

# Master Thesis

## How cities design policies on shared e-scooters - An analysis on five cities in Germany

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# Summary

The sharing economy is transforming cities: It changes how people work, consume, and move in and around cities. The rapid rise and development of the sharing economy has taken cities by surprise. Hence, cities are required to develop suitable policy designs to steer the development of these sharing services. This thesis explores how cities design policies on shared e-scooter services by applying the frameworks of Municipal Governance (Voytenko Palgan et al., 2021) and Policy Design (Howlett, 2018). Based on the analysis of five case study cities in Germany the following research question will be answered: *'How are policies on shared e-Scooters designed by cities in Germany?'* For the analysis this research applies a mixed methods approach by combining the findings of seven semi-structured interviews with municipal policy makers and policy document analysis on the federal, state and municipal level.

This study finds that cities differ in their Policy Design on shared e-scooters. Shared e-scooters are new mobility service, and thus, existing Policy Designs need to be adapted. This analysis shows that some cities go through different policy design stages in which they apply different governance mechanisms. In addition, the analysis concludes that the policy approaches towards shared e-scooters will likely further evolve within the next years. This offers a chance for cities to steer the development of the shared e-scooter market towards higher sustainability. The first step for a good policy design on shared e-scooter services is a clear goal definition, which states the role shared e-scooters should take within the cities' transportation system. The management and availability of e-scooter user data is identified as key success factor for policy decisions. The data allows to gain a better understanding of shared e-scooter usage patterns. Furthermore, policy learning is identified as a critical factor for cities to improve their policies as the shared e-scooter market is still highly dynamic. A well thought out and designed evaluation process of current policies is therefore central for cities when designing policies. This applies especially to larger cities since the limitations in information and knowledge by policy makers are higher than in cities of smaller scale.

Overall, this thesis finds that cities differ in their Policy Designs towards shared e-scooters. These differences route in variances within regulatory frameworks on state levels and differences within the chosen governance mechanisms. In general, as policy learning occurs and knowledge limitations are reduced, a trend towards more regulative governance mechanisms can be identified.

Key words:

e-scooter, micromobility, sharing economy, governance, policy design, sustainable mobility

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# 1. Introduction

## 1.1 Problem statement

The sharing economy is transforming the production and consumption in cities, facilitated by the rapid digitalisation. AirBnB, Uber and other global corporate companies change how people work, travel, and move in and around cities.

With the rise of the sharing economy – about a decade ago – there were many hopes assigned to this new form of economy. It was hoped by many, that the sharing economy will establish more sustainable forms of production and consumption. These initial hopes are now, a decade later, being challenged by many scholars.

AirBnB for example puts pressure on the housing market for local residents, which causes social problems within cities. Uber aims to disrupt the mobility market by offering ride hailing services and threatens the taxi market, causing labour right issues and potentially contributes to induced car traffic.

These developments have shown that the sharing economy is not sustainable by default (Mont et al., 2020, p. 7). Moreover, the sharing economy is seen today as a risk to professionalism, public safety, privacy and health, labour rights (Mont et al., 2020, p. 2), increased consumption and environmental burden (Martin, 2016, cited after Mont et al., 2020, p.2).

However, other scholars find that the sharing economy also contributes to sustainable production and consumption and might present one way to achieve sustainability goals. One key success factor for achieving a sustainable sharing economy will be how the state develops governance approaches towards this sector.

The rapid rise of the sharing economy – especially sharing services delivered by multi-national platforms – has taken governments by surprise and leads to challenges which cities are not prepared for (Mont et al., 2020, p. 2). These developments can be also applied to the mobility sector.

### *E-scooters:*

One recently launched shared service are e-scooters. E-scooters are micromobility services and thus fall within the same category as bike sharing services. E-scooters were first launched in the United States in 2018 and since then have rapidly expanded across the globe.

Especially in the early days of shared e-scooter services, sharing economy organisations have taken a rather disruptive approach. Companies have “flooded” the streets with e-scooters without prior notice to the cities’ administrative bodies. The companies rather preferred to take a path of “forgiveness” (Button et al. 2020, p. 6).

In line with prior experiences gained during the introduction of other shared services, municipalities were lacking a governance approach at the time of launch. Consequently, various approaches emerged on how to govern and steer the development of the e-scooter sharing market. This resulted in “many cities [moving] through trial-and-error stages in their search for appropriate legislation” (Gössling, 2020, p. 1). Gössling (2020) also finds that many cities have taken a reactive approach (“post-introduction”) in e-scooter regulation, rather than proactive approaches. The findings on the sustainability of e-scooters – especially regarding the influence on mobility behaviour<sup>1</sup> - are mixed. E-scooters are often a substitute for walking trips and short public transport rides. In fewer cases e-scooters substitute car trips. E-scooters are considered to be most sustainable when used as first or last mile services on intermodal trips. This puts the question forward which governance approaches by cities are most suitable to enhance the first and last mile use of e-scooters.

Field and Jon (2021, p. 369) find on a case study in Brisbane “that practitioners struggle with new mobility technologies popping up in urban landscapes without notice, and that the government is often left trying to catch up with what is already happening and the unknown of what to come.” This finding from Field and Jon (2021) is in line with the finding from Gössling (2020) that cities have moved through trial-and-error stages when governing e-scooters (*policy learning*).

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<sup>1</sup> The author is aware that there are many concerns regarding the life cycles of e-scooters. These factors need to be considered when focusing on the overall environmental sustainability of e-scooters. Nevertheless – due to feasibility - in this thesis the main focus will be laid on the potential of e-scooters to achieve a modal shift towards sustainable modes of transport.

Under the pressure of disruptive new mobility services emerging, it remains unclear, how much attention cities put on the overall goals of city transport planning, such as improving accessibility and integrating public transport with shared micromobility services. In general, the research on e-scooters focuses mainly on reactive policies on e-scooters. So far, researchers paid less attention to how these reactive policies fit to the overarching goals of transport planning (especially decreasing car dependency, modal shift, and accessibility), or if these policies are more focused on reducing the (in public spaces visible) negative externalities such as vandalism, cluttering or irresponsible riding (*policy fit*)<sup>2</sup>. In many cities are just starting to establish a clear policy design process on e-scooters which might put the overall goals of transport planning more prominent on the agenda of the policy design process.

## 1.2 Research aim

As outlined in the problem statement cities differ in their approach to govern the sharing economy. This also holds true in the space of micromobility. This thesis focuses especially on shared e-scooters, which have received limited attention so far, even though there is a considerable amount of literature on ridesharing, ride hailing and bicycle sharing (e. g. Gössling, 2020, p. 2).

The overall aim of this thesis is to analyse how cities govern micromobility services. First, the aim is to identify different governance mechanisms and roles used by cities in Germany on free-floating e-Scooters. This will be done by using the analytical framework of municipal governance of Voytenko Palgan et al. (2021).

As outlined in the problem statement, the disruptive character of the shared micromobility services and the governance mechanism used by the city, shapes how planners design policies on micromobility services. Therefore, this thesis will, secondly, analyse how the policy design process on micromobility services takes place in the case studies. The

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<sup>2</sup> A similar observation is made by policy makers in the POLIS network: They call this “*Keep your eyes on the goal*” (POLIS, 2019, p. 33). By this they mean that the main goal of transport planning is to reduce the car dependency and to achieve a modal shift. For this, new technologies (such as sharing solutions) can be very helpful. To achieve this, they call for a shift from reactive to proactive regulatory frameworks, which are more agile and consider uncertainties. In summary, they call for a more active role of cities: “*Public interest must lead, and cities must set the rules.*”

thesis examines the goals of the introduced policies and which tools are used to achieve those. A special focus will be placed on how the goals and tools fit together (*policy fit*) and how the city adapted their policies over time (*policy learning*).

## 1.3 Research questions

*Main research question:*

How are policies on shared e-scooters designed by cities in Germany?

*Sub-questions:*

1. Which goals do the cities intend to achieve with policies on shared e-scooters?
2. Which governance mechanisms are used by the cities?
3. How does the policy design process take place?

## 1.4 Scientific relevance

Voytenko Palgan et al. (2021, p. 108) state that it is an important area of future research to explain why municipalities differ in their governance approaches towards sharing economy organisations. This thesis will contribute to this research gap by identifying different governance approaches used by cities towards shared micromobility services in Europe, focussing on shared e-scooters. Furthermore, this thesis will research on five German cities as case studies and identify reasons for their respective policy choices. This will contribute to the bigger picture, why cities in Germany differ in their governance approaches towards the sharing economy. The focus of this thesis has been set on examining the urban policies, based on the finding that municipalities often influence the types of sharing economy organisations that emerge and flourish in cities or those that face hardships and ultimately fail (Bernardi & Diamantini, 2018, cited after Voytenko Palgan et al., 2021, p. 2).

Shared e-scooters are a recent phenomenon. They appeared first 2018 in the United States (Bozzi and Aguilera, 2021, p. 2). Therefore, the usage patterns, the social and

environmental impacts, and the best practices for regulating their use are only partially analysed (Bozzi and Aguilera, 2021, p. 2). However, the body of literature is growing. As outlined in the problem statement, some sharing economy organisations are challenging existing urban policies through their disruptive market approaches. This might influence how the policy design process within cities takes place. Cities need to adapt to the new developments by inventing new policies, which is important in order to leverage the sustainability potential of the sharing economy (Mont et al., 2020, p. 7). Based on the case studies of five German cities, this thesis will analyse, if and how the policy design process might change due to the disruptive nature of new mobility services. This will strengthen the understanding of how the sharing economy changes urban policies. Furthermore, these findings inform recommendations for potential further scientific research topics (chapter 7.3.2.).

## 1.5 Societal relevance

*“The role of municipalities in governing the sharing economy is becoming increasingly important for urban policy and planning since, if managed well, the sharing economy may have a transformative impact on cities and their economic prosperity, social viability and environmental quality.”* (Voytenko Palgan et al., 2021, p. 2).

Services delivered by the sharing economy are emerging within cities. As found by many scholars these services are not sustainable by default. Municipalities play an important role in governing the sharing economy to achieve the sustainable potentials of the sharing economies.

To achieve the 1.5 degrees goal of the Paris Agreement within the mobility sector, rapid change in mobility behaviour is required, especially a decrease in car dependency and a change of the build environment. As found by many scholars, people are more likely to change their mobility behaviour when there are other mobility options and infrastructure available. Therefore, there is a need to increase the attractiveness of sustainable transport modes. Shared micromobility services can help to achieve this important goal

of transport policies. But since micromobility services for example tend to cluster in areas with high densities – where sustainable modes of transport are already widely available (such as good public transport quality, well developed cycling and walking infrastructure) – there is a need for urban policies to step in. If considering (sharing) mobility as a public good, there is also an obligation to make shared micromobility services available to neighbourhoods with less socio-economic status and to areas in greater distance to inner city areas.

In the case of shared micromobility services the spatial implications of the sharing services are well visible in public spaces<sup>3</sup>. Many e-scooters for example are clogging sidewalks, which causes concerns by residents, pedestrians and by vulnerable people. In the case of the City of Berlin the blocking of e-scooters on sidewalks even led to a lawsuit between an interest group for blind people and the City of Berlin. The interest group claims the City of Berlin does not do enough to protect blind people from risks by parked scooters on sidewalks (Berliner Zeitung, 2022). The problem increased over the last years since the number of scooters is still growing since the legal authorization of e-scooters in Germany in June 2019. In October 2022 there were over 54.000 shared e-scooters in the City of Berlin present, adding to the 9.100 shared bikes (RBB24, 2022).

Overall, there is an urgent need for cities to adapt their policies to the new challenges arising from the sharing economy. New ways of governing might be needed. Therefore, it is of major importance to examine how cities govern the sharing economy, how policies are designed and to analyse which policies might need to be changed in the future. In chapter 7.3.1. the author draws recommendations to practice on how to design policies for e-scooter governance based on the findings of this analysis.

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<sup>3</sup> Other than for example for services such as AirBnB, where implications of the sharing economy (such as rising housing costs) are less visible.

## 2. Theoretical framework

### 2.1 The Sharing Economy

The Sharing Economy is a recent phenomenon which has been growing for over a decade (Acquier et al., 2017, cited after Mont et al., 2020, p.2). Mont et al. (2020, p. 2) define the Sharing economy as follows:

*“The sharing economy is an umbrella term for a great variety of organisational models that are transforming marketplaces and cityscapes, where goods and services, skills and spaces are shared, exchanged, rented or leased.”*

Rapid digitalisation and penetration of smartphones has facilitated the rise of sharing economy platforms which are transforming production and consumption systems in cities (May, 2017, etc. cited after Mont et al., 2020, p.2).

Mont et al. (2020) find in a comprehensive literature review, that there is a growing criticism of the sharing economy and its effects. They identify that there is not much evidence available to support the sustainability claims of sharing (Mont et al., 2020, p. 2). *“The sharing economy is seen as a threat to professionalism, public safety, privacy and health, and labour rights”* (Mont et al., 2020, p. 2), *“as well as a risk of promoting increased consumption and associated environmental burden”* (Martin, 2016, cited after Mont et al., 2020, p.2). *“In particular, the rapid penetration of services delivered by multi-national platform giants such as Airbnb and Uber has been taking governments by surprise, leaving them unprepared for the challenges that might arise”* (Mont et al., 2020, p. 2). *“As a result, many national and local governments have now started regulating sharing economy practices”* (Mont et al., 2020, p. 2).

Mont et al. (2020, p. 2) conclude that *“while the sharing economy contributes to both creating and addressing sustainability issues, the actual economic, social and environmental impacts of the sharing economy remain poorly understood.”*

Mont et al. (2020, p. 2) also state, that it is important to advance *“more sustainably promising forms of the sharing and leveraging its benefits, while circumventing the pitfalls of the sharing economy.”* But they conclude that ways to achieve this are not yet understood. *“In particular the roles and perspectives of users, businesses and municipal governments in institutionalising the sharing economy in various geographical contexts are important to examine”* (Mont et al., 2020, p. 2).

## 2.2 Analytical Framework of municipal governance

Voytenko Palgan et al. (2021) developed an analytical framework for municipal governance of the sharing economy, comprising five mechanisms (regulating, providing, enabling, self-governing, collaborating) and eleven roles. They developed this framework due to the research gap that *“academic understanding of municipal governance mechanisms of the sharing economy remains poor.”* (Voytenko Palgan et al., 2021, p. 1). The framework was developed on a rich empirical set of data including 139 semi-structured interviews, workshops, focus groups and research labs in Amsterdam, Gothenburg, London, Malmö, San Francisco and Toronto.

*Table 1: Analytical framework of the Sharing Economy by Voytenko Palgan et al. (2021). Own table.*

Governance mechanism	Governance roles
Enabling	Matchmaker
	Communicator
Regulating	Regulator
Providing	Data Provider
	Investor
	Host
	Owner

Self Governing	Consumer
	Sharer
Collaborating	Negotiator
	Partner

### *Regulating governance mechanism*

“In the regulator role, municipalities use laws, taxes, bans and policies to govern the establishment, operation and scaling-up of sharing economy organisations, either supporting or restricting them” (Voytenko Palgan et al., 2021, p. 9).

### *Enabling governance mechanism*

The “city as a matchmaker’ is evident when municipalities facilitate collaboration of SEOs with other similar organisations, potential users, knowledge institutes or venture capitalists (Voytenko Palgan et al., 2021, p. 9).

In the role ‘city as a communicator’ “municipalities may disseminate information about the best SEOs and market it to different stakeholders, organise competitions or offer voluntary certification schemes to recognise the best sharing practices (Voytenko Palgan et al., 2021, p. 9).

Voytenko Palgan et al. (2018, p. 4) also mention the role that the city does not take any enabling or regulating measures: “*the City of San Francisco largely ignores ride-sharing services (...) Uber and Lyft by not imposing any regulations or restrictions on them, which indirectly favours their operations in the city.*”

An ‘Enabler’-role is seen as controversial, when the city favours some sharing economy organisations over others as mentioned by Voytenko Palgan et al. (2018, p. 4). Especially if these companies are for-profit organizations the controversy intensifies as it is regarded as a breach of competition laws through interference in the market (Voytenko Palgan et al., 2018, p. 4).

### *Collaborative governance mechanism*

The authors distinguish two governance roles within the collaborative governance mechanism. The *'city as a partner'* is a role when cities partner with a private company to provide a service to the public. One example for this would be cities who partner with a car-sharing platform (e.g., the partnership between the City of Portland with the company Getaround).

The role *'city as a negotiator'* means that the city negotiates agreements and terms with private sharing companies. The authors mention an example from Amsterdam, when the city of Amsterdam and Airbnb signed a memorandum of understanding in 2014 to "initiate a relationship of mutual cooperation" (Voytenko Palgan et al., 2021, p. 8). One example from the micromobility sector is the cooperation agreement between the City of Ulm (Germany) and e-scooter operators to come to a "cooperative understanding between cities, sharing operators and the public transport agency to achieve the goal of a conflict-free coexistence of all actors and to improve the mobility of the citizens" (City of Ulm, 2019, translation by the author).

#### *Providing governance mechanism*

The role *'city as a host'* refers to "instances where a municipality provides infrastructural support to sharing economy organisations", whereas the role *'city as an investor'* provides funding to a sharing economy organisation (p. 8).

The role *'city as an owner'* "refers to situations where municipalities establish, own, and provide a sharing service to their citizens" (p. 8). This role can mean municipalities develop platforms inspired by existing commercial examples (Finck and Ranchordas, 2016, cited after Voytenko Palgan et al., 2021, p. 8). For example, the City of Seoul "operates a website to reserve sport facilities, lecture halls and meeting rooms for educational and cultural events" (Voytenko Palgan et al., 2021, p. 8). Voytenko Palgan et al. (2021, p. 8) conclude, that "*such interventions in the sharing economy are important when there is insufficient interest towards a certain service among citizens or businesses while municipalities consider it worth promoting*" e. g. from a sustainability perspective. There are also instances where commercial platforms are not an option, e. g. after

banning Uber, Seoul developed its own open-source ride-hailing app (Finck and Ranchordas, 2016).

*“City as a data provider’ reflects the situation whereby municipalities share their data by, for example, creating and operating open data platforms. This facilitates the engagement of citizens and businesses in sharing movements, as they may themselves develop applications and services that cater to needs of urban populations”* (Voytenko Palgan et al., 2021, p. 8). “Such initiatives may also increase the accountability and transparency of municipalities” (Voytenko Palgan et al., 2021, p. 8).

### *Self-governing mechanism*

The *“self-governing mechanism in the context of the sharing economy encompasses the capacity of municipalities to include sharing solutions within their own operations and activities”* (Voytenko Palgan et al., 2021, p. 8). The *‘city as a consumer’* refers to the situation, that the city itself includes sharing solutions in their own activities. The *‘city as a sharer’* refers to the role that municipal units offer assets they own for shared use by other municipal units (Voytanko Palgan et al., 2021, p. 9). Voytenko Palgan et al. (2021, p. 9) mention for example a platform used by cities in the United States which allows municipalities to lend heavy and expensive equipment between each other.

## 2.3 Policy Design

### *What is Policy Design?*

Central to this research is the Theory of Policy Design. Policy Design is a branch of the policy sciences concerned with the study of policy processes (Howlett and Mukherjee, 2018, p. 3). Policy design research is undertaken with the expectation

*“that such study can generate better or improved ways to construct policies and ensure that maximizing or even optimal results are achieved from the expenditure of scarce governing resources”* (Howlett and Mukherjee, 2018, p. 3).

Therefore, research on policy design is tightly linked to the question of policy success and implementation (Tosun and Treib, 2018, p. 318). Some policymaking efforts are *“well*

*thought out and constructed – or ‘designed’ – others are more arbitrary or capricious”* (Howlett and Mukherjee, 2018, p. 3). Reasons for poor policy designs can be for example limited information and knowledge (Howlett and Mukherjee, 2018, p. 3). Designing public policies is a difficult task due to several reasons. Howlett and Mukherjee (2018, p. 3) mention for example the lack of resources, that bureaucracies can be inefficient, incompetent, or motivated by values which are not in line with the public good. Furthermore, there could be stakeholders with veto rights present among state and societal actors, who are powerful and potentially block the best thought-out plans (Howlett and Mukherjee, 2018, p. 3). In general, there is a lot of uncertainty in policymaking (Howlett and Mukherjee, 2018, p. 4). Research in the modern policy studies has shown that *“public policymaking commonly results from the interactions of policymakers in the exercise of power rather than knowledge”* but even this does not guarantee the effective implementation of policies or the attainment of desired results (Howlett and Mukherjee, 2018, p. 4). This is due to the complexities in policy making where governments need to deal with several stakeholders, which differ in interests, goals, and opinions all while operating in a changing environment (Howlett and Mukherjee, 2018, p. 4).

### *Public Policy*

The term ‘public policy’ needs to be specified, since there are different definitions of this term being used. One often used definition is from Dye (1972, quoted after Howlett, 2019, p. 43) which focuses on the choices made by governments: *“what government chooses to do or not to do”*. Howlett (2019, p. 43) finds this as a useful definition in so far that policies are “conscious choices” and do not occur from accidents. But this definition is not useful when looking from a ‘design perspective’, since it leaves out the process which policies go through, and the definition by Dye neither incorporates the *“substantive content of government decisions”* and the elements which lead to this. (Howlett, 2019, p. 43). Howlett and Mukherjee (2018, p. 4) identify three central aspects of policymaking: design process, instrument choices and policy outputs. These elements will also be used in this thesis. The policy design process will be captured by analysing the policy design stages and how policy makers did design the policies. The instrument choices will be conceptualized as less abstract than governance mechanisms as conceptualized by

Voytgenko Palgan et al. (2021). The outputs finally are seen as the effects which can be seen in the real-life setting. Moreover ‘outputs’ are seen as how much shared e-scooters contribute to sustainable mobility. This is often measured by the first and last mile use of shared e-scooters. This is where policy evaluation comes into play since it not easy to capture which contribution shared e-scooters make to a modal shift for example. Rogge (2018, p. 42) argues that it takes a higher emphasis on evaluating the impact of existing policy mixes to be able to design better policies in the future. Therefore, the evaluation undertaken within the case studies will also be incorporated into the analysis in this thesis. According to Rogge (2018, p. 42) when it comes to policymaking policy adaptation and policy learning are crucial features. Policy learning is especially important when it comes to multi-faceted and uncertain policy challenges, such as sustainability transitions (Rogge 2018, p. 42), which shared e-scooters want to contribute to. Howlett and Mukherjee (2018, p. 379) divide between Policy aims and Policy tools when it comes to Policy Mixes (see also figure 1). This division will be tried to capture as well in this thesis and to refer to different levels identified by Howlett and Mukherjee (2018; see also figure 1).

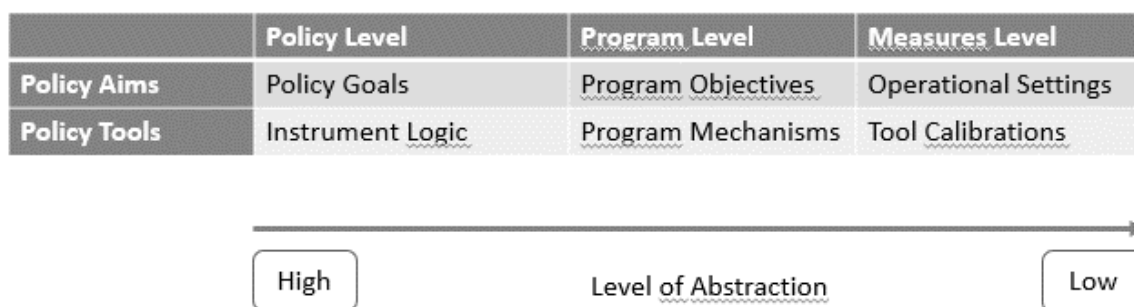


Figure 1: Components of a Policy Mix and the Position of Policy Program Therein. Based on: Howlett and Mukherjee, 2018, p. 379. Own figure.

## 2.4 Conceptual model

The conceptual model aims to structure the theoretical grounding of this thesis. This model combines the two theoretical backgrounds, the municipal governance mechanisms and Policy Design, with each other.

At the centre of the conceptual framework the policy is formulated. Policy formulation refers to the process of developing the policy and clarifying its goals. For the design of the first policy the government mechanism needs to be chosen. Afterwards, during implementation of the policy design the results and outcomes become visible. This can for example occur in the form of observations in public spaces or as feedback of the public. Then, based on those results, the evaluation takes place. This evaluation can either be a formalized review or a more ad-hoc approach. The evaluation then again can triggers a new policy formulation process and the process loop repeats. This implies a 2<sup>nd</sup> Policy Design will be set, which might use a different governance mechanism compared to the first policy design. Afterwards, again the policy design gets implemented leading to outcomes which then can be evaluated in another step. The same circular process also applies to the 3<sup>rd</sup> Policy design.

The process implies that the outcome of a Policy Design has an indirect influence on the policy design of the next stage. For example, the outcome of the 1<sup>st</sup> Policy Design influences the 2<sup>nd</sup> Policy Design since the feedback is taken into account during the design phase. This is indicated by the dotted line between these two elements.

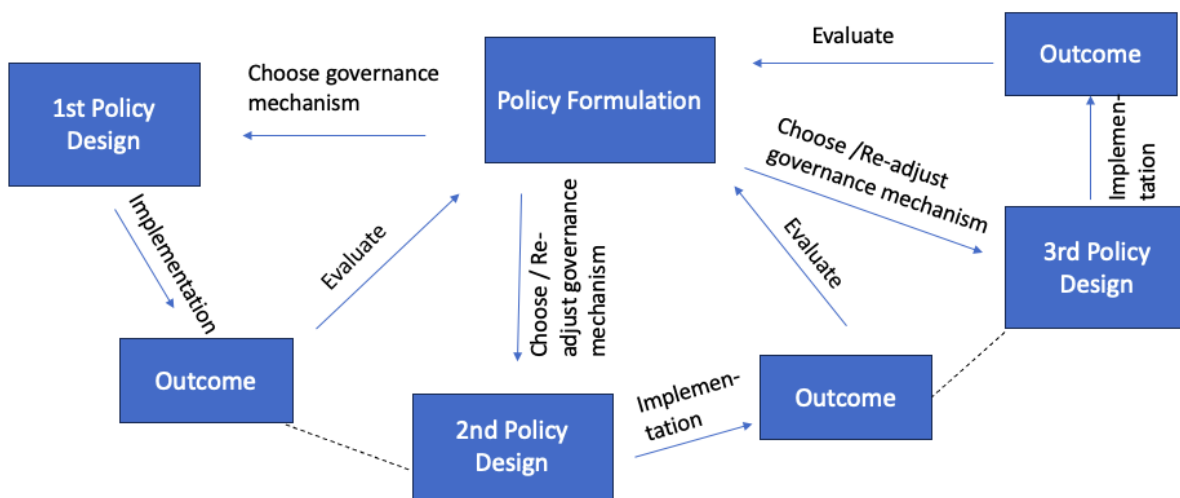


Figure 2: Conceptual model of the Policy Design Process within three Policy Design stages. Own figure.

## 3. Research methodology

This chapter will outline how the research methodology of this thesis will be structured. The research strategy, data collection, the selection of the case study, the data analysis and the validity and reliability will be discussed.

### 3.1 Research Strategy

This research chooses a qualitative approach and is conducted in two steps. First, qualitative desk research on policy papers is used to get an overview of the governance approaches present within German cities on micromobility services. Second, a qualitative case study on five German cities is done. According to van Thiel (2014, p. 58) in this thesis two of the four main research strategies are combined: Desk research and Case Study. The author chose for the combination of these two research strategies to get a better overview on the research subject among different cities in Germany, since there is still a research gap on governance approaches on e-scooters, as outlined in the scientific relevance part. The desk research is the preparation for conducting case studies on five different German cities, which is necessary to explore how policies are designed within a city. Therefore, both methods are beneficial to answer the main research question.

### 3.2 Data collection

This research will investigate the following main research question:

**How are policies on shared e-Scooters designed by cities in Germany?**

To address this research question, the following methods will be used during the research process.

#### 3.2.1 Desk research

As already mentioned, the first part of this research will be conducted through desk research. The main characteristic of desk research is the use of data which has been

collected or produced by someone else and for a different purpose than the research at hand (van Thiel, 2014, p. 102). Examples are policy memoranda, legal documents, annual reports, or newspaper articles (van Thiel, 2014, p. 102). Van Thiel (2014, p. 102) characterizes desk research as an efficient and cost-effective strategy, which reduces threats to validity and reliability, since the researcher does not interfere with the research situation. Therefore, this method is well suited for the purpose to identify different governance mechanisms used by cities on micromobility services in Germany.

Desk research can be conducted with primary and secondary data. In the strategy of using existing material, primary data refers to information that has not been produced for research purposes (van Thiel, 2014, p. 102).

The primary data shares two main characteristics (van Thiel, 2014, p. 104): The first characteristic is, they reflect people's behaviour, expressing opinions, chronicling events, or reporting what people decided or did. This allows for the advantage to study behaviour without having to prompt it. According to van Thiel the second characteristic refers to the point that the various types of documentation always have an interest of communicative function. This research will analyze the primary data to identify the behaviour (governance approaches in this case) of cities towards micromobility services and always consider the communicative function of the document / data source, since this is important when it comes to reliability and validity.

Secondary data according to van Thiel (2014, p. 104) mainly refers to statistical data, but it can also for example refer to conclusions from earlier studies for example. The analysis of conclusions from other studies is called meta-analysis (van Thiel, 2014, p. 105).

If there is more information available than the researcher can analyze in the given time frame, it necessitates a selection of the data at hand. This is also the case within this research, when researching governance approaches by cities on micromobility services. Therefore, it is necessary to select the data. The researcher needs to keep in mind in which context the existing data were collected, the quality of the data and the authorship of the data (van Thiel, 2014, p. 105). Van Thiel identifies the principal drawback of using existing data as an operationalization problem: Since the data was produced for a different purpose, it will often not entirely match with the research question (van Thiel,

2014, p. 106). That means the researcher needs to be pliable and creative to find information that meets the research needs and use the existing information in such a manner that its contents will occur with the research subject (van Thiel, 2014, p. 106). In this research the selection of documents will be done subjectively by the author, while considering the context, the quality, and the author of the data.

This desk research mixed the methods of meta-analysis, policy document analysis and newspaper articles analysis. The method of meta-analysis makes use of several previously conducted scientific studies (van Thiel, 2014, p. 113).

*Table 2: Overview on main policy reports analysed in this research*

<b>Scale</b>	<b>Author(s)</b>	<b>Publishing Organisation</b>	<b>Title</b>
Germany / United States	Carstens (2023)	Association of German Cities (Deutscher Städtetag)	The New Rules of the Multimodal Road: Lessons from an Analysis of E-Scooter Regulation in Germany and the United States (translated by author)
Europe	Homem de Gouveia et al. (2023)	POLIS – European Network of Policy Makers	Catch me if you can! How European Cities are regulating Shared Micromobility
Germany	Nadkarni (2020)	Difu (German Institute for Urbanistic)	Managing E-Scooter-Rentals in German Cities: A Check-Up
Germany	Bauer et al. (2022)	Difu (German Institute for Urbanistic) and DLR (German Aerospace Centre)	E-scooters in cities – Usage, conflicts and communal steering approaches (translated by the author)

### 3.2.2 Case studies

A case study can be conducted in several spatial scales (e. g. a group, an organization, a country, a city or a neighborhood) (van Thiel, 2014, p. 86). In this research the spatial scale is a city. Case studies typically take a holistic approach. Thus, a large body of – mainly qualitative – data is gathered (van Thiel, 2014, p. 86). Conducting a case study means that the research is conducted in a real-life setting (van Thiel, 2014, p. 86). The aim of case studies is to get an in-depth observation of the case. The researcher aims for depth instead of breadth (van Thiel, 2014, p. 87). Harrison et al. (2017) describes the case study research as most suitable for a comprehensive, holistic, and in-depth investigation of a complex issue. This results in a richly detailed and extensive description of the phenomenon under study (van Thiel, 2014, p. 87). Van Thiel concludes that it is often difficult to generalize findings to other situations challenging the external validity of case studies, whereas the internal validity is mostly very high (van Thiel, 2014, p. 87). Case study research is the predominantly interpretative approach in Public Administration and Public Management research (van Thiel, 2014, p. 87). As Harrison et al. (2017) find case studies are a unique platform to generate new insights into areas of inquiry. Therefore, this approach is well suited for this research. The data for the case studies within this research will be collected through interviews and desk research. The selected case studies are detailed below. The selection of case studies was in part based on the availability of interview partners, but also on the criteria of interview partners covering various sizes in cities.

*Table 3: Inhabitants of case study cities (Source: Statista, 2023).*

<b>City</b>	<b>Inhabitants (2022)</b>
Berlin	3.755.251
Cologne	1.084.831
Kiel	247.717
Osnabrück	167.366
Flensburg	92.550

### 3.2.3 Semi structured interview

As central research method the semi-structured interview was chosen. In the semi-structured interview, an interview manual or topic list is used as a guideline (van Thiel, 2014, p. 94). The formulation of the interview questions was guided by the variables mentioned in the research question and are derived from the theoretical framework (van Thiel, 2014, p. 94). For formulating the interview questions the author has also done preparatory research by studying documents about the case studies. Van Thiel (2014, p. 95) mentions that it is important to be clear and understandable when formulating research questions, and not too long or ambiguous questions. The researcher also needs to avoid asking suggestive or leading questions by for example giving their own opinions (van Thiel, 2014, p. 95).

Collecting data through interviews has not been easy. Due to the high relevance of the topic several policy makers declined to give an interview on this topic or did not respond to interview requests. The same applies to companies which offer shared micromobility service. The companies active in Germany were not available for interviews since there are too many requests by scientific scholars on this topic. Also, public transport operators declined interview requests.

Five of the interview partners agreed to the recording of the interviews. This ensured a high quality for the data analysis. Two respondents did not agree to interview citations due to constraints by their institution. Interview partners are shortened by a code due to feasibility reasons (e.g. R1). When interview partners do not want to be cited, but there is a general statement which is interesting for the thesis an anonymized code is used (RX).

Interview seven (R7) was excluded from the analysis since the recording of the interview was not allowed by the interview partner and the quality of data gathered was low. The fact that there was no audio file available for the analysis would have made the analysis more biased towards the author's opinion than in the other case study cities. The analysis would have been conducted based on notes which were taken by the author during the interview. Furthermore, the interview partner has been working for the potential case

study city for just a few months. Therefore, a retrospective analysis of earlier policy design stages would not have been possible based on the interview data. Since the data gathered in the other case study cities is of good quality there is enough data available to answer the research questions.

*Table 4: List of interview partners with code used for references, role of the interview partner, date of the interview and the duration*

<b>Interview</b>	<b>Role</b>	<b>Date</b>	<b>Duration</b>
Interview 1 (R1)	Policy maker - Senate of Berlin	01.09.2022	1:15h
Interview 2 (R2)	Policy maker - Senate of Berlin	03.09.2022	0:35h
Interview 3 (R3)	Policy maker - Regional level – Berlin	01.12.2022	0:30h
Interview 4 (R4/1; R4/2)	Policy maker – City of Cologne (no citation allowed)	27.10.2023	1:00h
Interview 5 (R5)	Policy maker – City of Flensburg	23.11.2023	0:45h
Interview 6 (R6)	Policy maker – City of Osnabrück (no citation allowed)	05.12.2023	0:55h
Interview 7 (R7)	excluded (no recording allowed and low data quality)	06.12.2023	0:50h
Interview 8 (R8)	Policy maker – City of Kiel	08.12.2023	0:45h

### 3.3 Data analysis

Preferably the interviews were recorded as long as the interviewee agreed to ensure a clean basis for further analysis. The interviews were recorded when the interviewees agree with this. The first step after conducting the interviews was to transcribe the audio

files. For the data analysis in this thesis only the content of the interviews was relevant, not the way in which someone said something. Therefore, small breaks or interruptions of the conversation were not transcribed (Mayring, 2016).

The second step after data collection was to order them and to store them in a systematic manner (van Thiel, 2014, p. 142; Mayring, 2016). For the systematic labelling of relevant interview findings an ordering scheme in the software MaxQDA was created. This ordering scheme is derived from the theoretical findings outlined in the theory section. The ordering scheme was developed further during the research process through the addition of new categories if the data yielded new findings (Mayring, 2016). Furthermore, the author added comments on the interview transcript to the coding scheme which paraphrase central findings stated by the interview partners and increase the ease of handling the data analysis.

### 3.4 Validity & Reliability

Within qualitative research the researchers take different stances towards the categories of validity and reliability (Bryman, 2012, p. 389). Panke (2018) for example identifies three quality criteria: Validity, reliability, and replicability. Validity can be divided into internal and external validity. The internal validity relates to the internal coherence of the research design components, whereas the external validity relates to the possibility of arriving at generalizations (Panke, 2018, p. 23f.). Van Thiel finds that within case studies it is often difficult to generalize findings to other situations, which challenges the external validity of case studies, whereas the internal validity is mostly very high (van Thiel, 2014, p. 87). Reliability is mostly defined as the consistency of measures and is often discussed as 'measurement validity' (Panke, 2018, p. 24). The roots of reliability lie within quantitative research. For qualitative research reliability is hard to achieve, since a study can mostly not be replicated within the same circumstances (Bryman, 2012, p. 390).

The application of the method of triangulation ensures a higher degree of validity and reliability within this research. Triangulation (also referred to as mixed methods) is a tested means to enhance validity and reliability (van Thiel, 2014, p. 52). Triangulation uses e.g. more than one method and/or more than one data source to ensure the validity and reliability (van Thiel, 2014, p. 52). This research applies the method of triangulation

through the use of several data sources (people and documents), as well as the application of two different research methods (interviews and document analysis) (van Thiel, 2014, p. 52).

## 4. Policy Document Analysis

In this first empirical chapter the policies of the federal state of Germany, the states and their policy reports for cities are analysed. Furthermore, the policy instruments available to cities will be specified. This will be done on the basis of a policy paper analysis.

### 4.1 Electric Vehicle Regulation (federal state)

E-Scooters are legal in Germany since the introduction of the new Electric Vehicle Regulation (eKFV) on 15<sup>th</sup> June 2019 (Bundesamt für Justiz, 2023). This short regulation – introduced by the federal state of Germany – mainly specifies how e-scooters need to be technically equipped and which product design is required to be considered as an e-scooter within Germany. Besides this, the regulation states that e-scooter users need to use bicycle infrastructure, with small exceptions when stated otherwise by a specific (newly introduced) traffic sign. Users are not allowed to use pedestrian infrastructure when riding an e-scooter. In the case of no bicycle infrastructure, e-scooters need to be ridden on the street. Only persons above 14 years of age are allowed to ride an e-scooter in Germany. For parking, the law only specifies that e-scooters need to be parked according to the same regulations as bicycles: *“The parking regulations for bicycles apply accordingly to the parking of small electric vehicles”* (Bundesamt für Justiz, 2023).

#### *Policy design process*

During the legislative process additional provisions were discussed such as a compulsory use of a helmet, a higher minimum rider age requirement of 16, and the permission for e-scooters to ride on sidewalks (Carstens, 2023, p. 18). None of these discussed provisions were included within the final regulation. The process included submissions of position papers regarding regulatory provisions of more than 40 associations. (Carstens, 2023, p. 18). For example, the permission to drive on the sidewalk was not included in the regulation due to the objections of associations for the blind and disabled and the association of German Cities (Carstens, 2023, p. 18).

## 4.2 Regulatory framework (federal state / states)

In a research paper by the German Association of Cities, Carstens (2023) gives a good overview of the Regulatory Framework regarding e-Scooter usage in Germany. The regulation is complicated as some of the regulatory competences lie with the federal state of Germany while others lie with the 16 German states. It is not the aim of this thesis to analyse the statutory background of German traffic legislation for e-scooters. Nevertheless, the summary of Carstens (2023, p. 20) will be used to give a short overview on the German regulatory framework on e-scooters: *“while German federal traffic law (StVG and StVO) regulates how traffic participants are to behave on the roads via traffic rules, the German state road laws (“Straßenrecht”) define fundamentally what constitutes a public road and the purposes a public road may fulfil.”*

As Carstens (2023, p. 20) states this regulation orders general registration of e-scooter (e. g. license plates) but does not provide guidance on whether e-scooter providers require a permit to operate on public roads, nor under which level of governance such permitting would fall (e. g. federal vs. state level). For a scientific report on this discussion see also the report of the scientific service of the German Bundestag (Deutscher Bundestag, 2020). As a result of this regulatory framework cities could be presented with several regulatory options as they lie in differing German states. In the meanwhile, some states introduced new laws to provide additional clarity (e.g. Berlin and Bremen), which both require special use permits (Carstens, 2023, p. 20). For other states the categorizations rest on prior court rulings (Carstens, 2023, p. 20), which are not only contractionary, since they are based on court decisions about bike rental systems, rather than e-scooters (Carstens, 2023, p. 20).

It will become clear in the data gathered from the interviews, that in the last years, this regulatory setup led to uncertainty among cities in regard to which regulatory mechanisms were applicable. By now, this has become clearer– driven through a new court decision (Verwaltungsgericht Köln, 2022) and other regulatory changes made by some of the 16 states (e. g. Berlin). However, some uncertainties among cities are remaining. As one legal advisory firm finds (Ernst and Young, 2023) it is unclear if the court rulings will

remain valid in the future. Carstens (2023, p. 20) concludes to this: *“As such, a patchwork legal framework has developed in Germany. Especially in states with neither a state law nor court ruling on e-scooters, confusion among cities has arisen as they develop their e-scooter regulation requirements.”*

There also have been initiatives by states to require e-scooter permits via federal regulation (Carstens, 2023, p. 20). However, these did not receive a majority by the legislative body (Carstens, 2023, p. 20). One initiative in February 2020 by a number of German states to change the federal traffic law regarding parking regulations for e-scooters (StVO) was not successful, since the German states did not come to an agreement in the federal council (Bundesrat) (Deutscher Bundestag, 2020, p. 8), according to Carstens (2023, p. 20) due to lobbying of shared micromobility companies.

### 4.3 Policies of German states

In the following the policies of North-Rine Westphalia, Berlin, Lower Saxony and Schleswig-Holstein will be presented and analysed. The five case studies are located within these German states.

#### *North-Rine Westphalia*

The state of North-Rine Westphalia, home to the city of Cologne, one of the case studies of this research, introduced a new Bicycle and local mobility law in 2021 (Ministerium für Inneres des Landes Nordrhein-Westfalen, 2021). The law identifies the bicycle as the backbone of sustainable mobility, but it acknowledges that other modes of transport also make an important contribution to local mobility, especially walking. When continuing reading the law also states that e-scooters support sustainable transport by offering different mobility options:

*“Innovative new means of transport, such as small electric vehicles (e.g. e-scooters), supplement the range of options and support intermodal travel chains”*

*(Ministerium für Inneres des Landes Nordrhein-Westfalen, 2021, Preamble, translated by the author).*

As a result, small electric vehicles are part of the multimodal mobility offer (Ministerium für Inneres des Landes Nordrhein-Westfalen, 2021, §30). The state formulates the goal to steer the development of e-scooter offerings towards the implementation of mobility hubs in residential and commercial areas. This implies the sharing services shall be brought to less densely populated areas:

*“The responsible state ministries support the expansion of suitable bike and small electric vehicle (e. g. e-scooter) sharing services. In this respect, the focus is on sharing services at mobility hubs and the expansion of bike- and small electric vehicle (e. g. e-scooter) sharing in central locations in residential and commercial areas, outside city centres and in rural areas” (Ministerium für Inneres des Landes Nordrhein-Westfalen, 2021, §28, translated by the author).*

Furthermore, the law specifies that stations for small electric vehicles should be set-up within designated areas in public spaces (Ministerium für Inneres des Landes Nordrhein-Westfalen, 2021, §30) and that use of small electric vehicles (e. g. e-scooters) should not be restricted by municipal bylaws in such a way that their use is prevented (Ministerium für Inneres des Landes Nordrhein-Westfalen, 2021, §30).

### *Berlin*

The State of Berlin passed the first mobility law of any German state in the year 2018. The mobility law has the following intention:

*“[To support people in their] individual lifestyle in all parts of Berlin that is equal and geared towards the mobility needs of the city and surrounding areas, regardless of age, gender, income, and personal mobility impairments as well as life situation, origin or individual transport availability. The mobility regulated by this law includes the special requirements of all mobility groups, those of pedestrians*

*and cyclists, local public transport, commercial transport and motorized private transport, and ensures the priority of sustainable transport.” (Senatsverwaltung für Mobilität, Verkehr, Klimaschutz und Umwelt, 2023, translated by the author).*

Based on this intention of the law, sustainable transport is set as priority within mobility policies of the State of Berlin. But the role of motorized individual traffic and bicycle traffic was one of the main topics in the last state election campaigns. After the new state government came into place there have been many discussions within the city about the mobility law and the planning of new bicycle infrastructure. Some actors even see “*a stabilization of the individual motorized transport*” by changes proposed to the mobility law by the new state government (RBB24, 2023).

The mobility law does not contain any specific goals towards shared mobility (Senatsverwaltung für Mobilität, Verkehr, Klimaschutz und Umwelt, 2023). In the last years it was discussed to add a paragraph for “new mobility” (which would have contained regulations for micromobility, besides others) to the mobility law, but no political agreement was reached for this, neither in the old and new government (Berliner Morgenpost, 2023).

### *Schleswig-Holstein*

The state of Schleswig Holstein does not have a mobility law as the State of Berlin and North-Rhine Westphalia. Therefore, in this section it will be shortly referenced to the appraisal ‘Future of Mobility in Schleswig Holstein’ (Könönen et al., 2016) and the ‘bike strategy 2030’ (PGV, 2020).

Könönen et al. (2016) identify in an appraisal to the ministry for economy, transport and technology that sharing services can be one measure to support sustainable transport. Sharing services can help to support the existing transport system for example by adding capacities in rush-hours (Könönen et al., 2016, p. 108). Moreover, sharing services can help to close gaps in the existing transport system as first and last mile services (Könönen et al., 2016, p. 108). The appraisal does not see sharing services as a priority but recommends to the state that it supports activities of cities and transport operators (Könönen et al., 2016, p. 110).

The second policy paper which contains some policy recommendations to sharing services is the 'bike strategy 2030'. This strategy specifies the goals in regard to bicycle policies, but does mention e-scooters (PGV, 2020). In regard to bike sharing services, it is recommended by the paper to implement mobility hubs, especially in connection to public transport (PGV, 2020, p. 23, 40-41).

### *Lower Saxony*

The State of Lower Saxony does not have a mobility law either. The desk research could not identify any specific goals of the State of Lower Saxony towards shared e-scooters. The State of Lower Saxony does have a general mobility concept which specifies general approaches in regard to transport and mobility (Niedersächsisches Ministerium für Wirtschaft, Arbeit und Verkehr, 2016). But there are no overall goals towards (sustainable) mobility defined, the concept does see mobility as requirement for economic growth, prosperity and social integration (Niedersächsisches Ministerium für Wirtschaft, Arbeit und Verkehr, 2016, p. 5). Sharing services are just mentioned in regard to carsharing, bike sharing is not mentioned in the concept (Niedersächsisches Ministerium für Wirtschaft, Arbeit und Verkehr, 2016).

## 4.4 City-level policy reports

### *Association of German Cities*

In February 2023 the Association of German Cities (Deutscher Städtetag) published a research report on e-scooter regulation in Germany and the United States with the title: *"The New Rules of the Multimodal Road: Lessons from an Analysis of E-Scooter Regulation in Germany and the United States"* (Carstens, 2023).

Carstens (2023, p. 6) finds that cities in Germany do not have sufficient regulatory flexibility to act and, therefore, calls for more autonomy of cities in urban transportation rulemaking. In the report four different regulatory options are identified, which will be further outlined in section 4.5. Furthermore, Carstens (2023) details policy recommendations to the federal level, state level and especially to cities.

### *POLIS – European Network of cities and regions*

POLIS is a network of European cities and regions which works on advancing transport innovation and sustainable mobility (Homem de Gouveia et al., 2023, 69). In November 2023, the POLIS network published a report with the memorable title *“Catch me if you can! – How European Cities are regulating Shared Micromobility”* (Homem de Gouveia et al., 2023). This policy report researches how cities and regions are managing the regulation of shared micromobility (Homem de Gouveia et al., 2023, p. 1), based on a survey and several interviews with experts from local and regional authorities and private operators, as well as desk review and working group meetings (Homem de Gouveia et al., 2023, p. 1). Central to this report is the question which goal the regulations follow. When looking at the European perspective of e-scooter regulation this policy paper is very valuable. In this thesis just the promoted perspective by the report of strategic thinking towards micromobility will be incorporated. Furthermore, the findings on the City of Berlin will be used, since the city is one of the case studies in this report.

### *German Institute for Urbanistic*

When this research started, to the authors knowledge, the most comprehensive overview of e-scooter governance in Germany for policymakers was a document published by the German Institute for Urbanistic (Difu). This special issue report on *“Managing E-Scooter-Rentals in German Cities: A Check-up”* (Nadkarni, 2020), summarizes the governance approaches of German Cities to e-Scooter systems available to cities by that time. Nadkarni (2020) describes how shared e-scooters were first appearing in the public streets in Germany when the Small Electric Vehicle Act - a national regulative act - went into effect on 15<sup>th</sup> June 2019 (Bundesamt für Justiz, 2023). By autumn 2019 shared e-scooters could be found in *“practically every major city”* (Nadkarni, 2020, p. 5). Nadkarni (2020) describes that the shared e-scooters caused severe problems in the urban space, for example *“parked e-scooters disrupted the movements of cyclists, pedestrians and especially people with disabilities”* (Nadkarni, 2020, p. 5). These newly emerging problems led to a profound discussion in Germany about how to manage the e-scooter rentals. (Nadkarni, 2020, p.5).

### *German Institute for Urbanistic and German Aerospace Center*

In October 2022, the German Institute for Urbanistic (Difu) and the German Aerospace Center (DLR) – two important institutions in Germany who publish policy-oriented reports – published a report with the Title “*E-scooters in cities - use, conflicts and municipal options for action*” (Bauer et al., 2022). This report seems to be a follow up report to the report by Nadkarni (2020). Bauer et al. gives advice to cities on how to steer (free-floating) e-Scooters in cities (Bauer et al., 2022).

According to the policy makers, which were interviewed by the author after the report by Bauer et al. (2022) was published, the report by Bauer et al. (2022) is a major source of information and guideline for cities. The research of Bauer et al. (2022) was conducted by a mixed method approach and included literature research, an online survey with users and non-users (n=3.834), workshops with city representatives, expert interviews, and video observations. Since the research conducted by Bauer et al. (2022) asked similar research questions to this research, the data and findings collected within the report are very valuable and of high quality for this research.

## 4.5 Policy instruments used by cities

As outlined within the policy reports in the last section, cities differ within their approach to regulate the e-scooter market. In the following, these instruments will be analysed. According to Nadkarni (2020) German cities use three different instruments to steer shared e-scooter services: Voluntary Agreements (1), special use permits (2) and public tenders (3). In contrast to Nadkarni (2020), Carstens (2023) identifies four instruments by adding a category of ‘special permit statue combined with a selection process’. In this thesis the classification of Nadkarni (2020) will be used, since the fourth category identified by Carstens (2023) can also be considered as subcategory of a special use permit (2) design.

### *Voluntary Agreement*

Voluntary agreements (also called ‘Memorandum of Understanding’) are the most used model among German cities (Nadkarni, 2020, p. 6). In August 2019, the Association of

German Cities (Deutscher Städtetag), German Association of Towns and Municipalities (Deutscher Städte- und Gemeindebund), and the operators which are currently active on the market signed a Memorandum of Understanding outlining standards of practice (Deutscher Städtetag, 2019). A Memorandum of Understanding is a not legally binding document (Nadkarni, 2020, p. 6). Since it is a voluntary agreement any type of provision can be integrated (Carstens, 2023, p. 22). According to Carstens (2023, p. 22) cities appreciate the flexibility and low-maintenance nature of the approach. But since this agreement has no legal foundation, it also leads to a lack of accountability on the operators' side (Carstens, 2023, p. 22). Nadkarni calls the voluntary agreement a "joint vision statement" (Nadkarni, 2020, p. 6). Nadkarni (2020, p. 6) finds that the Memorandum of Understanding "*highlights the purpose of joint action*" between municipal governments and e-scooter providers. Nadkarni (2020, p. 6) states that the overall compliance with voluntary agreements has been high so far, since providers focus on creating positive brand associations rather than acting as 'disruptors'. This differs to some of the approaches which operators in some US-American cities have taken.

According to Nadkarni (2020, p. 6) a voluntary agreement could include the following sections:

1. Determine demand and business area
2. Set Parking and No-Riding Zones
3. Discuss the relationship with public transport
4. Arrange data sharing standards
5. Agree on a data privacy policy
6. Create standards for redistribution, maintenance, and vehicle disposal
7. Select contact partners and communication protocols
8. Organize channels for citizen communication

### *Special use permits*

The second regulatory approach for the governance of shared e-scooter offerings in cities is the issue of special use permits. This approach gives the city the authority to hold providers to the agreed terms (Nadkarni, 2020, p. 7). In comparison to voluntary

agreements, it thus provides cities with a broader set of regulatory options. In July 2020 just three cities were using this approach (Bremen, Düsseldorf, and Leipzig) (Nadkarni, 2020, p. 7). Bauer et al. (2023, p. 33) identifies the followings actions as most likely to be regulated by special use permits:

1. Charging of fees
2. Restrictions on business areas and the definition of no-riding zones
3. Restrictions on limiting the number of vehicles in the municipal area or in sub-areas
4. Restrictions on the parking of vehicles
5. Minimum reaction time to move vehicles
6. Requirement to relocate unused vehicles
7. Provision of a data report with usage data
8. Set-up of a customer hotline

#### *Public tender*

Public tendering is a common form of shared e-scooter governance in the international context. It constitutes the norm in many North American cities (Nadkarni, 2020, p. 9). Public tendering constitutes the third regulatory approach towards shared e-scooters: *“This is an option that exists in the legal framework for municipalities to select mobility partners and is used to secure public transit providers. The 2009 Hamburg case seems again to be the stumbling block, convincing many municipalities that public tendering is not a viable legal option.”* (Nadkarni, 2020, p. 9). The Hamburg case of 2009 is a court ruling which has long lasting effects on the regulation of micromobility services in Germany. The ruling caused uncertainty among cities, if micromobility services can be considered as special or common use of roads (Nadkarni, 2020, p. 7; see also section 4.3). Public tendering has not yet been used in Germany for shared e-scooters due to the legal concerns until July 2020 (Nadkarni, 2020, p. 9). However, for other micromobility services this approach has been used in pilot projects. For example, the City of Kiel and surrounding areas used it for a station-based bikeshare system, including pedelecs and cargo-bicycles (Nadkarni, 2020, p. 9). Tendering processes are also sometimes used by public transport companies to find micromobility partners (Nadkarni, 2020, p. 9). For example, the Stadtwerke Jena have used public tendering to provide 150 e-scooters in

the city at designed scooter parking spaces (Nadkarni, 2020, p. 9). Nadkarni (2020, p. 9) states that direct public tendering by cities “*could bring the power of competition to advance public goals.*” Public tender processes are similar to special use permitting processes, but the public tendering process offers the following advantages (Nadkarni, 2020, p. 9):

- Regular opportunities to update requirements
- Ability to limit number of market participants
- option to provide direct incentives

## 5. Case studies

### 5.1 Berlin

#### *General introduction to the case study*

Berlin is the capital of Germany and has around 3.7 million inhabitants. The city is structured as a polycentric metropolitan area (Wikipedia, 2023). Compared to other states the public administration is structured differently in Berlin, since Berlin is one of the three city-states in Germany. Berlin's public administration consists of two levels, the Senate of Berlin and twelve districts. Policies on e-scooters are mainly designed on the state level by the Senate (different to other states in Germany, where cities have the main regulatory competences). The twelve districts are no independent municipalities, but subordinate to the Senate of Berlin (Wikipedia, 2023). The enforcement of rules lies with the districts, since they are responsible for public spaces within their area, including the management of sidewalks and parking lots (Homem de Gouveia et al., 2023, p. 40).

Berlin is the biggest market for micromobility services in Germany. The market is highly dynamic (KCW GmbH, 2022, p. 45), with many sharing companies, competition among providers and different business strategies (R1, 2). Shared e-scooter offerings first launched in Berlin in June 2019, right after the new electric vehicle regulation came into effect (Bauer et al., 2022, p. 22). The State of Berlin does not know how exactly the numbers of e-scooter have developed over time. According to newspaper reports, based on a data analysis right after the liberalisation, 4.800 e-scooters were present in Berlin. Most of these were located in the inner-city districts with just 6% located in the six districts in the outskirts (RBB24, 2019). End of August 2019 newspaper already reported 9.050 e-scooters available in Berlin (RBB24, 2019), whereas the Senate of Berlin did communicate lower numbers of e-scooters (RBB24, 2019). The number of e-scooters grew even further in the following years (R1, 4), with a small decline in number of e-scooters induced by the COVID-19 crisis (R1, 4). By end of the year 2022 policy makers expect to have more than 40.000 shared e-scooters in Berlin, adding on to around 6.000 shared bicycles (R1, 4). During the year of 2023, the numbers of e-scooters dropped to reach 25.000 e-scooters in November 2023 (RBB24, 2023). Going forward, from the year

2024 onwards, the Senate of Berlin will regulate the number of e-scooters to a limit of 19.000 e-scooters (Senatsverwaltung für Mobilität, Verkehr, Klimaschutz und Umwelt, 2023b).

### *Goal of policies*

On a policy level, Berlin's policies on e-scooters are based on the mobility law (R1, 37) which was passed in the year 2018. Since this law does not explicitly state any goals for micromobility as such, the general goals specified in the mobility law (see also section 4.4) apply also to micromobility services<sup>4</sup>: mobility for all (§3), people- and city-friendly traffic (§4), sustainable mobility, inter- and multimodality (§5), climate- and environment protection (§8), minimization of adverse health effects (§9) and transport safety (§10) (Senatsverwaltung für Mobilität, Verkehr, Klimaschutz und Umwelt, 2023).

On a program level policy makers specify these overarching goals of the mobility law within more specific program objectives. For example, one goal for the state level is to gain an overview of the current situation of the city's rapidly developing market for shared scooters (R1, 6) – since this knowledge was limited when the interviews were conducted – and to receive regular updates on changes in the number of scooters on the streets from the companies providing them (R1, 6). Another goal is to improve the understanding of the shared e-scooters impact on traffic (e.g. modal shifts) and to address the negative consequences. E-scooter operators often claim to be the first and last mile solution (R1, 7; R2, 8). However, the policy makers cannot say to what extent this holds true, since there is no data available to the public administration on how many trips for example by foot or public transport are substituted by shared e-scooter trips.<sup>5</sup> (R1, 6; R1, 41). Therefore, it is necessary for the public administration to receive usage data from the operators about trips made by shared e-scooters (R1, 28; R2, 8).

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<sup>4</sup> Subjectively selected by the author based on the relevance for shared e-scooter services

<sup>5</sup> Homem de Gouveia (2023, p. 43) have similar findings in their case study on shared e-scooters in Berlin.

### *Requirements and evaluation concept*

These goals mentioned by policy makers in the interviews find their synthesis in the “*Requirements and evaluation concept for free-floating sharing offers in Berlin*” (KCW GmbH, 2022), which was commissioned by the public administration to develop possible regulatory tools for sharing mobility offers. The concept has the status of a policy report but has not been brought to the state parliament. With the free-floating sharing services the Senate Department for Environment, Mobility, Consumers and Climate Protection aims

*“to utilize the potential and overall social benefits of free-floating sharing services to achieve the sustainable mobility goals, while at the same time reducing the risks and negative effects caused by the vehicles” (KCW GmbH, 2022, p. 12, translated by the author).*

This statement highlights that the Senate wants to leverage the potential of free-floating sharing services, while at the same time reducing negative externalities. Furthermore, the concept specifies the specific transport goals which apply to free-floating sharing services (KCW, 2022, p. 15-16), these are:

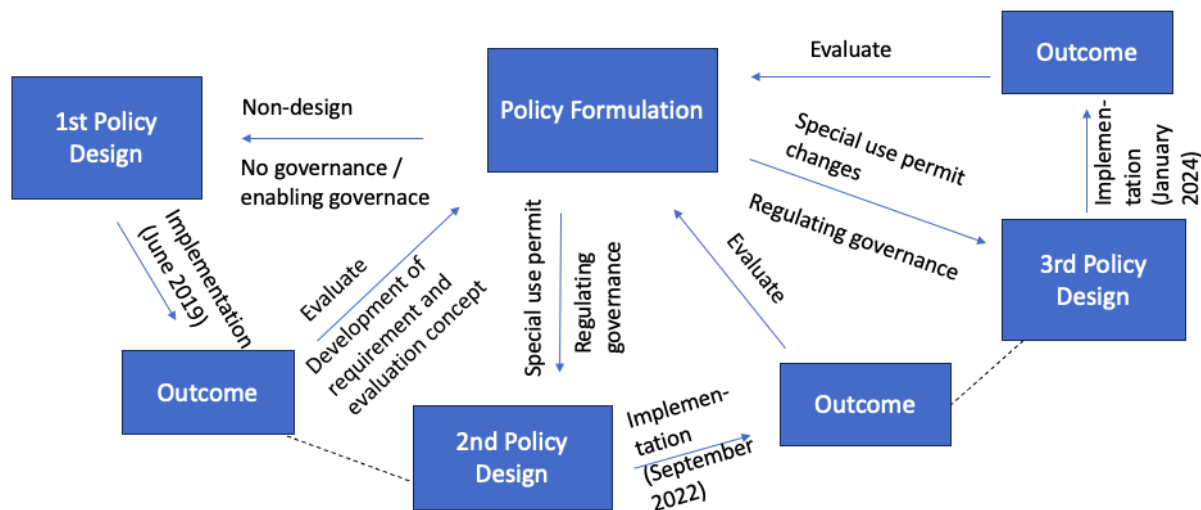
- Mobility for all
  - Accessibility for all
  - Accessibility at all times
  - Closing mobility gaps
- Climate, environmental and health protection
  - Strengthening sustainable transport
  - Environment and climate protection
  - Transport Safety
- City-friendly traffic
  - Freedom from interference
  - Little use of public space
  - Protection needs of people with mobility restrictions

These goals are derived from various sources. Firstly, from the mobility law but secondly, supplemented through the following plans and reports: the draft-bill for a “new mobility” paragraph in the mobility law (see also section 4.3; this draft did not reach political consensus yet); the urban development plan for mobility and transport Berlin 2030, the local public transport plan Berlin and the clean air plan (KCW, 2022, p. 15, titles translated by the author).

Reaching these goals requires changes in the governance mechanism used by the city of Berlin. In the following paragraph the governance mechanisms chosen by the state of Berlin during the different policy stages will be analyzed.

### *Governance mechanisms used by the city-state Berlin*

In summary, the Policy Designs in the city-state Berlin were conducted within three stages (see also figure 3 below).



*Figure 3: Conceptual model of the Policy Design Process adapted to the State of Berlin (Source: Own figure).*

During the first policy design stage (when shared e-scooters were legalized by the federal state in June 2019) the State of Berlin did not take any actions to govern shared e-scooters. This can be called a Non-Design, since no governance mechanism is used by the state. Since there is an absence of any governance mechanism, this could also be

considered as an enabling governance mechanism. The State of Berlin indirectly supports shared e-scooter operators by not interfering in the market (see also Voytenko Palgan et al., 2018, p. 4). Based on the outcome of this Policy Design (lots of negative externalities e.g. problems with the parking of shared e-scooters on sidewalks) a structured process to develop a requirement and evaluation concept was started by the Senate of Berlin (KCW, 2022). This requirement and evaluation concept was the basis for the formulation of the second policy design stage. This indirect influence of the outcome of the previous policy design on the policy design of the following stage is indicated through the dotted line (see Figure 3).

For the second policy design stage (implemented in September 2022) the State of Berlin used a regulating governance mechanism. The State of Berlin introduced a special use permit, enabled through changes of the State Road Law, which allows to specify rules shared e-scooter operators must comply with. The outcome of the second policy design stage is evaluated by the Senate of Berlin. However, at the time of this research, no public data on the outcome of this evaluation was available and the interviews were also conducted before the evaluation process of the second policy design stage.

During the third policy stage (implemented in January 2024) the State of Berlin also uses a regulating governance mechanism. The Senate of Berlin implements a shared e-scooter fleet cap size on the basis of the special use permit.

### *1<sup>st</sup> Policy*

There were already more than 9.000 shared e-scooters present in the city of Berlin by the end of the year 2019 and the numbers of e-scooters were increasing even further (R1, 4). At this time there was no concept in place by the state of Berlin on how e-scooters could be integrated into the existing transport system (R2, 4). The policy maker on the state level describes the situations as followed:

*“And then thousands of these vehicles arrived in Berlin in one fell swoop, and of course the whole thing was totally disorganized. There were no rules at all.” (R2, 4, translated by the author).*

As the policy maker states there were no policies in place which applied to the new mobility service of shared e-scooters. A regional policy maker experiences the problem quite similar:

*“the [e-scooters] were simply there (...) and that was a huge offer, and a huge problem, and general chaos (...) both in terms of planning and in terms of the requirement to perhaps consciously provide and manage mobility offers. As well as chaos, of course, on the roads and sidewalks” (R3, 3, translated by the author).*

The regional policy maker especially refers to the problems with parking of e-scooters since e-scooters were blocking sidewalks. The parking of e-scooters was a major problem in the city and regional policy makers did not have a guideline how to handle the new micromobility services:

*“You notice a massive traffic obstruction and obvious overuse, but you don’t even know whether you can touch them [the e-scooters] now, whether you can carry them away, what fees can be charged, if they have to be removed. Or how fines can be distributed if they are in the way. Where they are allowed to stand. What is an obstruction and what is not. (R3, 14, translated by the author).*

This shows the high degree of uncertainty for the local governments in Berlin on how to react to shared e-scooters. Based on these problem descriptions – especially by local policy makers and complaints by different civil society actors – the city-state Berlin decided to commission an extensive requirements and evaluation concept for free-floating sharing services (KCW, 2022). The start of the concept development was in March 2021 and the report was finished in April 2022 (KCW, 2022, p. 90). The concept

contained four main elements: The formulation of policy goals (1) – see also the paragraph above – the analysis of the status quo (2), an evaluation concept (3), and a requirements concept for free-floating sharing services (4) (KCW, 2022).

The analysis of the status quo was the second step after the formulation of policy goals. For this purpose, all sharing operators which were active in the state of Berlin in June 2021 (KCW, 2022, p. 18) were contacted and invited to a first workshop. In total in June 2021 there were 24 sharing operators active in Berlin, of which eight did offer shared e-scooters (KCW, 2022, p. 18). In the first workshop with the operators the Senate Department communicated the intentions and background of the project and announced that there will be a data request shared with the operators (KCW, 2022, p. 17). The Senate Department asked the operators for the following data: registered customers, active customers, number of vehicles, number of rides, average usage time of trips, average kilometres of trips and geo-referenced location of vehicles (KCW, 2022, p. 19). Some operators did not react to this data request of the Senate department (KCW, 2022, p. 19). The quality of the data provided varied greatly (KCW, 2022, p. 19) and most of the reported data had large gaps (KCW, 2022, p. 19). Due to the incomplete data the evaluation timeframe was shortened from two years to one month (KCW, 2022, p. 19). The second data request to the operators was also incomplete, except to the attributes 'number of vehicles' and 'percentage of electric vehicles' (KCW, 2022, p. 19). The operators justify the incomplete data provision with the argument of confidentiality (KCW, 2022, p. 20). Since there was not enough data provided by the operators the project decided to buy data from an external data-company. The acquired dataset provided the attributes 'number of vehicles', 'number of rides' and 'number of rental processes' (KCW, 2022, p. 20). However, the two datasets (from the operators and the external data company) could not be matched due to technical reasons (KCW, 2022, p. 20). It was concluded that there is no consistent data basis for a conclusive and verifiable inventory analysis (KCW, 2022, p. 19). Nevertheless, it was possible for the project to obtain a rough overview of the current situation in regard to sharing services in Berlin based on the two available datasets (KCW, 2022, p. 19). The data gathered by the analysis shows

that shared e-scooters do have – at a great distance – the highest number of shared mobility services in Berlin (see figure 4 below).

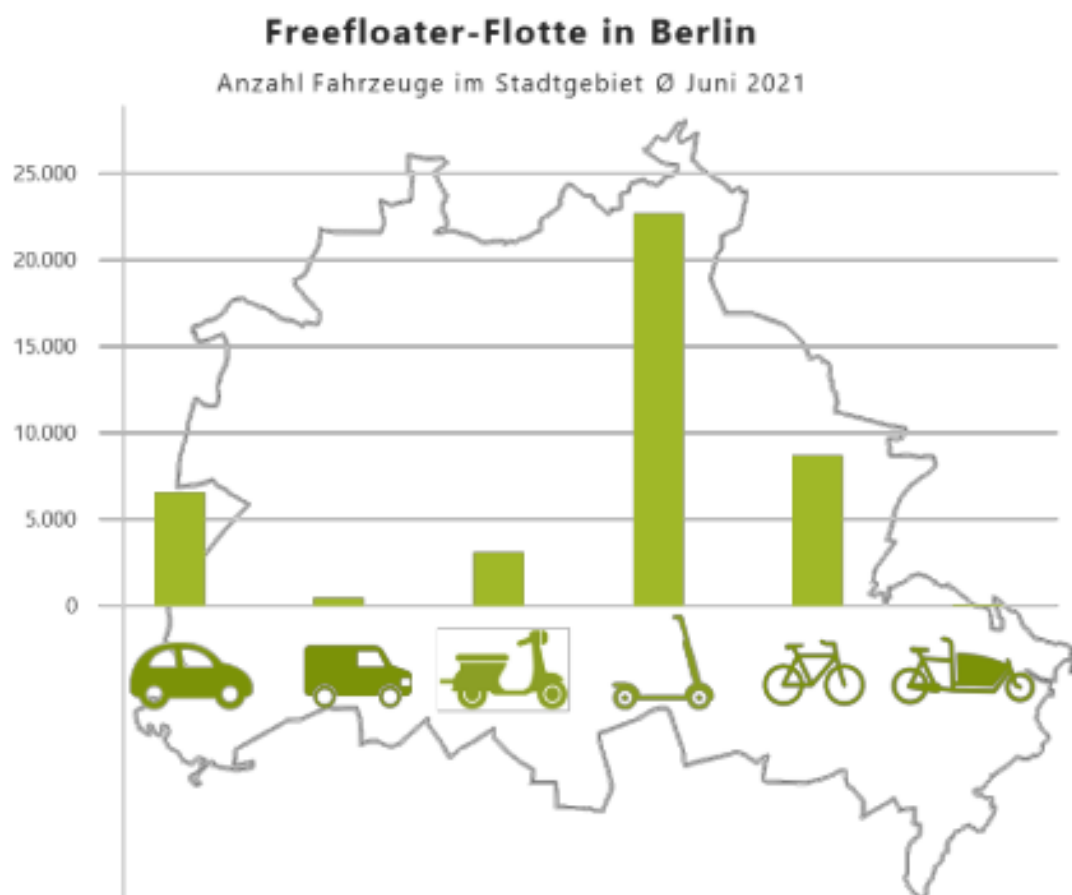


Figure 4: Type and amount of sharing services in Berlin, June 2021. (Source: KCW, 2022, p.22).

The report by KCW (2022) concludes on the data analysis:

*“Overall, the situation has proven to be very unsatisfactory, and it is recommended that a binding agreement will be reached with the providers in the future to provide uniform and meaningful data” (KCW, 2022, p. 20, translated by the author).*

Policy makers (R1, R2) mention the provision of data from operators also as key factor to steer the sharing services in Berlin:

*“a really important requirement is this obligation to provide data, i.e. that operators are obliged to transmit their usage data to us” (R2, 8, translated by the author).*

Based on this analysis of the status quo of KCW (2022) a need for monitoring and evaluation of the usage development of shared e-scooters by the Senate department was identified (R1, R2) Therefore the procurement of a data management platform was commissioned (R1, 6). To receive usage data from the operators a classification of shared e-scooters as a special use of the road is required. The process to implement the classification as a special use permit is outlined further down in the analysis of the second Policy Design.

## *2<sup>nd</sup> Policy*

Since the introduction of shared e-scooters it was the aim of policy makers to classify free-floating sharing services as special use of the road (R1, 9; R2, 8). This allows cities and city-states to steer the services towards their mobility and transport goals. A voluntary agreement was not considered as suitable for Berlin, since it would not be legally binding, and compliance seemed to be weak in other cities (R1, 34). According to the policy maker the case of Berlin is different to other cities, because Berlin works as the key-market in Germany for all sharing mobility operators and therefore the number of micromobility sharing services is much higher than in other cities (R1, 34). It took more than two years for the State of Berlin to classify free-floating sharing services as special use of the road. In September 2021 the parliament approved a novella to Berlin Road law (Berliner Straßengesetz). Paragraph 11a specifies that for micromobility and car sharing services a special use permit is required. The novella of the Berlin Road law became effective on September 1<sup>st</sup> 2022. The head of the Senate Department did comment in a press release to this change of the law in September 2021:

*“We want to drive forward the mobility transition - for this we also need sharing services such as bike sharing or e-scooters. However, they should not stand in the*

*way of others, but enable climate-friendly mobility for everyone. That is why we are creating an effective regulatory instrument and developing a concept together with the providers” (Land Berlin, 2021, translated by the author).*

As mentioned in the quote, the Senate Department does see this new instrument as an effective regulatory instrument. The novella of the state road law gives the State the ability to classify shared e-scooters as special use of the road, but the actual specific requirements towards shared services are specified by additional provisions to the law (Land Berlin, 2021). As the quote states, these additional provisions are developed together with the providers. Therefore, a structured communication process with the operators and other stakeholders took place before the novella of the state road law came into effect (R1, 10). This communication process was part of the project to develop a requirements and evaluation concept (KCW, 2022). The communication process incorporated all companies which offer free-floating sharing options, for example free floating e-scooters and free floating carsharing (R1, 10). Station based carsharing was not incorporated into this communication process, due to different traffic consequences and the lack of problems which need to be acted upon (R1, 10). Especially parking constitutes less of a problem as there are many car-parking spaces available within the city. Part of this communication process were the State of Berlin, the districts of Berlin, the sharing organisations, and other relevant associations such as the pedestrian association, disabled association, and associations for visually impaired people (R1, 10). The communication process lasted for about a year and was led by an external company (R1, 10). The overall goal was to develop a requirement concept with specific qualitative aspects how to steer and regulate sharing mobility (R1, 10; R2, 2).

Based on the analysis of the status quo and the communications process with the stakeholders' specific requirements for shared e-scooter regulation were defined and recommendations for policy tools were made (KCW, 2022, p. 63). The requirements are structured according to the goals identified in the concept (see also section 5.1.1). The requirements specify in detail how the tools could look like.

The communication process is rated as very important by the policy makers, since it gave the chance to discuss different policy tools with the operators (R2, 10). This had an important impact on the policy fit (R2, 10).

Since September 1<sup>st</sup>, 2022, the first regulations on the Program and Measures Level have been introduced (number of e-scooters within a short distance; time slot for removing scooter when parked wrongly; specific number of scooters in suburban areas etc.). Since the January 1<sup>st</sup>, 2023, these new rules were enforced, and fines can be issued for non-compliance. The strongest action the Senate of Berlin can take for non-compliance of e-scooter operators is to cancel the special use permit for the operator.

### *3<sup>rd</sup> Policy*

From the year 2024 onwards the Senate of Berlin introduced changes the additional provisions to the special use permit (Land Berlin, 2023b). The most important change is the restriction of the number of e-scooters to 19.000 vehicles within the inner-city center (Land Berlin, 2023b). Additionally, the operators will need to provide data to the Senate from 2024 onwards (Land Berlin, 2023b). This provides policy makers with the required data to evaluate the use of shared e-scooters and monitor the compliance to the rules by operators.

### *Future policies planned*

Since October 2023, Berlin has procured a data management platform (Land Berlin, 2023b). Therefore, the Senate of Berlin does consider further adaptation of the policies by summer 2024 based on the evaluation of the data (Land Berlin, 2023b). These adaptations may include further reductions of the number of e-scooters (Land Berlin, 2023b). Further regulatory options are mentioned within the published requirements and evaluation concept. This concept also states public tendering as a possible regulatory tool (KCW, 2022, p. 86). However, in October 2022 the Senate of Berlin did not have intentions to implement this regulatory tool (R2,12). The hesitations for the implementation of public tendering mainly stem from a lack of knowledge on how shared e-scooters contribute to modal shifts (R2, 12).

## 5.2 Cologne

### *General introduction to the case study*

The City of Cologne is a city with roughly 1 million inhabitants and is the biggest city in the state of North-Rhine Westphalia. The City of Cologne is structured mono-centric, with a dense inner-city centre, a high frequency of tourists and is located by the river Rhine. Shared e-scooters were introduced to the city right after e-scooters became legal, in 2019. The number of e-scooters started with 2.000 in June 2019 (Stadt Köln, 2019a), went up to 3.500 shared e-scooters in August 2019 (Stadt Köln, 2019d), 17.500 shared e-scooters in summer 2021 (Stadt Köln, 2022a) and dropped to 12.500 in September 2022 (Stadt Köln, 2022a). Shared e-scooters are a major discussion topic in the city and were even discussed in national media in 2021, due to a few hundred e-scooters which were found on the bottom of the river Rhine, and concerns about environmental impacts (Spiegel.de, 2021). The wide discussion about e-scooters was a reason for policy makers to implement regulations for shared e-scooters. This will be further discussed in the following paragraphs.

### *Goal of policies*

On the policy level the traffic development plan (Köln mobil 2025) of the city does not contain any specific goals towards shared e-scooter use (Stadt Köln, 2014) since shared e-scooters were yet not allowed by federal law when the traffic development plan was published (in the year 2014). The plan does mention bike-sharing services as part of increasing intermodal traffic, facilitated by the availability of mobile information and communication technology (Stadt Köln, 2014, p. 8; p. 19). The report also mentions mobility hubs (with bike sharing as one mobility option) as an action approach to increase sustainable mobility (Stadt Köln, 2014, p. 23). The report further identifies carsharing, bike sharing and electromobility as positive innovations to facilitate sustainable mobility (Stadt Köln, 2014, p. 23)

At the time when the New Electric Vehicle Regulation was introduced in June 2019, the City of Cologne had already formulated goals for the new mobility service of shared e-scooters. In a notice to the city's traffic committee about the start of the shared e-scooter services, it states the goal to support sustainable transport modes in all planning

processes and confirms this also applies for shared e-scooters (Stadt Köln, 2019a). The main purpose of further rules was the goal to reduce parking problems with shared e-scooters and to reduce conflicts between different traffic participants (Stadt Köln, 2021b).

### *Governance mechanisms used*

Summarizing the Policy Designs in the City of Cologne, three stages can be identified (see also figure 5 below).

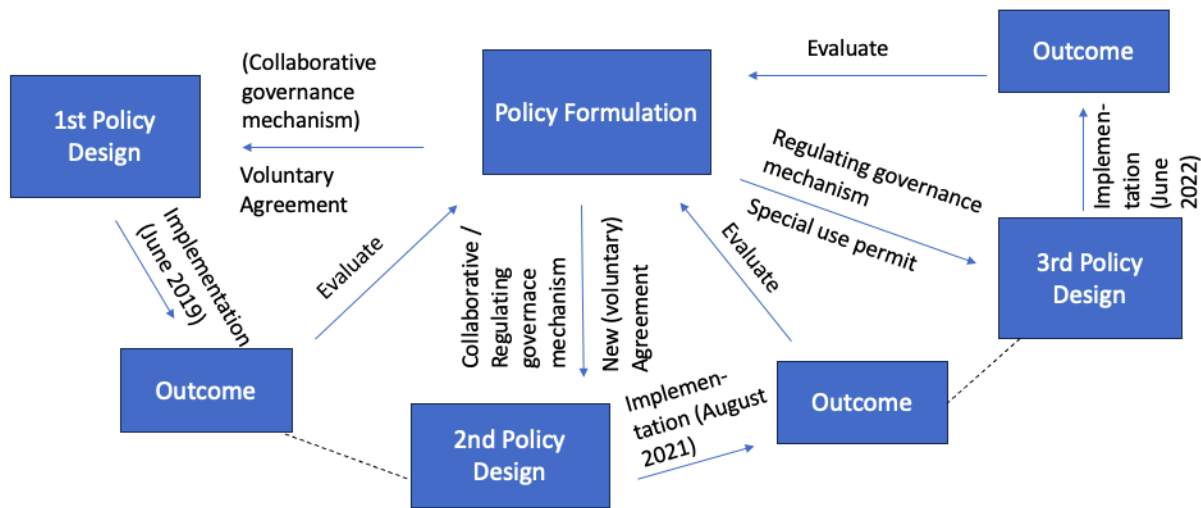


Figure 5: Conceptual model of the Policy Design Process adapted to the City of Cologne. (Source: Own figure).

For the first policy design (implemented in June 2019) the City of Cologne uses a collaborative governance mechanism, since the voluntary agreement does not incorporate any fines or consequences for non-compliance. The city takes the role of a negotiator. Subsequently the city evaluated their first policy design based on the outcomes. The evaluation was based on the available data and feedback from the public and media.

In the second Policy Design stage (implemented in August 2021) the city still uses a collaborative governance mechanism, since the rules of the updated voluntary agreement are set in a dialogue with the operators. Nonetheless, the city also uses elements of regulating mechanisms since the city takes a much stronger position in negotiating the

rules with the operators and made it de-facto mandatory for operators to sign the voluntary agreement. But compliance with the rules which have been set remained a problem. Again the policy design outcomes were evaluated without a formalized concept but based on the experiences of policy makers. They concluded that compliance with the set rules by operators remained a problem.

In the third Policy design stage (implemented in June 2022) the City of Cologne uses a regulative governance mechanism. The city implemented a special use permit which sets fees for shared e-scooters and provides fleet cap sizes for operators.

### *Policy design process*

#### *1<sup>st</sup> Policy:*

Before the federal regulation for shared e-scooters became effective twelve sharing companies did contact the City of Cologne and stated their general interest in offering shared e-scooter services (Stadt Köln, 2019a). Three days before the regulation was implemented (12<sup>th</sup> June 2019) the City did know of four companies which did actually want to offer their services in the City with an expected number of about 2.000 e-scooters in total, but due to the market dynamics no clear information by the public administration was possible (Stadt Köln, 2019a). By August 2019 there were 3.500 shared e-scooters present in the city (Stadt Köln, 2019d)

By 2019, Bike sharing services had already been present within the City of Cologne for several years. Therefore, the already existing voluntary agreement with bike-sharing operators was extended to shared e-scooter operators (Stadt Köln, 2019c). The sharing companies did show the intention to the city that they will act according to the agreement (Stadt Köln, 2019a). The Voluntary Agreement defines general rules such as: no parking in sensible urban areas; no obstruction of other traffic by parked e-scooters; keep sidewalk widths; quality criteria of the service; data sharing standards; process with complaints etc. The agreement defines specific zones where (1) sharing companies are not allowed to place e-scooters, (2) where virtual stations need to be coordinated with the city beforehand and (3) where no coordination with the city beforehand is required for virtual stations (Stadt Köln 2019a, 2019b; see also figure six). The voluntary agreement

did focus especially on where e-scooter operators place their shared e-scooters. The agreement does not provide any rules on where users were allowed to park and drop-off their shared e-scooter (Stadt Köln 2019a). An important tool in defining the non-parking zones for operators was the design manual for the urban space (Gestaltungshandbuch - Stadt Köln, 2018) which defines specific areas and their different meanings: For example: local areas, areas relevant to the whole city and international areas. These areas could be used for defining non parking zones for shared bikes and shared e-scooters.

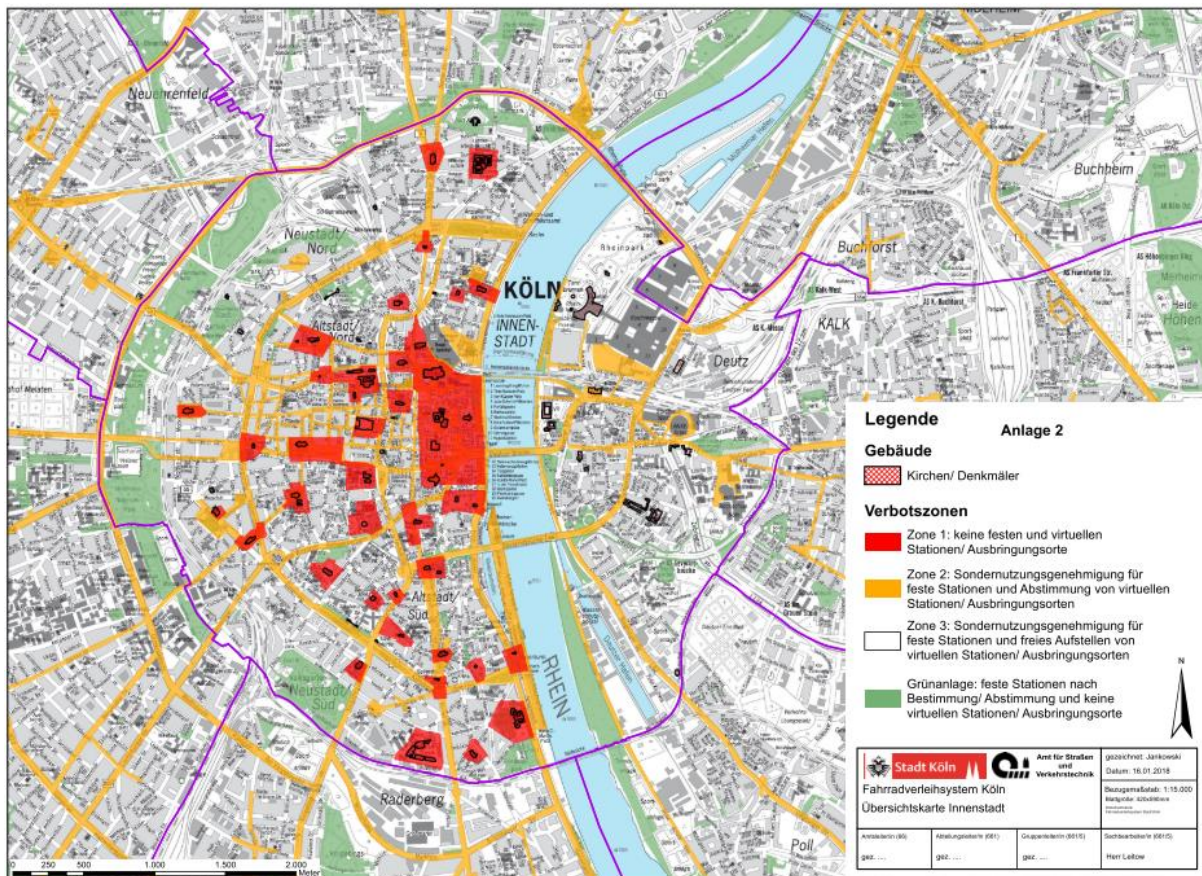


Figure 6: Different parking zones defined by the city of Cologne for shared bikes use in 2018 (use by operators based on voluntary agreement). These zones were also used for shared e-scooters from June 2019 onwards. (Source: Stadt Köln, 2019b).

## 2<sup>nd</sup> Policy

In summer 2021, the city of Cologne acted again on shared e-scooter rules. Due to the wide attention in the public and media about e-scooters found in the river Rhine, there was a political will to implement further regulation for shared e-scooter services. The city

council did commission the public administration to implement further rules for e-scooters (Stadt Köln, 2021f) and voted in a resolution on 19<sup>th</sup> July 2021 for specific measures such as:

- non-parking zones around water bodies
- implementation of stations for shared e-scooters, e.g. on car-parking spaces
- implementation of special use permits for shared e-scooters
- removal of shared e-scooters from water bodies by the operators
- 35% of shared e-scooters in outskirts

Based on this resolution by the city council the city did set up a meeting with the operators of shared e-scooters. In a press release of a meeting with operators on 22<sup>nd</sup> July the head of the department for mobility concluded:

*“We clearly defined the requirements and also pushed for quick results. We also did not want individual actions, but long-term solutions. Together with the operators, we decided on specific measures. We will monitor their implementation very closely and make adjustments where necessary.” (Stadt Köln, 2021d; translated by the author).*

This quote shows that there was a will by policy makers to implement further regulation on a voluntary basis with the operators – mainly due to the fact that there was no stronger short-term regulatory mechanism available. But it becomes also clear that the city wants to evaluate the existing rules and wants to adapt these rules in the future if necessary.

The representatives of the shared e-scooter operators also show their will to comply to the rules agreed on, while stating that there are further topics which need to be discussed further in the process:

*“The measures that have now been jointly agreed will ensure that e-scooters can also make their important contribution to the transport transition in Cologne. We would like to thank the City of Cologne for the constructive dialog and would like*

*to continue this in regular discussions. Many of the measures agreed today should quickly take effect and will also be evaluated. In other areas, we still need to work together on final solutions” (Stadt Köln, 2021d; translated by the author).*

As specific measures it was agreed by the city and operators that stations should be implemented in the future in specific areas. When there are stations implemented there would not be any other parking of shared e-scooters allowed (Stadt Köln, 2021d). Furthermore, restricted parking zones around water bodies should be implemented by operators based on a map provided by the city (see also figure seven). These restricted parking zones also apply for pedestrian zones (Stadt Köln, 2021d). Moreover, a faster reaction of operators was agreed on (Stadt Köln, 2021d). The operators provided a plan how dumped e-scooters should be recovered from water bodies (Stadt Köln, 2021d). Also, an information campaign was agreed on (Stadt Köln, 2021d). The Voluntary Agreement was adjusted to the new rules (Stadt Köln, 2021d).

On further rules such as a reduction of shared e-scooters in the inner-city centre, more shared e-scooters in the outskirts of the city, financial contribution of operators to stations and non-parking zones in specific areas at night times no consensus was reached on that meeting. The city and operators did agree on a weekly meeting to discuss further rules for shared e-scooters (Stadt Köln, 2021d).

On 9<sup>th</sup> August 2021 the City of Cologne published a further press release, which stated the new parking rules (see also figure seven) will be introduced the next day to the inner-city centre and will be further rolled out to the whole city successively (Stadt Köln, 2021b). The rules are implemented by the operators into their technical systems, e.g. parking of shared e-scooters is not possible in restricted zones (2021b).

The main goal of the new rules is stated to address the parking of shared e-scooters and to reduce the conflicts between different traffic participants (Stadt Köln, 2021b). The Mayor of the City of Cologne concludes in a press release about the meeting with the operators:

*“The new parking regulations are a first step. I expect the other agreements to be implemented in the near future.” (Stadt Köln, 2021b, translated by the author).*

This quote shows that the city was demanding compliance with the agreed rules (e.g. faster reaction times, recovery of e-scooters from water bodies) by the operators (Stadt Köln, 2021b).

On the 1<sup>st</sup> of September 2021 the City of Cologne did state new rules which got negotiated in further meetings with the operators. These rules were for example a reduction of the number of shared e-scooters in the inner-city centre of 35% percent and temporary non parking zones in special areas (Stadt Köln, 2021e). The mayor concluded on the results in a press release by the city:

*“The results made it possible to reach further agreements to continue tackling the problems with e-scooters on public roads. Nevertheless, we can only speak of a milestone. Further steps must be taken to ensure the conflict-free integration of e-scooters as an element of Cologne's traffic transition. I also expect the promise of a prompt recovery of the e-scooters from the Rhine to be fulfilled. (Stadt Köln, 2021e, translated by the author).”*

This quote shows that the city still has the goal to integrate shared e-scooters in the mobility system and considers e-scooters as one element to change the mobility behaviour. But it also gets clear the city does not have a sufficient steering instrument available by that time.

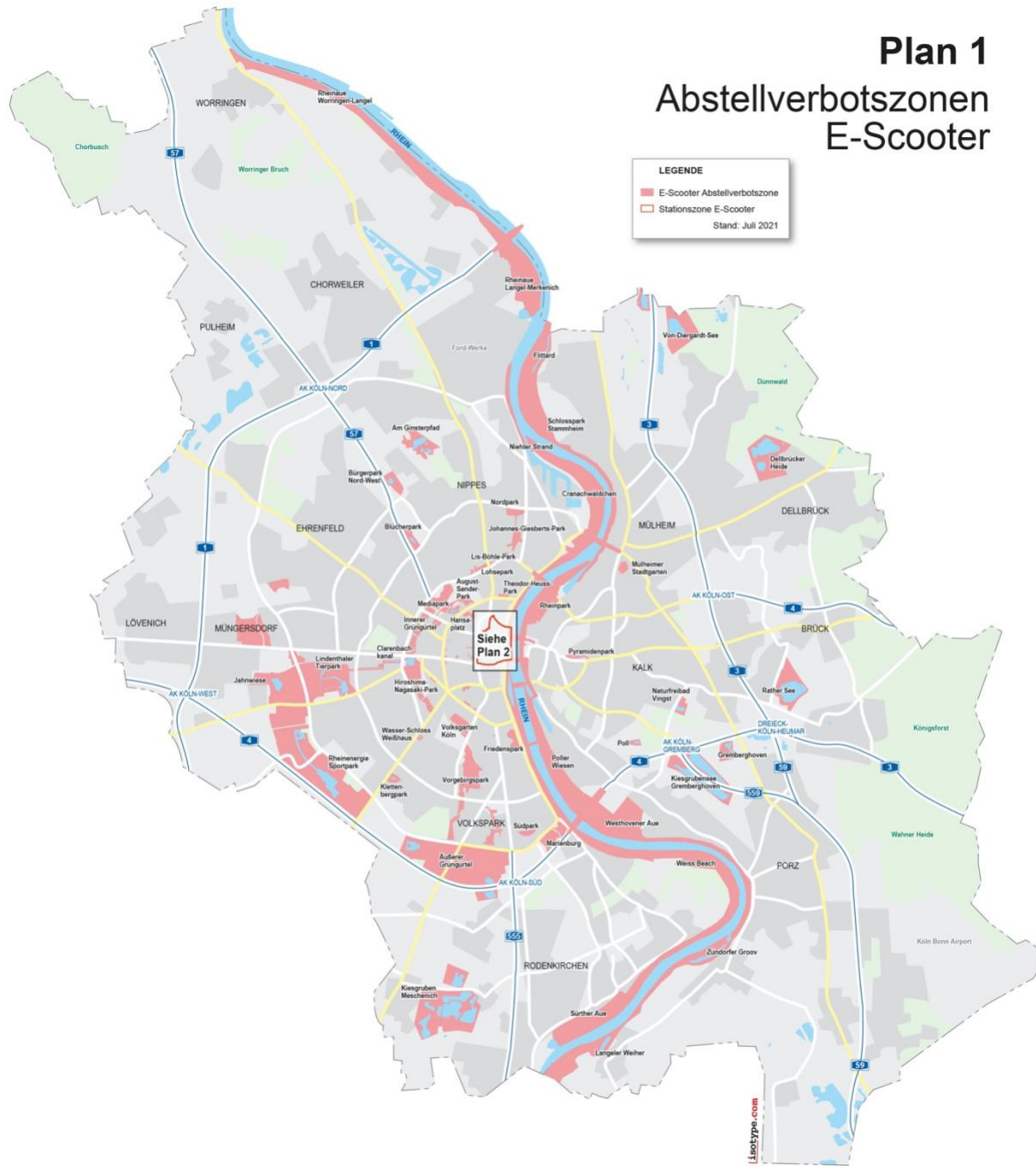


Figure 7: Non parking zones for users and operators needed to be implemented by shared e-scooter operators in August 2021 in their technical systems. (Source: Stadt Köln, 2021b).

### 3<sup>rd</sup> Policy

In 2022 the city decided to take a more regulative approach towards shared e-scooters. In March 2022, the city announced that from June 2022 onwards there will be a special use permit necessary for shared e-scooters (Bauer et al., 2022, p. 23; Stadt Köln,). With

the special use permit there are four distribution zones defined, each of these zones has a fleet cap: Zones 1 and 2, which include the old and inner city, are limited to 3,000 vehicles, while zone 3 is capped at 5,400 vehicles and zone 4, which extends to the outskirts of the city, is capped at 4,000 vehicles. (Bauer et al., 2022, p. 34). The special use permit does implement fees from 85€ to 130€ per year, based on the zone where the scooters are placed. Other sharing services will also be subject to a special usage fee, although this will be considerably lower, for example 10€ for sharing bikes per year (Bauer et al., 2022, p. 23). One e-scooter operator did try to challenge this special use fee for e-scooters, but the court ruled that these fees set by the City of Cologne are legal (Verwaltungsgericht Köln, 2022).

Bauer et al. (2022, p. 23) conclude that the special use permit does give the city more steering options, especially for the number of e-scooters and the parking behaviour.

#### *Further policies planned*

According to a press release the city does work on a plan to extend the special use permit with public tendering which gives the city the advantage to steer shared e-scooters towards more first and last mile use, in combination with public transport services (Stadt Köln, 2022d).

## 5.3 Kiel

#### *General introduction to the case study*

Kiel is the state capital of Lower Saxony and is the most populated city within the State with about 250.000 inhabitants (Statista, 2023). The city is structured monocentric and has a port since it is located at the Baltic see. Shared e-scooters first launched in the City of Kiel in August 2020 (Landeshauptstadt Kiel, 2023) and started with 200 vehicles (R 8, 2). The number of shared e-scooters rose up to roughly 3000 vehicles by autumn 2023 (R1, 8).

### *Goal of policies*

The City of Kiel has specified strategical goals for mobility in the traffic development plan from 2008. These goals are the following (Landeshauptstadt Kiel, 2008, p.4):

- Urban roads as living space
- Urban roads as serving the economy
- Child- and family-friendly traffic
- Environmentally friendly traffic
- Intra-regional cooperation

From these strategic goals there are specific requirements derived for special sectors and policy tools. In the traffic development plan from 2008, sharing services are not mentioned. There has been an update for the traffic development plan in 2019 for the sector of public transportation (Landeshauptstadt Kiel, 2019). In this policy paper bike sharing services are mentioned as one tool to improve the intermodality between public transport and bicycles (Landeshauptstadt Kiel, 2019, p. 19). In regard to e-scooters there are no specific goals formulated in policy papers, and there is no specific strategy yet on how to handle e-scooters within transport (R8, 18). On the cities' website it is stated that the City of Kiel has the goal to integrate shared e-scooters in the mobility and traffic system and aims to reduce the incorrect parking of e-scooters (Landeshauptstadt Kiel, 2023). The political committee stated in a resolution that it wants to ensure the continued use of e-scooters in Kiel, but at the same time reduce the current hazards and obstructions (Landeshauptstadt Kiel, 2022). Therefore, the committee commissioned the public administration to implement a mixed system of free-floating e-scooters and a station-based systems (Landeshauptstadt Kiel, 2022).

### *Governance mechanism used*

In the case study of Kiel one policy design stage can be identified. The City of Kiel uses a voluntary agreement which is similar to and inspired by the voluntary agreements of other cities. Therefore, since the introduction of shared e-scooters, the City of Kiel uses a collaborative governance mechanism and takes the role of a negotiator with the operators. The introduction of a special use permit sounds interesting to the city, but there

are no plans yet to introduce such a regulation due to limits of personnel resources (R8, 24).

### *Policy design process*

The voluntary agreement is signed by the city and the operators (two operators were active end of the year 2023, it used to be three beforehand) (R8, 22). So far there have been no changes to the agreement since its introduction (R8, 22). However, the City of Kiel did make minor informal changes through direct contact with the operators. This communication is facilitated through a monthly meeting between the City of Kiel and the operators (R8, 24). The voluntary agreement does incorporate for example rules limiting the number of e-scooters in specific places and parking regulations (e.g. no parking zones; operators use mobility hubs as often as possible) (Landeshauptstadt Kiel, 2020). According to the policy maker, the monthly meeting with the two operators, who are active in Kiel, is very valuable (R8, 28). The monthly meetings especially allow to discuss locations where there are problems with shared e-scooters (R8, 28). Nonetheless, overall, the compliance of e-scooter operators with the terms of the voluntary agreement and other arrangements is weak. The degree of compliance is also highly dependent on the specific person who runs the operations on the operators' side (R8, 27).

For the policy maker in Kiel parking of shared e-scooters is the main problem caused by e-scooters (R8, 7). There have been a lot of complaints by citizens about shared e-scooters, most of which state the problem of improper parking of e-scooters (R8, 7). The complaints do have waves of attention – sometimes connected to media attention – but in general complaints have become less frequent over the last years (R8, 4). The policy makers assume that citizens are becoming more familiar with this form of new mobility service (R8, 4). In general, shared e-scooters are considered as a marginal topic when it comes to strategic mobility decisions (R8, 11). However, according to the policy maker responsible for e-scooter governance in the City of Kiel, the public administration office and traffic and city planners are becoming increasingly aware that it is essential to consider e-scooters within the planning processes such as new street design and parking spaces (R8, 11).

## 5.4 Osnabrück

### *General introduction to the case study*

The City of Osnabrück has roughly 167.000 inhabitants and is the fourth largest city in the state of Lower Saxony (Wikipedia, 2024). The City of Osnabrück is structured mono-centric towards the city center.

Shared e-scooters were introduced to the city in June 2020. The number of e-scooters was limited through regulation since the beginning of the services to 500 e-scooters per operator (R6). However, this limit was later increased to 600 e-scooters per operator based on the initiative of the e-scooter operators (R6).

### *Goal of policies*

On the policy level the masterplan mobility (Masterplan Mobilität Osnabrück), published in the year 2010, does not contain any specific goals towards shared e-scooters or other micromobility sharing services (SHP, 2010). It can be assumed that this is driven by the fact that micromobility sharing services (e.g. bike sharing) were not common back then. The goals of the masterplan mobility are structured in three levels. The overall goal of traffic development planning is “*the sustainable development of the Osnabrück region as a business, residential and cultural location*” (SHP, 2010, p. 1). The second level of policy goals (called ‘value goals’) are based on the principles of social life and are subject to social change (SHP, 2010, p. 3). These goals are: ‘*Road safety and integrity*’; ‘*Mobility opportunities for all road users*’; ‘*Integrated urban and transportation development*’ and ‘*Raising awareness through information*’ (SHP, 2010, p. 3). These goals are further specified within action-oriented goals such as the reduction of the traffic amount, change of the modal split towards more sustainable transportation. In total the masterplan mobility aims to promote sustainable forms of transport “but also: efficient handling of road traffic in motorized private transport” (SHP, 2010, p. 10).

### *Governance mechanism used*

The City of Osnabrück implemented one policy design without further changes to the policy design, at least until the point in time when the data was collected for this research. The city chose a regulative governance mechanism by mandating the application for a

special use permit for operators. The city and the operators also signed an agreement which covered topics such as how the city and operators aim to interact. This voluntary agreement has similar objectives as voluntary agreements used by other cities (transport security; parking regulations; sustainability; support; data and communication) (Stadt Osnabrück, 2020b).

### *Policy Design process*

On May 29<sup>th</sup>, 2020, the City of Osnabrück established the requirement for e-scooter companies to apply for a special use permit when offering shared e-scooter services within the city (Stadt Osnabrück, 2020b). Compared to the policy design process of other cities this is unusual since at that point in time e-scooters were not yet present in the city. The policy makers wanted to act proactively, due to the experiences of other cities even if the legal assessment was not clear at that time. The City of Osnabrück commented on this in a press release:

*"Within the scope of special use, we are also able to set rules to protect the general public and limit the overall number of e-scooters" (Stadt Osnabrück, 2020).*

The city was right in their assumption that e-scooter operators were interested in offering their sharing services in the city. The first operator launched their services within the City of Osnabrück in June 2020, and a second operator started his services on October 1<sup>st</sup> that same year (Doerk, 2020). The number of e-scooters and the number of operators have not changed since then. The city states that the cooperation with the operators works very well, and compliance with the established agreement is high since the liability lies with the operators. In the agreement between the city and operators it is also stated that the city encourages it, when operators cluster their e-scooter in "hubs" (Stadt Osnabrück, 2020b).

## 5.5 Flensburg

### *General introduction to the case study*

The City of Flensburg has around 90.000 inhabitants and is the third-largest city in the state of Schleswig-Holstein and is located at the bay of Flensburg at the Baltic see. The city is structured monocentric towards the city center.

Shared e-scooters were introduced to the city in the beginning of 2021. Two companies are active in Flensburg with each of these companies operating a fleet of roughly 250 e-scooters at the start of the services (Stadt Flensburg, 2022). These numbers of e-scooters have lowered a bit over time (R5, 55).

### *Goal of policies*

The City of Flensburg has the goal to establish “environmentally friendly” and “high living standards” in the city. This is stated in the masterplan mobility which was published by the city (SHP, 2018). The three “value goals” of this plan are: ‘high living quality’, ‘integrated traffic and city development’, and ‘sustainable climate and resource protection’. These goals show that the city wants to reach its sustainability goals through the aid of mobility. Bike-sharing is mentioned several times in the report as an option to facilitate sustainable mobility, as well as mobility hubs (SHP, 2018). Shared e-scooters are not mentioned in the report since they were not yet legal in the year 2018 when the masterplan was published.

In a report to the cities council on shared e-scooters the public administration states that a central aim of policy makers is to facilitate modal shifts towards sustainable mobility including the use of shared e-scooters (Stadt Flensburg, 2023).

### *Governance mechanisms used*

The City of Flensburg implemented one policy design without further changes to the policy design later on. The city chose a collaborative governance mechanism and the instrument of a Voluntary Agreement. When contacting the city, the e-scooter operators had to provide a draft outlining their plans to offer shared e-scooter services in the city (R5, 7). The Voluntary agreement does include for example transport security, quality standards

and data-sharing (Stadt Flensburg, 2021). The agreement also includes no-riding zones, and these zones are adapted when needed (Stadt Flensburg, 2021).

### *Policy design process*

The first operator starting their services in Flensburg did contact the city before setting up their service. The operator and the city negotiated an agreement in the following (R5, 12). The policy maker had agreements from other cities at hand and was able to incorporate some of the elements within their agreement (R5, 10). The policy maker considers parking of e-scooters as the main problem (R5, 30) but complaints become less frequent as people get used to the e-scooter services (R5, 33). The shared e-scooter services work well at the moment and there is limited attention to the topic (R5, 42). This was different at the start of the e-scooter services. The City of Flensburg has conducted an evaluation on shared e-scooters which was presented to the city council (see also section 6.2.3). Operators are in general open to share the data with the city, but the city usually needs to ask a few times before receiving data (R5, 65). According to the interviewed policy maker the free-floating system is the key for the high usage rates.

## 6. General findings

In this chapter general findings from the case studies will be discussed. These findings are not necessarily generally applicable, due to the explorative approach carried out in this research. But this chapter does identify some important general findings which occur in policy making on shared e-scooters.

### 6.1 Municipal governance

From the data gathered within this study it becomes clear that governance mechanisms used by cities vary (see also table 5). Collaborative governance and regulating governance mechanisms are most often used by cities. In the beginning, shortly after the introduction of shared e-scooters, most cities tend to use collaborative governance mechanisms. Berlin is an exception as the public administration did not implement any policy to manage shared e-scooters operations in the beginning. In larger cities, such as Cologne and Berlin, the use of governance mechanisms has evolved over time and various policy stages can be identified. The study also highlights a trend towards governance through the introduction of regulation ('regulating governance') with the purpose of having a larger variety of steering instruments available and preserving the ability to implement legally binding policies. The City of Osnabrück is also an exception as the city uses a regulatory mechanism since the launch of e-scooters in the city. This can be explained through a knowledge advantage on the policy instrument of special use permits by specific policy makers within this city. Policy makers in other cities did not use this policy instrument due to legal uncertainties (see also section 4.2 to 4.5). The most used policy instrument is a Voluntary Agreement (see also table 5). This policy instrument is especially often used by smaller cities since it is easier to implement.

Table 5: Policy instruments and governance mechanisms chosen by the case study cities in different Policy Design stages and year of implementation of those

City	Inhabitants (#)	Year	1 <sup>st</sup> Policy	2 <sup>nd</sup> Policy	3 <sup>rd</sup> Policy	Future policies planned
Berlin	3.755.251	2019	Non-Design (2019) No governance / Enabling governance	Special use permit (2022) Regulating governance	Changes to the Special use permit (01.2024) Regulating governance	Evaluation if further changes to the Special use permit are needed (Summer 2024)
Cologne	1.084.831	2019	Voluntary Agreement (2019) Collaborative governance	Changes to the Voluntary Agreement (2021) Collaborative / regulating governance	Special use permit (2022) Regulating governance	Special use permit with public tender planned (2024)
Kiel	247.717	2020	Voluntary Agreement (2020) Collaborative governance			--
Osnabrück	167.366	2020	Special use permit implementation (2020) Regulating governance			--
Flensburg	92.550	2021	Voluntary Agreement (2021) Collaborative governance			--

Legend: Non-Design / Voluntary Agreement / Special use permit

## 6.2 Policy Design

### 6.2.1 Experiences with the introduction of e-scooters

The implementation of the New Electric Vehicle regulation in June 2019 which in a first instance allowed e-scooter offerings within German cities caused a high degree of uncertainty among policy makers of what was going to happen. This was the case in two of the analysed case studies, i.e., Berlin and Cologne. One regional policy maker in Berlin described the situation as followed:

*“The [e-scooters] were simply there (...) and that was a huge offer, and a huge problem, and general chaos” (R3, 3, translated by the author)*

Other policy makers (Berlin and Cologne) described the situation similarly (R1, R2, R4). One policy maker remembers the situation as followed:

*“The e-scooters have been around since the summer of 2019 and that's when thousands of these vehicles arrived in Berlin in one fell swoop, and of course the whole thing was totally disorganized. There were no rules.” (R2, 4, translated by the author)*

In the other case study cities e-scooters arrived after the implementation of the regulation (in the years 2020 and 2021) and the operators did ask for coordination with city before launching their services (Flensburg and Kiel). Therefore, the services were not carried out without coordination. The City of Osnabrück did introduce a special use permit even before an operator had contacted the city. This allowed the city to be prepared before e-scooter sharing services were launched within the city.

In conclusion, cities were not prepared for the launch of e-scooter sharing services in the year 2019 since they constituted a new type of vehicle in Germany. An additional driver for the high level of uncertainty was the fast introduction of the New Electric Vehicle regulation which came into effect only nine days after the resolution of the Federal Council

(Bundesamt für Justiz, 2023). This is highly unusual and the fastest policy making act on the federal level in twenty years according to the experience of one policy maker (RX, 2). These findings are in line with the findings from Mont et al. (2020, p. 2) who state that governments were taken by surprise and that the sharing economy is leads to challenges which cities are not prepared for. However, operators did change their approach compared to the market in the United States where they “flooded” the streets and took a path of “forgiveness” within Germany even if those companies were sometimes the same (Button et al. 2020, p. 6). The companies operating in Germany were more interested in creating positive brand associations. In the years of 2020 and 2021 cities were more prepared for the introduction of shared e-scooters to the cities. This process of policy learning occurred by knowledge sharing with other cities and allowed for the cities to implement voluntary agreements which were also in the interest of the operators (R6, R8).

#### *Parking of shared e-scooters as the main problem for cities*

Parking of shared e-scooters was the largest challenge within most of the case study cities (e.g. R2, 6). In all case study cities, in the beginning there was no public space designated for the e-scooters. They were considered as a stumbling tramp for the blind and visually impaired people creating a limitation for their mobility, and thus affecting them negatively in their mobility needs (e.g. R3, 19). This is in line with the findings of Bauer et al. (2022) that the introduction of shared e-scooters causes conflicts with other traffic participants such as pedestrians, mobility impaired people and bicycle users. Most policy makers are aware of these conflicts and consider those as a problem.

Therefore, the implementation of stations for shared e-scooters, especially within highly populated areas, is important to cities. This action is also supported by some operators as a statement from the ‘Platform Shared Mobility’ in a press release shows:

*"The decisive factor for the integration of this mobility offer in a community-friendly and low-conflict manner is the prompt provision of additional parking spaces. (...) We would like to see even more courage from the Senate (of Berlin)*

*to invest in the urgently needed transformation of Berlin's transportation system and to break new ground away from privately used cars.” (RBB24, 2023b).*

### 6.2.2 Information and knowledge limits

It is an important goal for policy makers to gain an overview on the current situation of the cities' rapidly developing markets for shared e-scooters (R1, 6). Since shared e-scooters are a rather new mobility service there is only limited data on the impact of this available to policy makers. For example, the public administration of Berlin does not exactly know how many e-scooters are present in the public spaces. However, it would be important for public administration to receive regular updates on changes in the number of e-scooters on the streets from the companies (R1, 6). This data would allow the cities administration to take more informed decisions which likely would lead to better outcomes. An even larger problem voiced by the cities is the fact that there is no knowledge on the effects of shared e-scooters on sustainable mobility and modal shifts available to policy makers. As a result, policy evaluation is an important aspect to be able to regularly adjust existing policies.

### 6.2.3 Policy Evaluation

Regarding the policy evaluation findings in this thesis are mixed. Most cities do not have a structured evaluation process of shared e-scooters offerings (Cologne, Kiel, Osnabrück), whereas the City of Berlin does have a strategy for policy evaluation. However, to the authors knowledge, also the City of Berlin has not yet consistently applied this policy evaluation strategy, but plans do so by summer 2024 (Land Berlin, 2023b). The City of Flensburg did conduct an evaluation on the impact of e-scooters (Stadt Flensburg, 2022). The city finds that within 2021 the e-scooter offering was on average used twice a day with an average trip length of 2,35km. In the month of November, the overall trips per day were one third lower than in the months of September. The distance of the trip was similar in September and November. The city concluded that the system of shared e-scooters is one additional mobility option which is attractive due to its flexibility and might help to change people's behaviours towards more sustainable transport choices (Stadt Flensburg, 2022). The evaluation did not allow a conclusion on if a

substitution of other traffic modes was made. Overall, the city took a positive stance towards the shared e-scooters.

The State of Berlin – having a totally different scale of e-scooters in the city with up to 40.000 e-scooter compared to 500 e-scooters in Flensburg – explicitly conceptualized the evaluation as a “learning system” (KCW, 2022, p. 45). The transport goals (derived from the mobility law) specify the goals which should be reached by the policies. The next step for the State of Berlin is to ask how these transport goals can be reached and which policy tools to choose in order to reach those goals (KCW, 2022, p. 45). A yearly monitoring process is planned to answer the question on whether the chosen policy tools did reach the intended outcome (KCW, 2022, p. 46). If the evaluation shows that the defined goals could not be reached through the implemented policies it will be considered to what extend the policy tools need to be adapted (KCW, 2022, p. 45). To support this evaluation process for the policies the public administration is building a data management tool to track and analyse shared mobility services (R1, 6). The tool allows the public administration to monitor the effects of these different mobility services (R1, 6). Furthermore, the data management tool will help to communicate with local policy makers (R2, 18). A long-term analysis of the tool’s data would reveal the true effects of shared e-scooters on the urban traffic and the mobility behaviour. This is a long-term goal of the policy maker to understand, if, and to what extent, shared e-scooters are used as first and last mile services (R1, 7).

#### 6.2.4 Policy Learning

Policy learning also stems from the knowledge sharing between different cities. For example, several interview partners did mention that they oriented their policies on the policies implemented in other cities. One example were the voluntary agreements which were shared between cities (e.g. R8, 22; R5, 6).

Concerning the evaluation of shared e-scooters in Berlin one policy maker is aware that there will be further policy adaptations needed:

*“There will certainly still be a lot to sharpen and improve. We are not giving ourselves any hope that this is a system that will work permanently with one direct implementation. But that was always the plan. It was established from the beginning of the project and the communication to the companies that such a system is a learning system.” (R1, 28).*

This citation shows that policy learning does occur also over different Policy Design stages. This policy maker in Berlin is aware that there will be further adaptations and evaluations needed to design well-fitting policies towards shared e-scooters. The policy learning aspect is also incorporated into the evaluation concept of sharing services in Berlin (KCW, 2022). Especially the case studies Cologne and Berlin illustrate that policy learning also takes place over different Policy Design stages. In Berlin this is formalized into a concept towards shared mobility services. In Cologne this policy learning takes the form of a more reactive approach induced through public attention on the topic of shared e-scooters.

### 6.2.5 Integration of public transport and shared micromobility

A central question to the policy success of shared e-scooters is the question, how public transport operators react to the new micromobility services. Transport agencies and public transport operators play a central role in enhancing intermodal trips.

In 2019 in Berlin, the Berlin Transport Agency (Berliner Verkehrs Gesellschaft) has launched an innovative multimodal transport app ('Jelbi'), which integrates the offers of public transport and sharing services for micromobility, shared cars and ride hailing services. Jelbi has integrated more than 80% of the available sharing services in Berlin including 37.000 shared e-scooters as of August 2022 (Jelbi, 2022). According to the Berlin Transport Agency Jelbi contributes to six goals of the Berlin Mobility law (Jelbi, 2022). Besides the integrated MasS app (including the functionality of ticketing to many sharing operators) it is a central feature to the project that mobility hubs are branded as 'Jelbi-stations' (Jelbi, 2022). During the peak of the COVID-19 crisis (year 2020) the sales of public transport tickets in this app dropped from 80% to 20%, whereas the sales of shared services increased from 20% to 80% (mobilityinstitute, 2020). This might indicate

that public transport operators can benefit from developing their business models towards the promotion of shared (micromobility) services, or at least the integration of shared (micromobility) services into their business logics. Policy makers on the state level of Berlin favour the services that Jelbi offers to public transport and shared mobility users since the app provides many citizens with access to a majority of sharing companies and connects their services to public transportation (R1, 71). Homem de Gueiva (2023, p. 42) consider the Jelbi project as a “digital success”.

It can be concluded that the findings from Hirschhorn et al. (2019) outlined previously, that public transport operators might control the disruptive potential by absorbing innovations, might not be the case in Berlin since the project Jelbi might even act as facilitator of innovations.

## 7. Conclusions & Recommendations

The previous three chapters analysed the empirical data which had been collected. Based on this analysis, conclusions will be drawn within this chapter. The concluding chapter will answer the research question *'How are policies on free floating e-Scooters designed by cities of different scales in Germany?'*. Afterwards, a critical reflection on the research will be given, and, at last, a few recommendations to the policy makers and scientific community based on the findings of this research will be formulated.

### 7.1 Conclusion

*'Which goals do the cities intend to achieve with policies on shared e-scooters?'*

Firstly, the analysis focused on which goals cities intend to achieve with policies on shared e-scooters. This research has shown that one goal which all cities have in common is the aim to steer the development of shared e-scooters in their city. However, in most case-study cities there is no clear goal setting yet (Cologne, Kiel, Osnabrück, Flensburg). Only the Senate of Berlin did develop specific goals on shared e-scooter offerings (and shared services in general) based on a policy report (KCW, 2022). These goals are derived from the mobility law of the State. The other case study cities do rely on the goals specified in their general strategic papers on mobility and traffic. In general, all the case-study cities have the goal to support forms of sustainable transportation. But due to limitations in knowledge it is not yet clear to the cities how sustainable shared e-scooters are. Therefore, the main goal of most cities is the reduction of the parking problems and solving frictions between different traffic participants. It is the task of cities to adapt their general mobility strategies to incorporate the new sharing services and to provide a clear (regulatory) foundation for their policies towards shared e-scooter offerings.

*'Which governance mechanisms are used by the cities?'*

Secondly, the research asked which governance mechanisms cities use. The governance mechanism which is most commonly used by cities is the collaborative governance (Kiel, Flensburg, Köln and Osnabrück). Berlin, as an exception, did not implement any policies at the launch of shared e-scooters (see also table 5 for governance mechanisms).

Therefore, in the case study Berlin there was no governance mechanism used. However, this decision by the City of Berlin could also be interpreted as an enablement of shared e-scooter services since the absence of policies allowed shared services to be established. Voytenko Palgan et al. (2021) state that there is a need to explain why cities differ in their governance approaches. In the case of German cities this answer is tightly linked to the availability of policy instruments. As outlined within chapter 4.1 and 4.2, within Germany a complex regulatory framework spanning across the federal and state level exists. This regulatory framework determines which policy instruments are available to respective cities. This differs between different states in Germany leading to a different set of policy instruments being available to each of the cities. In some states special use permits are lawful, while in other states this is not clear to policy makers, yet. These in part unclear regulatory frameworks for cities becomes increasingly sharpened through additional court decision and adaptation of the state road laws over time. The higher the degree of clarity the easier it becomes for cities to deploy the available policy instruments. For example, the City of Cologne implemented a special use permit as second policy design stage, after it became clear that special use permits are lawful and that compliance to voluntary agreements is low. The evolution of policy instruments and their usage is expected to continue over the next years, and it is up to the policy makers to choose well-fitting instruments which contribute towards achieving their formulated goals. Especially larger cities, such as Cologne and Berlin, consider the usefulness of public tendering processes for future policy design stages, as the knowledge on impacts of shared e-scooters on the overall mobility patterns is increasing. Overall, it can be concluded that there is a development from collaborative governance mechanisms towards regulatory governance, especially in larger cities. This can be explained by the will of policy makers (and the general public), to steer the development of shared e-scooters towards a more organized mobility service with reduced negative externalities (such as blocked sidewalks and therefore e.g. negative effects on the mobility for impaired people). Additionally, knowledge gaps towards shared e-scooter services are less severe than at the start of shared e-scooter services in Germany. Policy makers can apply first learnings of which regulatory framework works well and courts have clarified which regulatory frameworks are lawful.

*'How does the policy design process in cities takes place?'*

Thirdly, the analysis focused on how the policy design process in cities takes place. Overall, the policy design process differs between cities, but some similarities could be identified. All case study cities are interested in designing policies in cooperation with the operators. The cooperation with the operators ensures a good policy-fit as there is often a knowledge gap on the policy makers side regarding the function of a free-floating e-scooter system and the specific needs of mobility operators. Cities also aim to incorporate the interest and needs of other stakeholders (e.g. the associations of blind and visually impaired people).

Some cities take a more reactive approach in designing policies for shared e-scooters (e.g. Cologne) by implementing new policies when there is high pressure by the public. Other cities (e.g. Berlin) take a more structured and steady approach by developing a 'requirements and evaluation concept' (KCW, 2022), which provides a structured policy design process based on an analysis of the status quo and requirements which have been derived from the mobility law. However, this approach has the shortcoming that there was no consistent policy in place over a period of more three years (June 2019 to August 2022), which caused criticism on the local level (R3). The policy design approach of the City of Berlin entails a yearly evaluation process. The first time this evaluation was conducted it led to a limitation of the number of e-scooters allowed by the city-state of Berlin (3<sup>rd</sup> Policy Design). Berlin plans to conduct a second extended evaluation on shared e-scooters until summer 2024 focusing on the analysis of the data gathered from the operators. This data-evaluation has the potential to reduce the lack of knowledge by policy makers and might increase the policy fit. Smaller cities do have fewer public pressure compared to the larger cities. Most of the smaller cities, such as Flensburg and Kiel, take a cooperative approach towards the operators of shared e-scooters since there is limited need for further regulation. This holds true even if the compliance with the (voluntary) rules is not always given. In smaller cities rules are sometimes even just discussed verbally since there are fewer actors which need to be coordinated (e.g. Flensburg). Policy learning through knowledge sharing between cities is central for their policy design processes. One example are the voluntary agreements shared between

cities. The cities of Berlin and Cologne, which passed several policy stages, also learned in between the policy iterations which numbers of shared e-scooters works best for the cities mobility system.

*‘How are policies on free floating e-Scooters designed by cities in Germany?’*

As Howlett (2018) finds policy design is a ‘missing link’ in the policy studies. Policy design is complex and usually less accessible than other policy deliberations (Howlett, 2018, p. 29). This thesis adds a small piece to the scientific understanding of policy design. This thesis has taken an explorative approach and finds that cities differ within their goal setting, governance mechanisms and how policies are designed. In general, the levels of goal definitions on shared e-scooter services vary between the case-study cities. The governance mechanisms and policy instruments used by cities also differ among the studied cities. These differences in the approach can be explained through differences in the underlying regulatory frameworks of federal-states and differences in aims formulated by cities, as well as partial limitations in personnel resources. The policy design processes also vary among the studied cities and are linked to the goals defined by each city and the chosen governance mechanisms. Policy designs on shared e-scooters have evolved quickly over the last years and uncertainty by cities regarding lawfulness of policy instruments has been reduced over the last years. This offers the chance for policy makers to further develop their policy frameworks. The integration of shared e-scooter services with public transport will become increasingly important when cities aim to steer shared e-scooter services towards first and last mile usage. This will constitute a challenge for cities and will require further policy design stages, but the first steps have already been made (e.g. by the MaaS platform Jelbi).

The policy instruments which allow cities to establish shared e-scooter services as viable mobility options are generally available. Most policy makers think that e-scooters will not disappear in the city picture in the long-term until 2035 (R1, R2, R3, R4, R5, R8). According to the policy makers they might change their appearance (in terms of what type of vehicle is provided), but the service itself (in terms of fine-grid mobility services) will – according to the policy makers interviewed in this research – not disappear.

## 7.2 Critical reflection

This research was conducted over a long period of time. The first ideas for this research were made by the author beginning of the year 2022. This leads to the shortcoming of changing circumstances during the research process, especially in a research topic which is still rapidly developing. One example for the changing circumstances are the judicial assessment and interpretations of currently laws. During the start of this research the uncertainty regarding the lawfulness of special use permits for e-scooters was still very high. By now, this question seems to be largely solved in many states. The long time period over which this research was conducted might have the consequence that some circumstances described in this thesis are not fully up to date anymore. The author aimed to incorporate the latest developments during a final edit of this thesis to the degree possible. However, it cannot be ruled out that some errors which are based on the time the data was gathered remain. The author invested into highlighting the time during which data was gathered as transparently as possible. On the other hand, the prolonged time frame for this analysis also offers some advantages. As this thesis is analysing a process in policy design development and policy learning the author was able to incorporate a perspective on how policies evolve over time.

Reflecting on the research process itself, this thesis might have some shortcomings in outlining the underlying theory. The author decided for a theoretical framework early in the research process. But due to the limited availability of interview partners the research focus of this thesis needed to be adapted during the research process. Feasibility and time constraints prevented the change of the theoretical framework to another potentially more fitting structure. Nevertheless, the framework used within this thesis is still suitable to analyse the given research questions. The theoretical framework was adjusted during the research process to the degree needed to answer the given research questions. However, there might be other theoretical frameworks which are better suited to the given research questions. Retrospectively, it would have been useful from the beginning to further sharpen the definitions within the theory outline. Since the theories on Policy Design use a variety of different terms, a more precise definition of the terms before the data gathering process would have been useful for the research process.

## 7.3 Recommendations

### 7.3.1 Recommendations to the practice

*Consider implementing a special use permit, depending on the city size*

Today, in most states it is legal to consider free-floating shared e-scooters as special use of the road. This is either explicitly stated in the state road laws or based on supplementary court rulings. This stands in contrast to free-floating car sharing services for which courts have established that those need to be considered as common use of the road. Based on the classification as special use of the road cities have the ability to issue a special use permit for shared e-scooters. Special use permits have the advantage that cities can set fees per e-scooter. Based on court rulings for the case study city Cologne it is legal that cities do issue highly different fees for free-floating sharing bikes and free-floating e-scooters. The City of Cologne decided to take higher fees for e-scooters than for non-motorized sharing bikes. This is reasoned based on sustainability aspects such as the differences in lifecycle of the respective products. It could be assumed that a mix of different vehicle types will be most suitable since user preferences for the vehicle type seem to vary. Special use permits seem to be especially suitable for larger cities since the implementation effort is higher than for voluntary agreements. Special use permits have the advantage that the operators are accountable for their vehicles and fines, e.g. for incorrect parking, can be issued to the operators.

*Consider implementing a voluntary agreement, depending on the city size and resources*

Smaller cities do make good experiences with voluntary agreements even if compliance by operators is not always given and difficult to enforce. The main advantage of this steering instrument compared to special use permits is the lower number of personnel resources which are required to implement this mechanism. However, special use permits would have the advantage of being legally binding instrument. The case study of the city of Osnabrück highlights that the implementation of a special use permit is also possible for smaller cities if the policy makers are sufficiently knowledgeable.

### *Consider mandatory data sharing for the operators*

Free-floating shared e-scooters generate valuable data for transport planners. In a real-life setting users can drive everywhere within the city (as long as the operator allows it). It is highly recommended to policy makers to use this data which is generated through the use of the services. In contrast to data from traffic studies these operators can provide real live data about trips length, location of drop-offs etc. This data shows mobility needs of e-scooter users. E-scooter users are not representative for the whole of society, but they constitute a considerable amount of the citizens within a city. Therefore, this data can show valuable information to transport planners. Operators can be obliged to share their data with the city via a special use permit. The data for example allows to analyse if the number of e-scooter is too high within the city, and then as a consequence fleet cap sizes can be introduced also based on of the special use permit. This research has shown that data sharing works more efficiently and consistently with the use of special use permits. Otherwise, policy makers are dependent on the goodwill of operators. Especially in cities of larger scale operators hesitate to share their data with policy makers.

### *Implement fixed or virtual stations*

Parking of e-scooters is the main problem for policy makers arising from shared e-scooter offerings. Therefore, the focus should be on the implementation of stations, especially within inner-city areas. In most cities there is no, or little, public space designated to e-scooters. Cities can use this pressure caused through improper parked e-scooters to make public space available for sustainable mobility. Many cities have found fixed and virtual stations for e-shared e-scooters to be a good tool to provide this space. Fixed stations are especially suitable in highly populated or dense areas. It should be considered, if car parking spaces can be used for this purpose (the City of Cologne for example started early on the implementation of fixed stations in the inner-city centre and had good experiences with this approach).

### *Communicate with other departments beforehand*

Knowledge on special use permits is mostly available in other departments and not in the planning departments. Therefore, good communication between departments is needed.

Problems might arise from the differences in objectives between the departments. In most public administrations the road transport authorities are responsible for special use permits. Road transport authorities have the objective to secure transport safety. The original intention of special use permits is to specify areas where public space can be used differently than for the purpose of traffic (e.g. if a cafe wants to place tables and chairs in the public space). Special use permits are originally not designed for free-floating mobility services. This might increase the difficulty in implement rules and regulations to special use permits which have a traffic planning purpose. A good solution would be to jointly align on the goals at first.

#### *Consider the definition of specific goals for shared micromobility services*

The definition of specific goals for shared e-scooters might help to develop well thought-out policy designs. A good example is the requirements and evaluation concept of Berlin. If the concept and the goals are approved by the city parliament this could increase the ease of implementing further policies.

#### *Evaluate if public tendering is an option*

Public tendering allows for the shared e-scooter services to be restricted to one or more operators. This constitutes an advantage for users since they do not need to install and use different apps from different operators. This might lead to even higher attractiveness of the e-scooter system for users. Additionally, some operators favour public tendering since they have less competitive pressure after winning the contract given the limited number of competitors. Public tendering has additional benefits such as customized branding of the shared service offering.

#### *Collaborate with public transport agencies*

The integration of public transport and shared services is a key success factor for shared e-scooter offerings. The example of the Jelbi app showcases the deep integration of shared services with a public transport operator. Ticket system integration of shared services is an additional step which can be taken and potentially is closely linked to the implementation of a public tendering process. The integration of shared micromobility

services with public transportation is commonly seen as a sustainable urban transport mode since it *“could enhance accessibility and lead to potential modal shifts away from private car use.”* (Oeschger et al., 2020, p. 1).

In general, from the authors perspective, it is required to think about free-floating e-scooters in a systemic manner. Free-floating micromobility offers enhances accessibility which needs to be considered when designing policies. The POLIS network of policy makers (Homem de Gouveia et al., 2023, p. 12) puts this systemic perspective in the following words:

*“How realistic is it, to expect shared e-scooters to ‘absorb’ many car journeys on a one-for-one basis, or not to provide an attractive alternative to people walking? Should we judge shared micromobility by the percentage of trips that ‘would have been made by car’ or ‘by walking and cycling’? These questions may sound obvious, but are the strategically useful?*

*The challenge of modal shift is not about a monomodal shift, i.e. from a preference for one mode to preference for another. Rather, it is about enabling a menu of mobility options that, taken together, offer users a more attractive alternative to individual car ownership (...)*

*This is the strategic challenge in which shared micromobility has a role to play. It increases diversity and thus enriches this ‘multimodal alternative menu’.”*

To the authors view this quote asks the right questions. This research highlights the possibility of e-scooters being another mobility option which support the mobility transition and modal shift. The research has shown that cities are taking steps to steer the evolvement of the shared e-scooter market towards higher sustainability and increasing use for first and last mile transportation. This development has the potential to continue further, and well-designed policies are required for that.

### 7.3.2 Scientific recommendations

E-Scooters are a new phenomenon and have brought sharing mobility to the attention of the greater public. Research on the sharing mobility is still limited (Orozco-Fontalvo et al.,

2023, p. 406). Therefore, several topics arise which might be interesting for further research. Some of the potential future research questions which rose to the authors attention while conducting this research will be outlined in the following paragraphs.

One interesting research topic could be the e-scooter development over a timeframe of several years from a socio-technical regime perspective and a comparison of the developments within different countries, which took different governance approaches towards shared e-scooters. The German disruptive, market-based approach after liberalisation does have major disadvantages and negative externalities, which especially cities had, and still have, to deal with. But this market-based approach can also provide very valuable learnings for policy makers (e.g. learnings about mobility needs by georeferenced data on e-scooter trips), which could not have been experienced through a stronger regulatory approach from the start<sup>6</sup>. Until now it remains unclear, if a tighter regulatory approach on shared e-scooters would have had the same success in terms of usage rates (e.g. in regard to first and last mile use<sup>7</sup>) as the disruptive German approach has had. The author would assume that these stricter policies designed by cities – without any major interfering framework from the federal state – would not have had the same success in enabling the potential of shared e-scooter usage for increasing mobility and access to transport. In Germany, until now, it is up to policy maker to steer the development of shared e-scooters more towards the outskirts of cities and to leverage additional potentials which are not cost-effective for operators. Given the limited cost-effectiveness e-scooter companies otherwise do not operate in these areas. Based on this general idea of design thinking towards e-scooter governance it would be interesting to compare how the development of shared e-scooters took place in other countries which opted for different governance approaches. This thought links to the identified scientific knowledge gap concerning the ways of capitalising on the strengths of the sharing economy (Mont et al., 2020, p. 1).

Another potential research topic would be the influence of Artificial Intelligence on the mobility sector and how the incorporation of these into technical solutions will change the

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<sup>6</sup> E.g. it does not seem realistic that municipal policy makers would have designed free-floating e-scooters systems without beforehand having any stations implemented in cities

<sup>7</sup> Even if this data is still limited also in Germany, but the data will most likely increase in the next years

use of mobility services. This research would contribute to the Science and Technology Studies. First developments within this direction are already visible now, for example when e-scooters cannot be parked if they are improperly parked, and a photo is needed as to proof this.

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