“work in a traditional way (...), locked into old systems and old ways of doing things”*. That leaves the task to *“figure out how we could work with intermodality”* (Interviewee 2).

Interviewee 2 continues that, not having a defined system for integrating biking, for example, naturally raises the questions of *“resources, (...) do we have time and money to change something?”*. Parts of active intermodality are still owned and operated by different actors, so it is difficult to bring those parts together.

How can it be overcome?

The theory of collaboration suggests that leadership and mandate are required to successfully collaborate. In the cases of Stuttgart and Gothenburg, where responsibilities over mobility hubs and integrating biking with public transport are not clear, leadership and mandate are needed to steer the planning processes towards a successful outcome. Leadership and mandate, as important co-action conditions, are crucial because collaboration needs to be organized by clearly defined roles of involved actors. Moreover, according to the theoretical framework, leadership as well as mandate is an essential aspect of gaining secondary and primary values such as mutual respect, trust, or a joint problem definition.

In the case of Stuttgart, responsibilities over the long-term implementation of pop-up solutions and over mobility hubs are needed. There is no clearly defined leader of such cases which is why they are usually discussed individually. This takes a lot of time. The reason for this is, according to Interviewee 5, head of the Office of Civil Engineering Stuttgart, that “*without fixed structures, actors have different opinions and that leads to conflict of interests*”. Leader of such projects have to be found individually which is not always easy. Therefore, leadership and mandates have to be defined early on in the process to facilitate the planning process – and its execution. This reflects the German planning system, where actors do what they are assigned to do, but struggle with tasks that are not clearly assigned. The system works as long as roles are assigned from above, but problems arise when responsibilities suddenly aren’t clear anymore, or when responsibilities aren’t defined by laws and regulations that do not encompass newly developed mobility trends such as active intermodality.

In Gothenburg, however, where responsibilities over biking, bike parking and mobility hubs are dispersed among different actors, clear leadership and mandate is needed, as well. Actors operate in their own geographical area and therefore, a leader is needed that oversees the entire region in Västra Götaland, including Gothenburg. Therefore, the theory suggests to strengthen the collaboration further by clearly defining roles each actor has to play to reach the common goal as well as to assign leadership of projects to either one of the actors or a composited team. As responsibilities are clearly defined within their boundaries, an additional actor on a higher level might be needed to steer the process and assign roles accordingly.

2. Barrier: Different priorities and perspectives among relevant actors hinder collaboration, despite the overall consensus of the necessity of urban intermodal transport networks

In the case of Stuttgart, different offices within the city administration have to collaborate in order to present a preliminary plan to the city council. Each office has its own priority: the Office of Urban Planning and Renewal is in charge of drawing up a plan based on the overall regulations, the Office of Civil Engineering examines its feasibility and executes it, and the Traffic Authority prioritizes issues such as traffic safety. Although Interviewee 1 and 5 agree that “*in times of climate change (...), sustainable modes of transport are crucial and main priority in Stuttgart is the shift to a more sustainable transport network*”, Interviewee 1 emphasizes that “*several interests come together under the idea of a shift to a more sustainable transport network*”. Conflicts usually arise when discussing plan details. For example, a recurring issue is overlapping infrastructure where busses, cars and bikes get their own streets and lanes, especially since the streets’ capacity is limited. With three offices arguing from different perspectives, it is not always easy to find a solution for measures that facilitate active intermodality, especially when motorized traffic is disregarded. Interviewee 1 explains that the Office of Urban Planning and Renewal, who is in charge of making plans, makes compromises in case a conflict of interests arises between the other offices:

“Ok, we did not plan ideally for bike traffic, but we did something for pedestrians. Public transport did not suffer any disadvantages (...) and streets for car traffic was narrowed down. We compromise.”

Conflict of interests on the planning level usually affects the quality of the street design in a negative way to meet all opinions and regulations that come with different responsibilities. Furthermore, another common conflict is the on-going debate of whether parking spaces for cars should be taken away in favor of bike lanes (Interviewee 1). The Office of Urban Planning and Renewal emphasizes the importance of bike traffic and suggests other places where cars can be parked, but the Traffic Authority is against that solution because it would cause anger among the residents who want to park their car right outside. *“There is anger when personal matters are interfered with, such as removing car parking spaces”*, says Interviewee 1. Changing the street design towards a more sustainable outlook and therefore, for a better intermodal transport network, is usually not welcomed, because residents value their cars. On the other hand, an integrated, intermodal transport network is usually thought of when planning new areas which doesn't cause as much conflict as changing the current street network, because it is embedded in the overall planning process (Interviewee 5).

In Västra Götaland, as well, planners agree that a shift to a more sustainable and intermodal transport network including biking and walking is needed and aimed at. Three main actors are responsible for different modes of transport, and they all have a different perspective on what is important to plan for intermodality, therefore approaching it differently. While Västtrafik and Västra Götalandsregionen are responsible for public transport, Gothenburg plans for its own geographic area. It has its own concept, called *Målbild Koll2035*, that encompasses lots of goals regarding urban transport (Interviewee 4). Interviewee 4 from Västtrafik, who works closely with the city, says that

“we decide over the public transport system and (we) sometimes depend on each other of course, because our decisions have impact on each other. So in that way we need to collaborate to make decisions that go in line with the whole picture”.

Västtrafik does not have any influence on city planning processes but is involved in the early stages of planning. Interviewee 4 continues that it is important to Västtrafik *“to get what (they) need in terms of infrastructure and public transport development. (...) (They) tend to get in conflict where (they) (...) discuss how to make space for public transport and the micro mobility network”*. Micro mobility as part of active intermodality is something that the strategic level as well as the public transport operator and the city wants, but it is difficult to realize it.

“The problem why it does not go as fast (...), is that we should understand that the city has different goals and perspectives to take in hand. We only have one, we should only increase sustainable (transport), that is all we want and work for. But the city has so much more to take into account when it comes to priorities (...). So we tend to get in conflict there” says Interviewee 4 who works for Västtrafik.

Why has it occurred?

Planners in Stuttgart are bound to stick to the regulations set for each transport mode, rather than focusing on their integration. Therefore, the actual outcome might differ from what is best for each mode in order to find the best solution for them all. This affects the quality of the intermodal transport network in the city. Furthermore, each office belongs to a different department within the city administration which is why they have different mayors that lead the departments. Interviewee 5, head of the Office of Civil Engineering points out that *“different political parties have different views on mobility and therefore, that might complicate planning processes”*. Interviewee 1 agrees that *“(finding compromises) is no problem among planners, but the political level is problematic”*. Thus, expectations and priorities of different offices might not align, although overall aiming for the same goal. Furthermore, apart from being led by different political parties, each office has its main priority: it could be that the Traffic Authority is concerned about traffic safety when implementing bike routes on former parking spaces, and then the offices need to find a compromise that works for them all. Additionally, Interviewee 5 adds that factors from the outside usually collide with planning processes, meaning that politics, the city council and the public might have further wishes and things to add.

Integrating biking and walking with public transport in Gothenburg involve different actors which requires well-established collaboration between especially Västtrafik and the city. Thus, inconsistent planning occurs most likely when two different perspectives meet, despite the fact that sustainable, intermodal transport network is aimed at. Interviewee 4 says that

“the region (...) has a bigger scale to take care of and needs to see the connection between different areas and cities. Gothenburg tends to look more at their own geographic scale. (...) And that is right because that is where they can make an impact on the planning, so it is not strange, it is a consequence of how we are organized”.

Another important aspect that affects collaboration and makes actors prioritize different components of intermodal travels is the question about budget.

“It is hard in the collaboration when one part gets stuff done and the other parts don't. And that is because we have different budgets and are driven by different organizations, so that's also a challenge in the collaboration, that we are not under the same budgets for these questions” (Interviewee 4).

Typically, the consequence is that Västtrafik would have to wait for the city to prioritize what is best for Västtrafik, which means that implementing public transport that aligns with the bike and pedestrian network would have to wait. Therefore, time and budget does not always match in the collaboration and leads to an uneven planning process for intermodal measures.

How can it be overcome?

In both Stuttgart and Gothenburg, planners on a systematic and planning level share the same goal, but when it comes down to the execution of strategies and plans, issues occur. Although shared objectives and a clear problem definition is given on that level, there seems to be a lack of those aspects on the executive level. According to the theoretical framework, joint problem

definition and action as well as shared objectives as primary values and understanding the roles and motivations of each actor as secondary values are important to reach a successful outcome and although those values seem to be given on the higher level, the lack of them lead to inconvenient outcomes in the actual doing.

In Stuttgart, the problem is that different offices insist on incorporating their point of view, regardless of the actual physical outcome. The theory of collaboration suggests that joint action and a joint problem definition are needed for a successful collaboration in Stuttgart. The goal is to implement a sustainable street network that integrates biking and walking with public transport, and especially in parts of the city that need to be renewed, it is important to agree on a shared goal on a much smaller scale, too. Although the same overall goal is aimed at, without joint action and joint problem definition regarding the common objective, the collaboration produces a negative outcome for transport users, despite the fact that the planners agreed based on all regulations. Focusing on a more detailed physical outcome and agreeing on how that outcome can be achieved best through a better definition of how to collaborate might be useful to implement an integrated street network. Although there seems to be an understanding on the planning level, the executing level lacks shared objectives on a much smaller scale where details of wanted intermodal outcomes are important.

In Gothenburg, however, although actors agree that sustainable transport needs to be improved and biking and walking better integrated, there seems to be a disfunction when it come to the actual implementation of supporting measures due to different prioritization among the actors. The theory suggests a better understanding of each other's motivation and roles as well as a joint problem definition on a much smaller scale, too, where the actual implementation of modes of transport is done. An equal prioritization of different aspects of the planning process would facilitate the planning for an intermodal urban transport network.

5.3.2 Summary and Comparison

Active intermodality, in this thesis mostly referred to as the integration of biking and walking with public transport, is something that isn't naturally planned for within the systems Stuttgart and Gothenburg work in. Both cases showed that old structures need to be broken and reinstated to allow new mobility patterns such as intermodality to be improved. Although such new planning structures for certain measures do not exist yet in neither of the cities, measures that encourage active intermodality – as it is defined in the literature – are planned for, but both struggle with the implementation of concepts that did not exist before. Mobility hubs in Stuttgart are difficult to plan for as responsibilities are not clear, and integrating biking with public transport on a local and regional scale as well as mobility hubs are difficult to implement because of dispersed organizational structures.

Interestingly, the German and Swedish systems are different in their organization and responsibilities and yet create the same barriers. Both cities created systems in the past at the disadvantage of sustainable intermodal transport and in favor of the car, all on the national, regional and local level when it comes to the implementation of certain measures. Stuttgart and Gothenburg face the same barriers nowadays and as the theory of collaboration has shown,

similar solutions on a theoretical basis are needed, even though the organization of the collaboration is very different. Therefore, the impact of each respective system on the collaboration is immense: For example, while planning processes in Stuttgart are mostly done by offices of the city administration, the organization in Gothenburg is more dispersed among actors which requires a different kind of collaboration – and solution. Overall, structures lack collaboration on integrating biking and walking with public transport and mobility hubs in various ways to further facilitate and improve intermodality. In both cases, barriers of the collaboration regarding intermodality is a result of the current planning system that still favors the car.

How do Planners deal with the Barriers?

The comparison has shown that different systems produce different collaborative dynamics in which the actors can operate. Especially the intermodal measures that do not have an assigned planning process show how actors deal with that in their specific planning framework – and that handling affects active intermodality in the long run.

In Stuttgart, where planning for mobility hubs is somehow restricted by the planning system, Interviewee 5, head of the Office of Civil Engineering in Stuttgart explains that

“There are no sustainable structures. There are different possibilities within the city administration, the municipal services could be in charge of those things or different offices of the city administration. This has to be examined on a case-by-case basis, as there is still no fixed structure or responsibilities.”

After asking for what the Interviewees think has room for improvement, Interviewees 1 and 5 agree that the collaboration works well, without singling out an aspect that needs to be improved. On the contrary, both Interviewees stress the well-functioning collaboration with each other and emphasize external factors as having a negative impact on the otherwise well-established collaborative structures within the city administration.

“Lets put it that way, we have a goal. But when it comes down to concrete examples, they (different actors within the planning process) usually create quality restrictions in public transport or the street network.” (Interviewee 1).

It seems like the system they work in is not questioned, and neither is there a need to establish new processes nor to assign responsibilities in favor of active intermodality, although issues are known among planners. However, small doubts come to light as Interviewee 5 adds that *“it is easy to plan from the perspective of the Office of Urban Planning and Renewal, there is a nice plan and that’s how they are wish for it to be executed. But executing it is difficult (...) and causes high personnel costs”*. Despite this, they seem to be fine with discussing case-by-case instead of implementing structures that cover such issues that lead to less quality in the street space.

In Gothenburg, however, planners on the systematic level acknowledge the problem and are looking to introduce a new system where responsibilities are clear regarding intermodality in

form of the integration of biking with public transport. Although the will is there, the implementation is currently just a project, which planners from Västra Götalandsregionen on a systematic level define as being difficult to implement, once the project is done.

“The problem that we have (is that) we (...) are very good with working with (...) pilot studies, but to integrate that (...), that’s where we are not very good at. (...) So it’s unclear what to do with (that, once the pilot study is over). Is Västtrafik going to work with cycling integration or was it just a pilot study, and that we don’t know.”, says Interviewee 3, planner at Västra Götalandsregionen.

Interviewee 3 continues that strategies are clear, but they are not clear enough. Additionally, they explain that actors have different budgets and might also have different strategies, which makes the integration of the planning process in the system more difficult. They stress the importance of strategies needing to be clearer so that it is easier to find consensus on the political and systematic level, which would facilitate Västtrafiks’ work on the ground. In line with that, planners at Västtrafik are currently trying to figure out how to successfully introduce a new collaborative structure.

“We are kind of an island in the whole organization right now”, says Interviewee 2 from Västtrafik. *“We are trying to figure out how we should work with intermodality and then there will be a discussion with planners and all the other departments that might be involved.”*

Therefore, as Interviewee 3 said, a clear strategy is needed to plan for long-term solutions. Looking at the implementation-level, Interviewee 4 pinpoints that although Västtrafik is involved in the early stages of planning processes in Gothenburg, they *“tend to get lost in the process when they start to build the houses”*. Interviewee 4 adds that both the city and Västtrafik identified this issue and plan to incorporate that in their collaborative planning. Besides the more detailed planning processes with Gothenburg, Interviewee 4 confirms what Interviewee 2 and 3 already mentioned:

“We all want to work with combined mobility and sustainable travel and on the strategic level, we all agree that this is very important. But when it comes down to financial and practical doings, there the priorities fall apart a bit. It is easy to agree on the high level but when it comes to the actual doing, we might have to do something that is not in line with what the strategic level told us to.”

The comparison showed how different systems create different dynamics that have a big impact on the long-term planning for active intermodality. Planners in Stuttgart do not aspire to build new structures, for example, and this could be applied to other examples, as well: in the long-run, it could be more challenging to improve active intermodality if measures that are not already part of the system yet need to be planned for. The German planning system does not allow much creativity to form new structures, unless it has been decided on a higher level. On the other hand, once measures are incorporated into the planning process, they are executed with no ifs and buts. In Gothenburg, the dynamics among the planners are different: they address the problem by trying to figure out what can be done better, are there new collaborative

structures needed or do the already existing ones need to be improved? This comparison shows how collaboration is limited by each respective system and its regulations and how planners find solutions for unplanned measures: the Swedish system in Gothenburg is more flexible and allows more room for maneuvers, but also causes more chaos in the collaboration compared to the German system in Stuttgart, where everything seems to be set and final.

6. Conclusion

The aim of this thesis was to understand planning practices for intermodality, and it sets out in the cities of Stuttgart/Germany and Gothenburg/Sweden. A collaborative perspective was taken to answer the question: how can active intermodality be improved?

Both Stuttgart and Gothenburg aim for a more sustainable, intermodal transport network, where biking and walking is integrated with public transport. Active intermodality is a crucial part in their transport networks as those modes solve the last-mile issue while bettering environmental conditions and the residents' health. According to literature, active intermodality refers to the integration of biking and walking with public transport by implementing bike stations, bike parking facilities near transport nodes. Important for it to be attractive, ways need to be shortened through mixed land-use and a connecting bike network and sidewalks. Active intermodality is a phenomenon that requires an integrated land-use and transport planning approach, which can be best studied and understood from a collaborative perspective.

Stuttgart and Gothenburg are both embedded in different planning systems, Stuttgart in a German system that is very hierarchical and does not allow much freedom of choice, while the Swedish planning system is less hierarchical and gives cities total planning competence. Furthermore, public transport and active intermodality is entirely planned for by the city in Stuttgart with having the public transport operator outsourced. In Gothenburg, however, the region Västra Götalandsregionen and their public transport operator, Västtrafik, are in charge of public transport in Gothenburg (and the entire region), while Gothenburg is responsible for their infrastructure as well as biking. Against the different planning background, the relevant planning documents were read. Those planning documents are in line with what the literature suggested as being important for active intermodality. The integration and extension of biking and walking is in the center of attention. Additionally, the planning documents highlighted the importance of collaboration to reach a more sustainable intermodal transport network. While the *SUMP* in Stuttgart only mentioned responsibilities over certain projects regarding the improvement of the bike network or digital apps for travel information, the Transport Provision Programme in Gothenburg describes roughly the collaboration between relevant actors. However, those documents only give an idea of how collaboration works in those cities, which is why this study was complemented by interviews with relevant actors mentioned in those documents.

Thus, Interviewees from the Offices of Urban Planning and Renewal and Civil Engineering in Stuttgart as well as from Västtrafik and Västra Götalandsregionen in Västra Götland were conducted to further understand the collaboration. The Interviewees were asked questions about their definition of active intermodality – which was mostly in line with what could be found in the planning documents – and their collaboration within their organization and with others companies. To answer the question on how to improve active intermodality, barriers within the collaboration were identified. The results have shown that both cities face the same barriers, even though the collaboration is organized very differently. The first barrier is the lack of interfaces within their planning system that is needed for a successful long-term integration of biking and walking with public transport – a crucial part of intermodality. The theoretical framework suggests that in both cases, clear defined leadership and mandates are needed to

overcome those barrier. The second barrier is different priorities and perspectives among relevant actors that plan for active intermodality. According to the theory, this calls for the improvement of joint action and joint problem definition in Stuttgart where all involved actors are part of the same city administration. Meanwhile, in Gothenburg/Västra Götaland, a better understanding of each other's role and motivation could lead to a joint problem definition to better plan for intermodality. Despite the different systems Stuttgart and Gothenburg work in, the theory suggests similar solutions to the same barriers. The theoretical framework has shown that it can identify issues within the collaboration but does not suggest solutions for external problems. Therefore, the barriers show that there is a clear limit to what collaboration can achieve, and those limits are the systems themselves.

This thesis has shown that understanding planning practices for active intermodality is deeply rooted in understanding collaboration between different actors. Collaboration is needed and inevitable when planning for intermodal measures, because it involves planners from different departments and requires the inclusion of different perspectives. The theory brought to light that with the improvement of the collaboration, the shared objective – intermodal measures – might be achieved more successfully.

6.1 Policy Recommendations

This thesis revealed that both Stuttgart and Gothenburg struggle to implement certain aspects of active intermodality in their respective city. Even though the theoretical framework pointed out what can be done to improve the collaboration in Stuttgart and Gothenburg and as a result, to improve planning practices for active intermodality, the overall planning system still pose a clear limit to what can be achieved through collaboration. This limit is beyond the scope of the theory, however, the thesis can give some policy recommendations based on its results. Even though the theory suggests similar improvements in both cities, a different solution in those cities is needed on a practical level to further improve collaborative planning practices. Different solutions are explained in the paragraph below that could help the actors to collaborate more effectively and efficiently.

The policy recommendations are based on and in line with the system the cities' function in and differ from each other. In the case of Stuttgart, this thesis suggests incorporating a planning scheme for all kinds of mobility hubs into the set regulations, so that planners have a fixed framework they can plan accordingly to. Furthermore, planners need to be given more flexibility in their planning practices to reach a better outcome in the physical streetscape. In Gothenburg, on the other hand, collaboration between the different actors needs to be strengthened to achieve a better outcome. This could be done by drawing more concrete plans as already mentioned by the Interviewees.

6.2 Further Research

All Interviewees agreed upon the impact of financial aspects of planning for sustainable modes of transport: it all comes down to money. Although this is an important issue in the realm of transport planning, it was beyond the scope of this thesis.

Both the city council in Stuttgart and the regional council in Västra Götaland are political bodies that have the last word in planning processes. Planners in Stuttgart agree that

“when the city council makes a decision, we have to execute it, and when the new city council wants to lift the decision, they can do that. They can do that or not, but that is happening on the political level. We don’t have any influence, we will just stick to the new decision” (Interviewee 5).

Planners in Västra Götaland are in a similar position:

“(If the politicians give us) tasks that support sustainable mobility, its good, that would be the best to support intermodality. But it is very hard to do that (to plan for intermodality) if the politicians do not do that“, says Interviewee 4 from Västtrafik. Interviewee 3 from Västra Götalandsregionen adds that *“funding (...) comes from clear strategies, visions and instructions”* (Interviewee 3).

This shows that projects and plans will often be financially limited because there is not enough budget available – which makes planning for sustainable modes more difficult. This raises the question, how biking and walking and thus, active intermodality, can gain importance in current transport politics to enable more funding and to improve its planning.

References

- Allard, R. F., & Moura, F. (2016). The incorporation of passenger connectivity and intermodal considerations in intercity transport planning. *Transport Reviews*, 36(2), 251-277.
- Bell, D. (2019). Intermodal mobility hubs and user needs. *Social sciences*, 8(2), 65.
- Bennaya, S., & Kilani, M. (2023). Evaluating the Benefits of Promoting Intermodality and Active Modes in Urban Transportation: A Microsimulation Approach. In *Smart Cities: Social and Environmental Challenges and Opportunities for Local Authorities* (pp. 279-294). Cham: Springer International Publishing.
- Bernal, L. M. M. D. (2016). Basic parameters for the design of intermodal public transport infrastructures. *Transportation Research Procedia*, 14, 499-508.
- Blomgren, G. (2020). Introducing Mass Transit in Gothenburg-Relationships Between Travel Time and Mode Choice.
- Boverket, Sveriges Kommuner och Regioner & Trafikverket. (2022). Handbok för trafikstrategiskt arbete. Tillgänglighet i ett hållbart samhälle. https://bransch.trafikverket.se/contentassets/740b84c13230422e851eeef569fa73f4/trv-handbok-for-trafikstrategiskt-arbete_2023-01-12.pdf
- Cannon, R., Zhao, C., & Hiselius, L. W. (2024). Barriers to better bicycle parking for promoting intermodal journeys: An inter-organisational collaboration perspective. *Transport Policy*, 145, 65-73.
- Curtis, C., Ellder, E., & Scheurer, J. (2019). Public transport accessibility tools matter: A case study of Gothenburg, Sweden. *Case Studies on Transport Policy*, 7(1), 96-107.
- EU Urban Mobility Observatory. (2019). Sweden. https://urban-mobility-observatory.transport.ec.europa.eu/sustainable-urban-mobility-plans/member-state-profiles/sweden_en
- Geurs, K. T. (2018). Transport planning with accessibility indices in the Netherlands. International Transport Forum Discussion Paper.
- Goletz, M., Haustein, S., Wolking, C., & l'Hostis, A. (2020). Intermodality in European metropolises: The current state of the art, and the results of an expert survey covering Berlin, Copenhagen, Hamburg and Paris. *Transport Policy*, 94, 109-122.
- Gössling, S. (2013). Urban transport transitions: Copenhagen, city of cyclists. *Journal of Transport Geography*, 33, 196-206.
- Göteborgs stad.(2014). Gothenburg 2035. Transport Strategy for a Close-Knit City. https://goteborg.se/wps/wcm/connect/6c603463-f0b8-4fc9-9cd4-c1e934b41969/Trafikstrategi_eng_140821_web.pdf?MOD=AJPERES

- Göteborgs stad. (2022). Översiktsplan. <https://oversiktsplan.goteborg.se>
- Göteborgs stad. (2024a). Statistikdatabas. <https://statistikdatabas.goteborg.se/pxweb/sv/>
- Göteborgs stad. (2024b). Trafik och resandeutveckling 2023. <https://goteborg.se/wps/wcm/connect/99ec2212-5a8c-4817-8836-197da012a211/Trafik-och-resandeutveckling+2023+goteborg.se.pdf?MOD=AJPERES>
- Göteborgs stad. (n.d.a). Befolkningutveckling. <https://goteborg.se/wps/portal/enhetssida/statistik-och-analys/demografi-och-analys/korta-kommentarer/befolkningutveckling-2023>
- Göteborgs stad. (n.d.b). Geografi och kartor. <https://goteborg.se/wps/portal/enhetssida/statistik-och-analys/geografi>
- Göteborgs stad. (n.d.c). Om kommunens organisation. <https://goteborg.se/wps/portal/start/kommun-och-politik/kommunens-organisation/sastyrs-goteborg/om-kommunens-organisation>
- Griffin, G. P., & Sener, I. N. (2016). Planning for bike share connectivity to rail transit. *Journal of public transportation*, 19(2), 1-22.
- Hrelja, R., Pettersson, F., & Westerdahl, S. (2016). The qualities needed for a successful collaboration: A contribution to the conceptual understanding of collaboration for efficient public transport. *Sustainability*, 8(6), 542.
- Huxham, C. (2003). Theorizing collaboration practice. *Public management review*, 5(3), 401-423.
- Litman, T. (2017). *Introduction to multi-modal transportation planning*. Canada: Victoria Transport Policy Institute.
- Maltese, I., Gatta, V., & Marcucci, E. (2021). Active travel in sustainable urban mobility plans. An Italian overview. *Research in Transportation Business & Management*, 40, 100621.
- Manaugh, K., Badami, M. G., & El-Geneidy, A. M. (2015). Integrating social equity into urban transportation planning: A critical evaluation of equity objectives and measures in transportation plans in North America. *Transport policy*, 37, 167-176.
- Mozos-Blanco, M. Á., Pozo-Menéndez, E., Arce-Ruiz, R., & Baucells-Aletà, N. (2018). The way to sustainable mobility. A comparative analysis of sustainable mobility plans in Spain. *Transport policy*, 72, 45-54.
- Newman, P., Kosonen, L., & Kenworthy, J. (2016). The theory of urban fabrics: Planning the walking, transit and automobile cities for reduced automobile dependence. *Town Planning Reviews*, 87 (4), 429–458.

- Nieuwenhuijsen, M. J. (2016). Urban and transport planning, environmental exposures and health-new concepts, methods and tools to improve health in cities. *Environmental health*, 15, 161-171.
- Nordregio. (n.d.). The spatial planning systems in the Nordic region. <https://archive.nordregio.se/Metameny/About-Nordregio/Nordic-working-groups/nwgcityregions/The-spatial-planning-systems-in-the-Nordic-region/index.html>
- Oehler, S., Seyboth, A., Scherz, S. & Wortmann, M. (2014). Das Verkehrsentwicklungskonzept der Landeshauptstadt Stuttgart. <https://www.stuttgart.de/leben/mobilitaet/nachhaltige-mobilitaet/mobilitaets-konzepte/verkehrsentwicklungskonzept-2030.php>
- Olvera, L. D., Guézéré, A., Plat, D., & Pochet, P. (2015). Improvising intermodality and multimodality. Empirical findings for Lomé, Togo. *Case Studies on Transport Policy*, 3(4), 459-467.
- Oostendorp, R., Krajzewicz, D., Gebhardt, L., & Heinrichs, D. (2019). Intermodal mobility in cities and its contribution to accessibility. *Applied Mobilities*, 4(2), 183-199.
- Pazzini, M., Lantieri, C., Vignali, V., Simone, A., Dondi, G., Luppino, G., & Grasso, D. (2022). Comparison between different territorial policies to support intermodality of public transport. *Transportation Research Procedia*, 60, 68-75.
- Pettersson, F., & Hrelja, R. (2020). How to create functioning collaboration in theory and in practice—practical experiences of collaboration when planning public transport systems. *International journal of sustainable transportation*, 14(1), 1-13.
- Pettersson, F., Stjernborg, V., & Curtis, C. (2021). Critical challenges in implementing sustainable transport policy in Stockholm and Gothenburg. *Cities*, 113, 103153.
- Polygo. (n.d.). Über polygo. <https://www.mypolygo.de/ueber-polygo>
- Sagaris, L., Tiznado-Aitken, I., & Steiniger, S. (2017). Exploring the social and spatial potential of an intermodal approach to transport planning. *International Journal of Sustainable Transportation*, 11(10), 721-736.
- Schalk, R., & Curşeu, P. L. (2010). Cooperation in organizations. *Journal of Managerial Psychology*, 25(5), 453-459.
- Shrestha, P. B. (2022). *Inter-modality hubs in the Metropolitan Area of Barcelona: A comparison between the metropolitan and the local scale in a GIS tool to support urban planning decisions* (Master's thesis, Universitat Politècnica de Catalunya).
- SSB AG. (2023). Geschäftsbericht 2022. Stuttgarter Straßenbahn Aktiengesellschaft. <https://www.ssb-ag.de/unternehmen/informationen-fakten/geschaeftsberichte/geschaeftsbericht-2022/>
- SSB AG. (n.d.a). Das Unternehmen. Die Stuttgarter Straßenbahn AG. <https://www.ssb-ag.de/unternehmen/die-ssb/>

- SSB AG. (n.d.b). Der Einkauf der SSB. <https://www.ssb-ag.de/unternehmen/einkauf/>
- Steiner, K., & Irnich, S. (2020). Strategic planning for integrated mobility-on-demand and urban public bus networks. *Transportation Science*, 54(6), 1616-1639.
- Stuttgart. (2011). Public Corporate Governance für die Landeshauptstadt Stuttgart. Standards zur Steigerung der Effizienz, Transparenz und Kontrolle bei den städtischen Beteiligungsgesellschaften. https://publicgovernance.de/media/PCGK_Stuttgart_2011.pdf
- Stuttgart. (2018). Masterplan zur Gestaltung nachhaltiger und emissionsfreier Mobilität – Green City Plan – Landeshauptstadt Stuttgart. <https://www.stuttgart.de/leben/mobilitaet/nachhaltige-mobilitaet/mobilitaets-konzepte/green-city-plan.php>
- Stuttgart. (2021). Nahverkehrsplan für die Landeshauptstadt Stuttgart. 3. Fortschreibung (Teil-Fortschreibung). <https://www.stuttgart.de/leben/mobilitaet/oepnv/nahverkehrsplan.php>
- Stuttgart. (2022). Beteiligungsbericht der Landeshauptstadt Stuttgart. <https://www.stuttgart.de/rathaus/finanzen/beteiligungsbericht.php>
- Stuttgart. (2023). Aktionsplan 2023. Nachhaltig und innovativ mobil in Stuttgart. <https://www.stuttgart.de/leben/mobilitaet/nachhaltige-mobilitaet/mobilitaets-konzepte/aktionsplan-nachhaltig-mobil.php?font=plus>
- Stuttgart. (n.d.a). Finanzen. Public Corporate Governance. <https://www.stuttgart.de/rathaus/finanzen/public-corporate-governance.php>
- Stuttgart. (n.d.b). Mitglieder des Gemeinderats. Retrieved 28.02.2024 from <https://www.stuttgart.de/rathaus/gemeinderat/mitglieder-des-gemeinderats/>
- Stuttgart. (n.d.c). Rathaus. Verwaltung. <https://www.stuttgart.de/rathaus/verwaltung/>
- Stuttgart. (n.d.d). Stadt- und Freiraumentwicklung. Flächennutzungsplanung. <https://www.stuttgart.de/leben/stadtentwicklung/stadtplanung/stadt--und-freiraumentwicklung/Flaechennutzungsplanung.php>
- Stuttgart. (n.d.e). Stadtgeschichte. Stadtgeschichte im Überblick. <https://www.stuttgart.de/kultur/stadtgeschichte/stadtgeschichte-im-ueberblick.php>
- Stuttgart. (n.d.f). Stadtplan. <https://maps.stuttgart.de/stadtplan/>
- Sveriges Kommuner och Regioner. (2024). Kollektivtrafik, persontransporter. <https://skr.se/skr/samhallsplaneringinfrastruktur/trafikinfrastruktur/kollektivtrafikpersontransporter.964.html>
- Thomson, A. M., Perry, J. L., & Miller, T. K. (2009). Conceptualizing and measuring collaboration. *Journal of public administration research and theory*, 19(1), 23-56.

- Trafikverket. (2021). Summary “A direction framework for long-term infrastructure-planning, for the periods 2022-2033 and 2022-2036”. <http://trafikverket.diva-portal.org/smash/get/diva2:1568062/FULLTEXT01.pdf>
- Trafikverket. (2023). Regionalt trafikstrategiskt arbete. Fördjupningsdokument till Handbok för trafikstrategiskt arbete. <http://trafikverket.diva-portal.org/smash/get/diva2:1822626/FULLTEXT01.pdf>
- Trafikverket. (2024). Trafikstrategisk arbete – Tillgänglighet i ett hållbart samhälle. <https://bransch.trafikverket.se/for-dig-i-branschen/Planera-och-utreda/samhallsplanering/samspel-mellan-trafik-och-bebyggelse/Planera-for-hallbara-stader-och-atraktiva-regioner/Trafik-for-en-attractiv-stad/>
- Umweltbundesamt. (2014). Abbildung: Räumliches Planungssystem in Deutschland. https://www.umweltbundesamt.de/sites/default/files/medien/371/bilder/raeumliches_planungssystem_25.03_0.jpg
- Umweltbundesamt. (2020). Planungsebenen, Planungsräume – Stufen der räumlichen Planung. <https://www.umweltbundesamt.de/themen/nachhaltigkeit-strategien-internationales/planungsinstrumente/planungsebenen-planungsraeume-stufen-der#bundesebene>
- Umweltbundesamt. (2022). Kommunale Verkehrsplanung. <https://www.umweltbundesamt.de/themen/verkehr/nachhaltige-mobilitaet/verkehrsplanung/kommunale-verkehrsplanung#integrierte-verkehrsentwicklungsplanung-kommunen-stellen-weichen>
- Västra Götalandsregionen. (2019). Public Transport. <https://www.vgregion.se/en/public-transport/>
- Västra Götalandsregionen. (2021). Trafikförsörjningsprogram 2021-2025. Hållbara resor i Västra Götaland. <https://mellanarkiv-offentlig.vgregion.se/alfresco/s/archive/stream/public/v1/source/available/SOFIA/KTN6620-2120840548-20/SURROGATE/Hållbara%20resor%20i%20Västra%20Götaland%20beslutad%2018%20maj.pdf>
- Västra Götalandsregionen. (2022). Kollektivtrafikens miljö-och klimastrategi. <https://www.vgregion.se/kollektivtrafik/sa-styrs-kollektivtrafiken/trafikforsorjningsprogrammet/kollektivtrafikens-miljo--och-klimatstrategi/>
- Västra Götalandsregionen. (2023). Trafikförsörjningsprogram – Hållbara resor i Västra Götaland. <https://www.vgregion.se/kollektivtrafik/sa-styrs-kollektivtrafiken/trafikforsorjningsprogrammet/>
- Västra Götalandsregionen. (2024a). Politisk organisation. <https://www.vgregion.se/politik/politisk-organisation/>

- Västra Götalandsregionen. (2024b). Så styrs kollektivtrafiken i Västra Götaland. <https://www.vgregion.se/kollektivtrafik/sa-styrs-kollektivtrafiken/>
- Västtrafik. (2024). Linjekator. Spårvagn, båt och stombussar i Göteborg. https://www.vasttrafik.se/globalassets/media/kartor/linjenatskartor/sparvagn/sparvagn-stombuss-bat_feb2024.pdf
- VVS. (2023). Stuttgart Innenstadt. <https://download.vvs.de/Innenstadt.pdf>
- Waddell, P. (2016). Integrated land use and transportation planning and modelling: Addressing challenges in research and practice. In *Transport Models in Urban Planning Practices* (pp. 71-92). Routledge.
- Willing, C., Brandt, T., & Neumann, D. (2017). Intermodal mobility. *Business & Information Systems Engineering*, 59, 173-179.
- Wondratschek, F. (2023). How might travel times and mobility behavior influence multimodality in the environmental network? A structural analysis of the state capital Stuttgart.
- Wong, R. C. P., Szeto, W. Y., Yang, L., Li, Y. C., & Wong, S. C. (2018). Public transport policy measures for improving elderly mobility. *Transport policy*, 63, 73-79.
- Wood, D. J., & Gray, B. (1991). Toward a comprehensive theory of collaboration. *The Journal of applied behavioral science*, 27(2), 139-162.

Appendix

Interview Guide

Interviewee

Which Organization Are You Working for and what Is Your Role?
Für welches Amt arbeiten Sie und für welche Aufgaben sind Sie zuständig?

Intermodality

Do you plan for intermodality?
Planen Sie für Intermodalität?

How and in what way do you plan for intermodality?
Wie und in welcher Weise arbeiten Sie für Intermodalität?

What role are you playing when planning for intermodality?
Welche Rolle spielen Sie in der Planung für Intermodalität?

How do you plan for the integration of bicycling and walking with public transportation?
Wie planen Sie die Eingliederung von Fahrrad- und Fußverkehr mit ÖPNV?

What is your Definition of (active) Intermodality?
Wie definieren Sie den Begriff (aktive) Intermodalität?

Collaboration

Which Organizations are important when planning for intermodality?
Welche Organisationen sind wichtig wenn es um die Planung von Intermodalität geht?

What are their interests?
Was sind deren Interessen?

Do those organizations (or within the same organization) view public transportation/intermodality the same way as you or are there any differences?
Sehen diese Organisationen die ÖPNV/Intermodalität genauso oder gibt es da Unterschiede?

How do you work together for the integration/combination of biking/walking with public transportation?
Wie arbeiten Sie zusammen, um die Kombination/Integration von Radfahren und Laufen mit ÖPNV zu gewährleisten?

Is street design an important factor in the planning process?
Ist die Straßengestaltung ein wichtiger Faktor im Planungsprozess?

Is accessibility an important factor in the planning process?
Spielt Barrierefreiheit eine wichtige Rolle?

As XXX, how do you plan together with planners in other departments?
Als XXX, wie arbeiten Sie zusammen mit Planern aus anderen Abteilungen?

Do you as XXX work closely with XXX?
Arbeiten Sie als XXX eng zusammen mit XXX?

How Do You Collaborate?
Wie sieht diese Zusammenarbeit aus?

Are there different views on the physical design of public transportation?
Gibt es verschiedene Ansichten darüber, wie das physische Design von ÖPNV aussehen soll?

What do you think about mobility hubs?
Was denken Sie über Mobility Hubs?

Collaboration in Detail

Are the Roles of all collaborating parties clear?
Sind die Rollen aller Teilnehmenden klar definiert?

Is there a clear definition of what should be achieved?
Wurde klar definiert, was durch die Zusammenarbeit erreicht werden soll?

Where and how are the most important decisions made?
Wo und wie werden die wichtigsten Entscheidungen getroffen?

What Factors Facilitate Collaboration?
Welche Faktoren ermöglichen und/oder begünstigen die Zusammenarbeit?

What Factors Hinder Collaboration?
Welche Faktoren erschweren die Zusammenarbeit?

Are there any conflicts (of interest)?
Gibt es (Interessens-)Konflikte?

Are there any on-going discussions/dialogues with other actors?
Gibt es aktuell Dialoge zwischen den Akteuren?

How do you talk/meet? Where does the dialogue take place
Welche Art des Austauschs gibt es? Wo findet der Austausch statt?

How are those dialogues managed?
Wie werden diese Austausche koordiniert?

Do they work well?
Funktionieren diese Austausche gut?

Statutory Declaration

I declare that I have authored this thesis independently, that I have not used other than the declared sources / resources and that I have explicitly marked all material which has been quoted either literally or by content from the used sources.

This paper was not previously presented to another examination board and has not been published.

22.05.2024

A handwritten signature in blue ink, appearing to read 'H. H. H.', written over a horizontal line.

date

signature