Assessing the Impact of Shared Dockless E-scooters in the Friedrichstraβe, Berlin:

an Examination of Parking Patterns and Resident Perceptions

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16/06/2023

Abstract

The introduction of shared e-scooters in cities has given a new dimension to shared micro-mobility. In a country leading in the amount of cities that have adopted, the number of e-scooters Berlin only seems to be growing. It quickly gaining popularity as an environmentally friendly mode of transportation in Berlin, also contributing to first- & last-mile connectivity and decreased traffic congestion. However, the improper behaviour of users has become a concern for the public space of central areas, including the improper parking. They are obstructing the mobility of road users and conflicting with public amenities. Therefore, this research aims to assess the impact of e-scooter parking in a central and diverse street, the Friedrichstraße in Berlin. The results show that even though the vast majority of e-scooters were parked without causing disturbances, there is a variety of factors that cause improperly parked e-scooters to cause disturbance in the public space. The mobility of other road users seems to be impacted the most, especially on the sidewalk. The implementation of designated parking zones seems to have had a positive effect on improper parking, however, the attitude of the public still seems to be mostly negative towards parked e-scooters. Furthermore, there are indications that residents that are not aware of the e-scooter parking regulations have a more negative attitude towards parked e-scooters. Therefore, it is important for further regulations to be implemented, in order to limit the impact of parked e-scooters on the public space as well as improve the public attitude towards e-scooter, if Berlin has the ambition to keep shared e-scooters in their city for the long term.

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1. Introduction

1.1 Relevance for research

The introduction of shared dockless e-scooters has brought a new mode of transportation in urban mobility. Though they mainly functioned as an expansion to shared bicycle services when first introduced in 2017, cities across the world have rapidly adopted this mode of transportation as an eco-friendly and accessible mode of transportation. The electric-powered two-wheelers can be used by the public through smartphone applications and have created a new dimension to shared mobility. With their potential to alleviate traffic congestion, reduce carbon emissions, and provide first- and last-mile connectivity, shared e-scooters have emerged as a potential solution to the transportation challenges faced by cities throughout the world (Hardt & Bogenberger, 2019; Severengiz, 2020). However, the presence and usage of shared e-scooters are not without challenges and resistance.

In Europe, Germany is the country that is leading in the number of cities that have adopted the shared dockless e-scooter, with the city of Berlin offering the highest amount of available e-scooters out of these cities. As a city committed to sustainability and reducing carbon emissions, the introduction of this sustainable mode of transportation aligns with Berlin's long-term goals of becoming a greener and more liveable city. Shared e-scooters produce zero tailpipe emissions and have the potential to have a significantly smaller carbon footprint compared to traditional gasoline-powered vehicles. By encouraging the use of e-scooters as an alternative to private cars for short trips, Berlin aims to tackle the issues of air pollution and traffic congestion in the city, particularly in densely populated areas and during peak hours.

As of now, Berlin's transportation landscape is especially characterized by a robust public transit system, including an extensive network of buses, trams, and subways (S-Bahn & U-Bahn). However, despite the extensive public transit system, in a sprawling city like Berlin, public transit may not always reach every corner. Therefore, e-scooters could be an option for commuters to complete their journeys, bridging the gap between public transportation stations and the final destination and thus offering a solution to the first- and last-mile connectivity challenge. This enhanced mobility access has the potential to improve connectivity, reduce travel times, and enhance the overall efficiency of the transportation network (Zuniga-Garcia, 2022).

Nonetheless, the introduction of shared dockless e-scooters in the city has not been without resistance and has caused an ongoing debate among residents and city authorities. One of the most prominent concerns is the issue of improper parking by users, which especially occurs within the more central-lying areas of Berlin that contain a relatively high share of the e-scooters. With an estimated total of more than 30 thousand e-scooters available for rent in Berlin from 5 different major operators (Berliner Zeitung, 2023), questions arise about where these scooters should be parked when not in use. Though it is allowed to park the e-scooter in most areas, improper parking of e-scooters can lead to instances of blocked roads and conflicts in public spaces, obstructing other road users. As a result of the disturbance that e-scooters cause on sidewalks, for example, the association for the blind and visually impaired sued the Senate Department in 2022 intending to get parked e-scooters removed from the sidewalk (Berliner Zeitung, 2022).

1.2 Research Question

Though shared e-scooters are widely present in the district of Mitte in Berlin, this study will especially focus on the Friedrichstraße. Despite the e-scooters increasingly being regulated, they are still used by many. Therefore, this research aims to investigate the impact of parking in the Friedrichstraße. Hence, the main research question for this paper will be:

"What is the impact of e-scooter parking in the Friedrichstraße in Berlin?

The research question will be answered with the following sub-questions:

- To what extent do parked e-scooters cause disturbance in the public space in the Friedrichstraße?
- How do residents perceive the presence of parked e-scooters in the Friedrichstraße?

1.3 Structure of the Thesis

This paper further clarifies the concepts and theories that are relevant to this study. There will be an emphasis on theory in the field of sustainable transportation & micro-mobility in the urban environment. This focuses on shared e-scooters in particular and also specifically delves deeper into the case of Berlin. Moreover, there will be an emphasis on how improper parking of e-scooters can affect the mobility of other transport modes. Together, this provides a foundation for understanding and analysing the research topic. This is visualized in the conceptual model. The framework also outlines the key elements that will be utilized in the subsequent data analysis and discussion sections, highlighting the link between the theory and empirical findings. The expectations of the research are formulated based on the theoretical framework, setting the stage for the subsequent analysis. (Theoretical framework).

Consequently, the chosen research method is described in alignment with the research question. Furthermore, details regarding data collection, including the location and methodological approach, are provided, as well as how the data is analysed and interpreted (Methodology). Afterwards, the collected data is examined through the lens of the theoretical framework. The key findings from the empirical data collection in Berlin are presented, and comparisons with similar or divergent research findings from other studies are made, to highlight the significance and implications of the current research. To facilitate a comprehensive analysis, the results section is divided into sub-sections that correspond to different aspects of the theoretical framework (Results).

In the concluding section, the main points of the study are summarized. The findings are placed within the broader theoretical framework, shedding light on their significance and relevance (Conclusion). The strengths and weaknesses of the study are critically reflected upon, acknowledging any limitations or areas for improvement (Discussion). Depending on the type of research conducted, recommendations for further research or policy implications may be provided, offering insights for future studies or practical applications.

2. Theoretical framework

2.1 Theories & Concepts

The importance of the movement towards sustainable urban mobility has become increasingly prominent after the Organisation for Economic Co-operation and Development (OECD) (2012) concluded the rapid increase of negative environmental change. Identified as a leading cause of this, was the increase of greenhouse gas emission on a global level. By 2050, the ”global greenhouse gas (GHG) emissions are projected to increase by 50%, primarily due to a 70% growth in energy-related CO2 emissions”. Its members have agreed on Agenda 2030, which contains seventeen sustainable development goals to reduce the emission of CO2 and other greenhouse gases in the atmosphere. Within these goals, transport and mobility are considered central topics for sustainable development.

Similarly, concentrating on the importance of non-polluting transportation, the European Union has recently developed a strategic plan called the Sustainable Urban Mobility Plans (European Commission, 2023). This holds guidelines for developing sustainable mobility in cities. Examples of the guidelines include ensuring that all residents are offered accessible transport options, improving safety and reducing air & noise levels. The European Commission (2023) emphasises that working according to these guidelines will have several benefits, such as contributing to improved health and environment, increased mobility and enabling the development of new mobility structures.

One way to achieve these goals is to aim for more active- and micro-mobility. While active mobility is defined as utilising walking and cycling for single trips or within a trip in combination with public transport (Gerike et al, 2016), micro-mobility “encompasses a range of personal, light, low-speed vehicles” (McQueen et al., 2020). The term "micro-mobility" refers to various service models and transportation modes that cater to the diverse needs of travellers, such as station-based bike-sharing, dockless bike-sharing, and scooter-sharing. It encompasses non-conventional battery-powered vehicles, including Segways, electric scooters, and e-skateboards, which aim to provide efficient transportation over short distances, while reducing environmental impact (McQueen et al., 2020).

Micro-mobility can also be defined as the use of micro-vehicles weighing less than 50 kg or having a mass of no more than 350 kg and a design speed not exceeding 45 km/h (Christoforou, 2021). Figure 1 gives a further indication of how micro-mobility is distinguished from meso- & macro-mobility (Christoforou, 2021). The key features of micro-mobility include flexibility in scheduling, routing, and accessibility, as well as the ability to bridge first and last-mile gaps in transit systems. In the context of this research, micro-mobility encompasses all transportation modes that allow users to switch between behaving as pedestrians or vehicles as needed, such as crossing roads or boarding buses. Micro vehicles, which can be motorized or non-motorized and shared or privately owned, augment pedestrian mobility and may have an approximate weight threshold of around 40 kg.

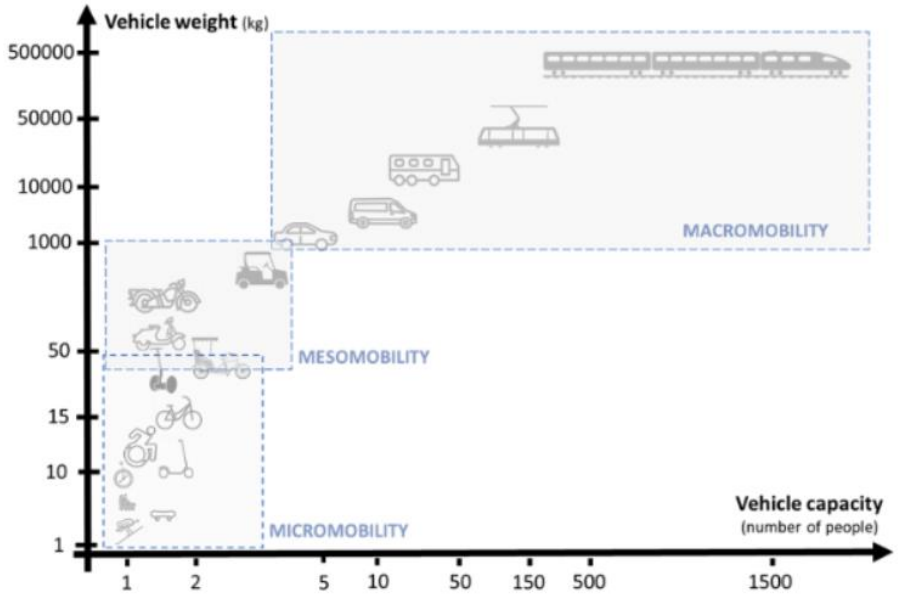


Figure 1: The three scales of mobility as a function of vehicle weight and capacity (Christoforou, 2021)

However, though micro-mobility is gaining popularity in cities throughout the world, the effective contribution of shared e-scooters to sustainable urban mobility goals is yet to be determined. For example, several studies shed light on which modes of transportation are replaced by the introduction of e-scooters. The results greatly vary from country to country, where a study in Oslo found that only 3% of e-scooter users had switched their mode choice from their private car to an e-scooter (Fearnley et al, 2020), while in Zürich the number was as high as 12% (Reck et al, 2022). Furthermore, focusing on the environmental aspect, Bozzi & Aguilera (2021) argue that the environmental impact of shared e-scooters is yet to be extensively researched. Though these e-scooters do not produce any tailpipe emissions, the production, use and maintenance of these e-scooters is not a waste-free process. According to Gebhardt et al (2022), e-scooters as a sustainable alternative depends on several factors, such as life span and the carbon intensity of battery production. Other drawbacks to the regular use of shared e-scooters include low perceived safety, the effects of bad weather conditions, and low baggage capacity (Hardt & Bogenberger, 2019).

The introduction of shared bicycles and e-scooters services has added a new dimension to micro-mobility, as they have made it possible for the public to use forms of active- and micro-mobility in cities, without having private ownership of such modes of transportation. These shared bicycles and e-scooters are however dockless, meaning that they do not have a fixed parking location and can be parked and picked up anywhere in the service area. Though this makes active- and micro-mobility more accessible, it can also lead to disturbances.

These disturbances have been causing frustrations amongst residents and authorities and in the case of dockless shared e-scooters, the image has been significantly affected. Hence, they do not always see dockless shared e-scooter services as an opportunity, but rather as a nuisance. An example of a city where the public has turned against e-scooters is Paris. This was also one of the first cities to introduce shared e-scooters as a mode of transportation in 2018. Ever since, there has been a wide range of critiques, especially referring to the amount of (fatal) incidents, unsafe behaviour in traffic and disturbance by improper parking (BBC, 2023). This eventually resulted in a referendum, in which the public voted with a majority of almost 90% to ban shared e-scooters from the city (BBC, 2023). Therefore, only 5 years after the e-scooters were introduced in Paris, they will be removed.

Especially with a growing number of e-scooters and operators, the issue of improper parking in public spaces has become more prominent. After the introduction of the e-scooters, they first shared the sidewalk with pedestrians, both in terms of transportation and parking the e-scooters. James et al. (2019) state that a problem occurred with the parking of e-scooters on the sidewalk as they were parked illegally, for example lying on the sidewalk blocking pedestrians from passing by. The appurtenant study by James et al. (2019) in Rosslyn, Virginia, found that 16% of electric scooters were parked 'incorrectly'. In this context, incorrectly meant that a parked e-scooter adhered to at least one of the following criteria:

- Blocking pedestrian right-of-way
- Blocking vehicle right-of-way
- On private property
- Damaging property (i.e., plants or trees)
- Not upright
- Obstructing access to a fire hydrant or valve
- Obstructing access to street furniture
- Obstructing access to a bus stop
- Obstructing access to a bike-share station

The category of 'blocking pedestrian right-of-way' was most prominent, with 6%. Parked e-scooters that did not fall under one of these categories were parked 'correctly'. Though the vast majority was parked 'correctly' according to the research by James et al. (2019), the improperly parked e-scooters still pose a problem for the quality of public space in urban environments, as well as causing frustrations among residents. For example, another study in Oslo showed that up to 4 out of 10 cyclists and pedestrians that participated in a survey were left irritated by parked dockless e-scooters (Berge, 2019). The result of these frustrations is often a wish for more regulations.

2.2 Case of Berlin

Berlin is no exception in that regard, as their inhabitants are having similar frustrations. After the ban of shared dockless e-scooter services in Paris, the already ongoing discussion in Berlin about these two-wheelers rose to a new level (Tagesspiegel, 2023). An increasing share of the inhabitants of Berlin are against the presence of the e-scooters, however, authorities in Berlin see the implementation of shared dockless e-scooters as a step in the right direction concerning the Berlin Mobility Act implemented in 2018. This entails a transition from car-dependency to more multimodal travel behaviour, including active and micro-mobility to eventually become a climate-neutral city by 2045 (Senate Department for the Environment, Urban Mobility, Consumer Protection and Climate Action, 2018). However, since the concept of dockless shared e-scooters is still relatively new, it is argued that city authorities have been through trial and error phases in the search for effective legislation. It is becoming increasingly clear which policies are effective. By introducing speed limits, restricting e-scooters to only use bicycle infrastructure, designated parking zones and behavioural campaigns, e-scooter disturbance could be limited (Gössling, 2020).

City authorities and e-scooter operators are working together to address the challenges through the implementation of parking policies. One example of a policy that has already been integrated in Berlin, is the creation of areas in which parking is not allowed. However, if users still decide to do so, they are fined. To still enable e-scooter parking in these areas, small designated parking zones in central areas of Berlin have been developed. For example in the Friedrichstraße, users are allowed to pass through the street but are restricted to park in small zones throughout the street, as illustrated in Figure 2. Therefore parking on the sidewalk is not allowed.

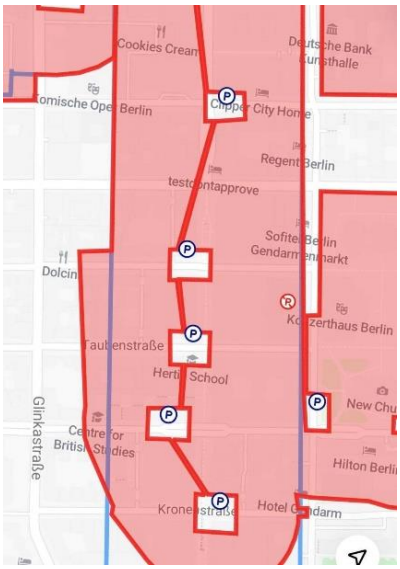


Figure 2: Designated parking zones in Friedrichstraße (Author)

Additionally, a change in the ParkGebO regulation that was implemented on January the first 2023 allowed for two-wheeled vehicles to park for free in car parking spaces (Senate Chancellery of Berlin, 2022), in an attempt to reduce the number of e-scooters parked on the sidewalks. This shows that e-scooters are increasingly being integrated as a mode of transport into the city of Berlin.

2.3 Conceptual model

Based on the literature discussed, figure 3 gives an overview of the impact that shared micro-mobility has had since the introduction of shared dockless e-scooter services.

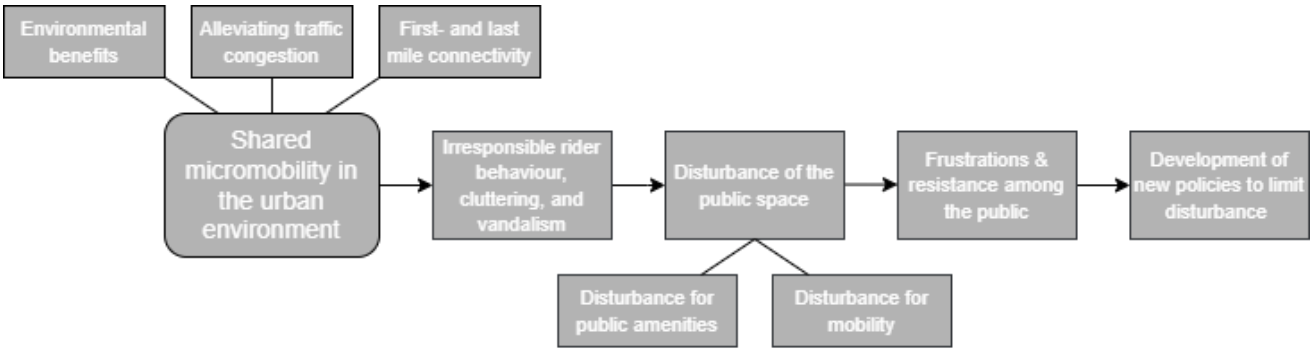


Figure 3: Conceptual model (Author)

2.4 Expectations

As there is a relatively high amount of e-scooters within the central areas of Berlin, together with Berlin's population, including a diverse range of residents, commuters and tourists, this city offers a diverse pool of perspectives and experiences related to e-scooter use and parking. The expectation for this research is that results are similar to research done by James et al. (2019). As this research aims to investigate the impact parked e-scooters have on the public space in the Friedrichstraße in Berlin, there is a strong focus on both the effects on mobility and public amenities. Effects on mobility in this case refers to the impact parked e-scooters have on the mobility of other road users like pedestrians, cyclists and car drivers, whereas effects on public amenities refers to conflicts with for example commercial establishments, bus stops and benches. Furthermore, since the research by James et al. (2019) showed that the biggest share of incorrectly parked e-scooters is parked on the sidewalk, these are central to this research as well. The expectation is that the majority of e-scooters observed are correctly parked, therefore, parked within the allowed parking area, standing upright, and not causing obstructions, providing insights into the adherence to parking regulations. Furthermore, the expectation is that wrongly parked e-scooters are mostly found on the sidewalk. These include those parked outside the allowed parking area, not standing upright, or causing obstructions for other road users or users of public spaces.

Therefore, out of all other modes of transportation in the research area, especially the mobility of pedestrians would be impacted. It is also expected that residents indicate this category to be disturbing, thus negatively impacting their perception of parked e-scooters. Since the Friedrichstraße contains several designated parking zones, outside of which parking is not allowed (fines as a result), the expectation is that the majority of parked e-scooters in the research area are parked within these areas. Moreover, it is expected that the disturbance caused by parked e-scooters mostly consists of disturbance of mobility, and less because of disturbance of public amenities. Lastly, in the same research by James et al. (2019), a survey revealed notable differences in perceptions regarding the effects of e-scooter parking between individuals with prior experience using them and those without. This suggests that greater familiarity with these new devices tends to result in more balanced perspectives regarding their impact on sidewalk accessibility and safety. This result seems to apply in other situations as well and correlates with the mere-exposure effect (Zizak & Reber, 2004), where a greater familiarity often results in a more positive perception of things, just because they are familiar with them. This could also apply to familiarity with e-scooters and their regulations.

3. Methodology

3.1 Study area

This study aims to investigate the impact of parked dockless shared e-scooters in central-lying areas of Berlin, with this case focusing on the Friedrichstraße. Figure 4 shows the area of Friedrichstadt, with the research area of the Friedrichstraße highlighted in green. It is a busy and popular area in Berlin, which offers a diverse urban environment with a mix of commercial establishments, public amenities, sidewalks, and transportation infrastructure. As a result, there is a high density of e-scooter usage. Furthermore, the Friedrichtstraße is well-connected with multiple transportation options, enabling the shared dockless e-scooters to function as a mode of transportation for first- and last-mile connectivity and enhancing the likelihood of e-scooter usage in the area. Additionally, at the time of the research, a part of the Friedrichtstraße was temporarily closed off to cars and had been transformed into a parklet. This made the research area even more diverse. Considering the characteristics of this street, this setting presents a feasible opportunity to study how e-scooter parking practices interact with the movement of people and vehicles, including potential conflicts and obstructions caused by improper parking. To keep a clearer overview during the data collection, the research area is dissected into 6 sections. Sections 1, 5 & 6 consist of roads where all road users are present, whereas sections 2, 3 & 4 consisted of a parklet where cars were prohibited. Within these sections, both observational data was collected, as well as responses for a short survey.

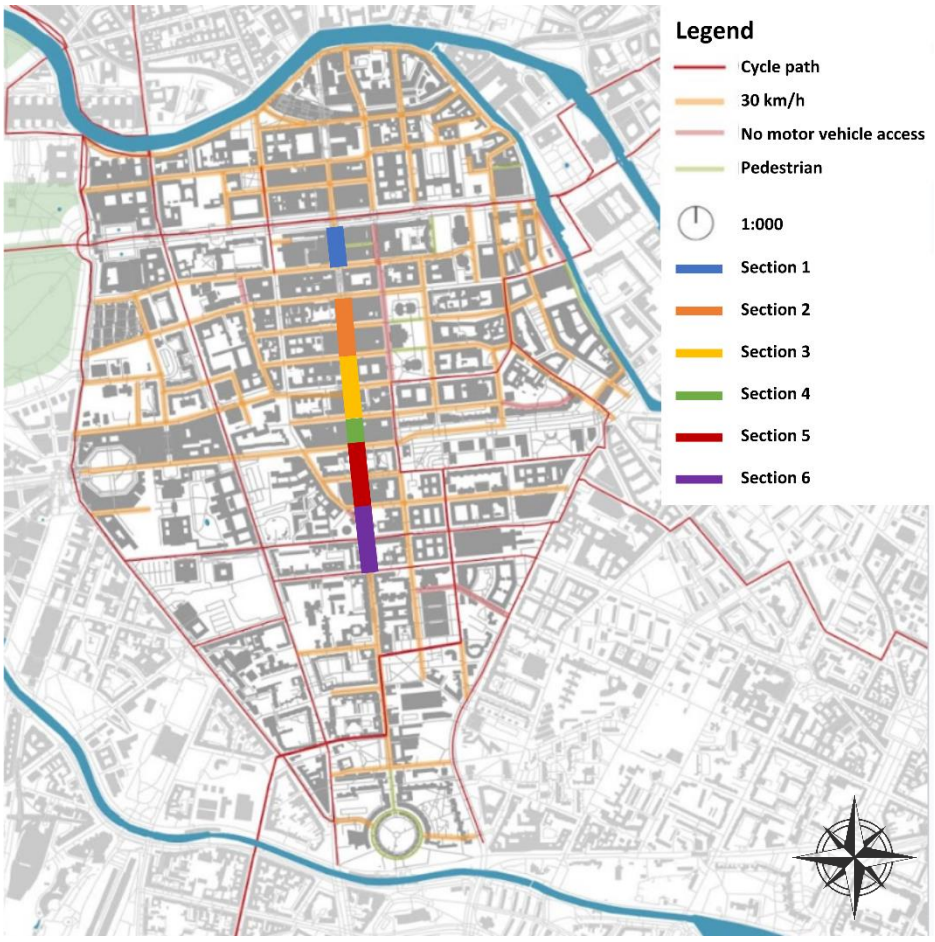


Figure 4: Map of Friedrichstadt, Berlin, indicating the research areas (Author)

The sections of the Friedrichstraße in this research were located between the intersections of the Friedrichstraße with the following streets:

- Section 1: Unter den Linden – Behrenstraße
- Section 2: Französische straße – Taubenstraße
- Section 3: Taubenstraße – Kronenstraße
- Section 4: Kronenstraße - Leipziger straße
- Section 5: Leipziger straße – Schutzenstraße
- Section 6: Schutzenstraße – Rudi-dutschke straße

3.2 Observation sessions

The objective of these observations is to gather data to evaluate the impact parked e-scooters have on public space in Friedrichstraße. Furthermore, it enables a comparison with previous studies relating to e-scooter parking (e.g. James et al., 2019; Gössling, 2020). The data will show further insights into where and how improperly parked e-scooters cause disturbances. Measuring the impact of improper parking of e-scooters will also make it possible to suggest policy changes and opportunities for further research to contribute to the ongoing efforts of cities in addressing the parking challenges associated with micro-mobility solutions.

The observation process involves counting the parked e-scooters that are present in the Friedrichstraße and classifying them into two distinct categories based on specific criteria: 'rightly parked' and 'wrongly parked':

- **Rightly parked**: E-scooters parked within the allowed parking area, standing upright, and not causing obstructions to mobility and public amenities
- **Wrongly parked**: E-scooters not parked within the allowed parking area, not standing upright, or causing obstructions to mobility and public amenities

Each e-scooter's parking condition will be evaluated based on predefined criteria in different categories. These categories include for example whether the e-scooters are parked in a permitted area or whether a parked e-scooter is placed on a part of the street that is allocated to a different mode of transportation. Within these categories, there are more specific criteria to assess the parked e-scooters. This will allow for further categorization accordingly. With this research, there is especially a focus on the following two aspects:

1. Obstructions for other road users: improperly parked e-scooters can impede mobility and cause safety risks for other road users. If e-scooters are parked in a way that blocks sidewalks or other designated pedestrian areas, it can hinder the movement of pedestrians, especially for individuals with mobility impairments. When parked on a bicycle lane or road allocated for cars, this can cause accidents and inconvenience.
2. Conflicts with public amenities: e-scooters parked in locations that restrict access to public amenities, businesses, or residences can negatively impact individuals who rely on those facilities. Factors such as blocking entrances or limiting access to public transportation stops can significantly affect people's ability to use and enjoy these services.

If a parked e-scooter adheres to any of the criteria above, they are categorized as parked wrongly. Therefore, e-scooters can only be parked correctly without adhering to any of the criteria. Using this classification, the collected data can be analysed to determine the proportion of e-scooters observed that are parked correctly versus those that are not, and why. Further analysis can reveal, for example, the percentage of correctly parked e-scooters on sidewalks and the percentage of wrongly parked e-scooters obstructing sidewalks. Moreover, the data will be supported with the use of pictures, to further illustrate why these parked e-scooters are parked correctly or incorrectly and give an even more clear view of the impact of parked e-scooters on the direct surroundings. Data collection is done during the day, as the expectation is that e-scooters are used more frequently throughout the day, as well as potentially causing more disturbance. The study is conducted during two time periods: morning (9:00-12:00) and afternoon (from 12:00 to 16:00), however, the duration of the observation period varies depending on the volume of e-scooters present in the designated area. The operators that are active in the research area, and therefore under consideration for this research are Voi, Lime, Tier, Bird, and Bolt.

3.3 Survey

Throughout the data collection, short surveys are handed out to people around the research area, in addition to the observational study. The format is a closed-ended survey, in which the questions restrict respondents to a predefined set of answer options, limiting their ability to provide unique or unexpected responses. Instead, these questions aim to gather specific feedback on targeted areas of interest. The questions could either be answered with only ‘yes’, ‘no’ or ‘I would not like to share’, or with the use of a Likert scale. Therefore, no personal data is collected in the survey. Moreover, the survey takes place in the same research area as the observations. To ensure the inclusivity of respondents, the survey is available in both English and German, catering to non-English speakers.

The survey aims to gauge the public's perception of e-scooter parking in Berlin. In this survey participants indicate whether they live in Berlin, their attitude towards parked e-scooters, the severity of pedestrian obstruction by e-scooters and, finally, whether they are aware of the regulations in place concerning e-scooter parking in Berlin. Therefore, the survey focuses on the disturbance people experience from e-scooter parking and aims to capture individuals' general attitudes towards e-scooter parking. Furthermore, the survey enables a better understanding of whether familiarity with e-scooter parking regulations has an impact on the attitude of respondents towards parked e-scooters. Moreover, the survey indicates how perceptions of local inhabitants differ from perceptions of visitors.

Together with the observational data from this research, it is possible to compare the measured e-scooter disturbance by wrongly parked e-scooters to how the attitude of participants is affected by this. This will give further insight into how impactful parking disturbances are for the public view of e-scooters.

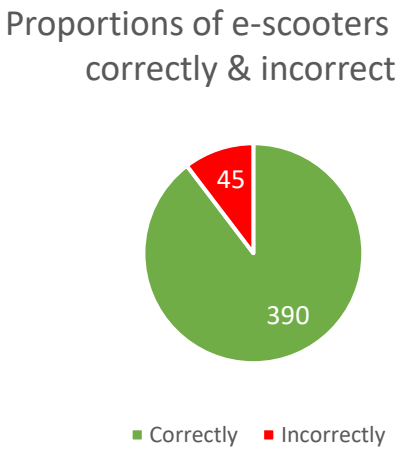
4. Results

4.1 Observational study

Throughout the data collection, weather conditions were either sunny or cloudy, therefore relatively favourable for people to make use of e-scooters and thus favourable for this research. In total, 435 parked shared e-scooters were observed. There were a variety of reasons why parked e-scooters were classified as incorrectly. For e-scooters to be classified as 'parked incorrectly', they adhered to at least one of the following criteria:

- Obstructing mobility of other transport modes
    - Parked on a bike lane
    - Parked in a car lane
    - Parked on a sidewalk outside of a designated parking zone
- Conflicting with public amenities
    - Parked leaning on a bench
    - Parked on a landscaped planting/tree/street lamp/street billboard
    - Parked at a bus stop
    - Parked leaning on a garbage bin
    - Parked in front of restaurant/residence/shop

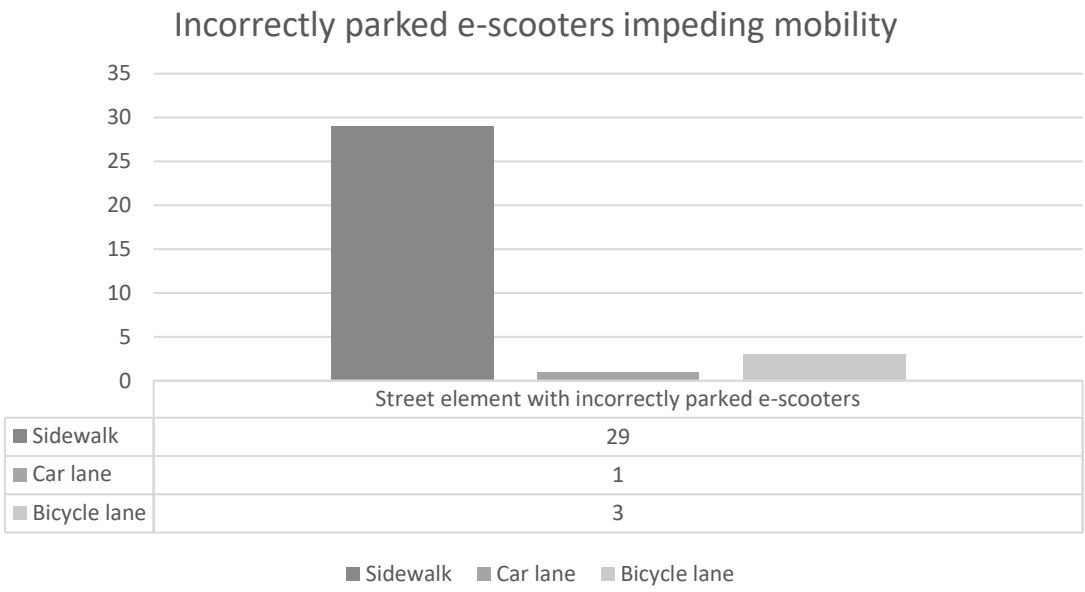
The total amount of e-scooters that were parked 'correctly' according to the conditions of this research is 390 of 435, therefore 45 e-scooters were parked 'incorrectly' (Graph 1). This shows that the vast majority of the observed e-scooters did not cause any obstructions, which correlates with the research by James et al. (2019).



Graph 1: Proportions of correctly & incorrectly parked e-scooters

Figure 5: Parked e-scooter impeding mobility of pedestrians of sidewalk (Author)

Similar to the results of James et al. (2019), the category that contains the highest share of improperly parked e-scooters, is e-scooters parked on the sidewalk. Figure 5 further illustrates how these disturb the mobility of pedestrians. 83 of the recorded parked e-scooters were parked on a sidewalk, which made up for 19,1% of the total amount of e-scooters. As some of the designated e-scooter parking zones were on the sidewalk, 54 of the 83 e-scooters were not necessarily parked incorrectly. However, the remaining 29 e-scooters that were parked on the sidewalk did cause obstructions (Figure 5). Furthermore, 3 e-scooters were recorded to be parked on a bicycle lane, and 1 on a car lane. Therefore, 33 of the 45 incorrectly parked e-scooters obstructed the mobility of other transport modes (Graph 2).



Graph 2: Number of incorrectly parked e-scooters disturbing mobility per street element

Though no research has been done yet specifically on the impact of parked e-scooters on sidewalks for the disabled, the efforts from the association for the blind and visually impaired to get parked e-scooters removed from the sidewalk (Berliner Zeitung, 2022), suggest that the e-scooters on the sidewalk especially limit the mobility of this group of the population (Figure 5).

Since in the Friedrichstraße, car drivers and cyclists share the road, these parked e-scooters do not only cause disturbance, but pose a significant risk to the safety of other road users, despite it being a relatively small share of the total parked e-scooters. Furthermore, another 30 e-scooters were parked in a 'buffer zone', which is defined as the area between the car lane and bike lane/sidewalk. Although these were classified as parked correctly, these can still be close to parts of the road that are allocated to other transport modes. As shown in Figures 6 & 7, these e-scooters could be considered to be parked incorrectly and therefore change the outcome of this research and that of James et al. (2019).

Figure 7: E-scooters parked in a buffer zone, (Author)

Figure 6: E-scooters parked in a buffer zone, (Author)

Moreover, out of the 435 e-scooters observed, 282 were parked within the small designated parking zones located throughout the Friedrichstraße. These are indicated by signs and yellow paint on the tarmac. Out of these 282, only 3 e-scooters were parked incorrectly, which in this case was caused by these not standing upright (Figure 8). Therefore, almost all of the e-scooters parked within the designated parking area were parked correctly as well (Figures 9 & 10). This suggests these designated parking zones can indeed contribute to limiting the disturbance by improper parking (Gössling, 2020), also indicating that regulations can be effective.

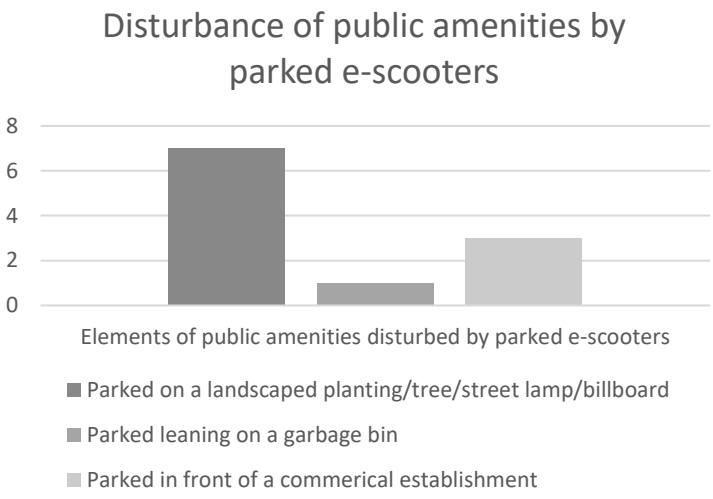
Figure 8: E-scooters within a parking zone not standing upright, (Author)

Figure 9: A group of correctly parked e-scooters within a designated parking zone, (Author)

Figure 10: A group of correctly parked e-scooters within a designated parking zone, (Author)

Considering the change in parking regulations in Berlin since January 1st (Senate Chancellery of Berlin, 2022), it is worthwhile to note that none of the observed e-scooters in this area were parked in a parking spot designated for cars. This suggests that the regulation change that allows e-scooters to be parked in car parking spaces for free has not had the desired result. It is possible that this was affected by the relatively small amount of car parking spaces in the research area and the temporary parklets that restricted cars from entering a large part of the Friedrichstraße at the time of the data collection.

Apart from obstructions for mobility, 11 observed e-scooters caused a direct disturbance to public amenities in the research area (Graph 3). This result is in line with the expectation that the mobility of other road users is mostly affected by the improper parking of e-scooters, whereas public amenities are suggested to be affected on fewer occasions. However, Figure 11 shows a clear conflict of a parked e-scooter with a commercial establishment, whereas There were no e-scooters observed that obstructed bus stops and benches, however, these were also hardly present in the research area.



Graph 3: Number of incorrectly parked e-scooters disturbing public amenities per element

Figure 11: E-scooter parked in front of the entrace of a restaurant, (Author)

4.2 Survey

In total, 30 responses were gathered. Out of all the respondents, 23 indicated to live in Berlin and 7 indicated to live somewhere else. Furthermore, the results suggest that even though a considerable portion of the respondents (11 out of 30) were aware of the regulations regarding e-scooter parking in Berlin, 16 respondents mentioned not being aware of these regulations. Interestingly, there seemed to be differences between the answers of respondents regarding their attitude towards parked e-scooters and how frequently they experience being obstructed by them.

When asked about their attitude towards parked e-scooters in Berlin on a scale from 1-10, the measured average for all respondents on this question was 5.0. The results between the residents of Berlin and the people not living in Berlin showed slight differences. The average of the residents of Berlin was 4.7, whereas the average for people not living in Berlin was 6.1. This result might indicate that residents' experiences are more negative towards e-scooter parking, as they are the ones most affected, compared to people that only visit Berlin. Furthermore, opinions were heavily divided on this topic, with for example 3 people that answered this question with a 1 (meaning very bad), whereas one person replied with a 10 (very good).

What makes this result even more interesting, is that all of these respondents lived in Berlin, indicating a wide spectrum of opinions on this topic amongst residents. Another finding was that there seems to be a slight difference on this matter between respondents that are familiar with the e-scooter parking regulations, and those that are not. The average of respondents aware of the regulations was 5.6, whereas those that were not averaged 4.4. This result aligns with the research by James et al. (2019), as it shows that people that are more familiar with e-scooters in general, experience less disturbance from e-scooters and are more positive towards them. Moreover, this also seems to be similar to the mere-exposure effect (Zizak & Reber, 2004).

The responses regarding the frequency of e-scooters blocking pedestrian pathways indicate a moderate level of occurrence. While some respondents reported rarely experiencing obstructions, others mentioned it happening more frequently. The average of all respondents on a scale from 1-10 (1 defined as never, 10 defined as always) was 4.9. Though this result indicates that on average, people experience obstruction relatively frequently, there is reason to state that people do not experience parked e-scooters being disturbing all the time. Similarly to the difference in attitude towards e-scooter parking, opinions were again different between residents and people living outside of Berlin. The average among residents was 5.3, whereas for visitors the average was 3.6. This result again indicates that residents experience more disturbance from parked e-scooters.

The respondents that indicated being aware of the regulations, experienced less frequent disturbance on average according to the survey. This result seems to be again similar to the matter of attitude. Though a slight difference, the results indicate an average of 4.5 for people that are aware of the regulations, whereas respondents that were not aware averaged 5.1. This result also aligns with the conclusion by James et al. (2019) on the connection between familiarity with e-scooters and the attitude towards them, as well as a correlation with the mere-exposure effect (Zizak & Reber, 2004).

In general, attitudes towards e-scooter parking seemed to be mostly negative, though the majority of parked e-scooters in this research did not cause disturbance.

5. Discussion

Following this research, a number of limitations have come to light. First of all, this research was performed during a Blended Intensive Project of Erasmus, in which there was a limited period of time for data collection. The data has been collected over the span of only 4 days, as well as in the same month, limiting the diversity of the research. Therefore, it is possible that for example e-scooters were observed twice without being used in between observations, or that parking practices in the research area differ per period in the week, month and year. Thus, the research might give a skewed image of the actual usage and parking practice of e-scooters in the research area. Furthermore, it is important to take into consideration that e-scooters that are parked correctly according to the research can easily be vandalized or moved and cause disturbances as a result.

Moreover, the research has been performed in groups, which can lead to different interpretations of the parked e-scooters. Besides, it is hardly objective to measure whether a parked e-scooter is disturbing, as people have different perceptions of how parked e-scooters are disturbing. This also applies to the survey, as different aspects could influence the attitude of people towards e-scooter parking, other than the factors that were taken into account for this research. For example, excessive or haphazard placement of e-scooters in public spaces can contribute to visual clutter and diminish the aesthetic quality of the surroundings. This aspect is particularly relevant in areas with historical or cultural significance, where maintaining the visual appeal of the environment can be an important factor. Furthermore, the perception and opinions of the public regarding the presence of improperly parked e-scooters can widely differ because of previous experiences and cultural backgrounds. This might have had an impact on the results of both the observations and the survey.

Lastly, due to the limited available time for data collection in the research area, the decision was made to focus mainly on observational data collection. However, as a result, the survey was eventually answered by a relatively low number of 30 respondents. Due to the relatively small size of the sample, the results suggest a false level of accuracy. Furthermore, the survey was kept relatively short. Hence, the survey hardly explores which factors influence the attitude of respondents towards e-scooter parking practices. A bigger sample and bigger diversity of questions (for example relating to the frequency of e-scooter use or transport mode choice) could have enabled more insight into the perceptions of residents and visitors concerning e-scooter parking.

6. Conclusion

This study has focused on the impact of e-scooter parking on the public space of the Friedrichstraße in Berlin, mainly including the obstruction of mobility and public amenities. Overall, the research findings suggest that while the majority of e-scooters were parked correctly and did not cause disturbance in the public space in the Friedrichstraße, there is a need to further limit improper parking behaviour. E-scooters that impede the mobility of other transport modes seem to pose the biggest issue for the quality of the public space, especially for (impaired) pedestrians, whereas conflicts with public amenities happen lew frequently. This finding supports the efforts of organizations advocating for the removal of e-scooters from sidewalks. Furthermore, the results indicate that the designated parking zones positively contribute to the proper parking of shared dockless e-scooters, thus highlighting the importance of effective regulations and designated parking zones to minimize disturbances and enhance the co-existence of e-scooters with other modes of transportation in urban environments.

Moreover, the research encountered diverse attitudes of residents and visitors towards e-scooter parking. While some residents mainly expressed a positive attitude towards e-scooters, others held strong negative attitudes, also due to the disturbances caused by improper parking. Though the results gave slight indications that greater familiarity with the parking regulations resulted in a more positive attitude towards e-scooters, the general attitude was still mostly negative.

More extensive and also longer research could give even more insight into the impact that improperly parked e-scooters have on the public space. Although city authorities are still in a trial and error phase regarding effective legislation, shared dockless e-scooters have the potential to contribute to the goals of Berlin to become climate neutral. Negative attitudes of the public have already caused other cities to get rid of the shared dockless e-scooter services. Therefore, it is worthwhile for Berlin to aim for more parking regulations and an increased familiarity with e-scooters, to ensure that shared dockless e-scooters can become a regular face of urban mobility.

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8. Appendixes

Appendix 1: Observational data collection instrument

Table: Each individual scooter is to be filled in at the top row (number of e-scooters), allowing one column for one e-scooter, since the scooter can be for example both standing up & parked at a bus stop. The table contains 18 columns, meaning we will use several tables to account for our observations.

Place:_____ Date:_____ Time:_____

Number of e-scooters																	
General e-scooter parking guidelines																	
1. Parked in a no-parking zone																	
2. Parked within the referred parking-zone.																	
3. Parked standing up																	
Street elements																	
4. Parked on a bike lane																	
5. Parked in a public car-parking																	
6. Parked in a car lane																	
7. Parked in a buffer zone																	
Sidewalk elements																	
8. Parked on a sidewalk																	
9. Parked on a parking-rack for e-scooters																	
10. Parked on a parking-rack for bicycles																	
11. Parked within 3 meters of a designated parking area																	
12. Parked leaning on a bench																	
13. Parked on a landscaped planting/tree/street lamp/street billboard																	
14. Parked at a bus stop																	
15. Parked leaning on a garbage bin																	
Other elements																	
16. Parked in front of restaurant/residence/shop																	
17. Parked elsewhere																	

Elements	Explanation
Parked in a no-parking zone	Parking-zones are administered by the operators which are shown through respective apps. The “no-parking-zones” are shown as red or black areas in which rental e-scooters are not allowed to be parked.
Parked within the referred parking-zone	Parking-zones are administered by the operators which are shown through respective apps.
Parked standing up	E-scooters should be parked standing up according to german jurisdictions and e-scooter operators.
Street elements	
Parked on a bike lane	Obstruction and safety-risk for cyclists.
Parked in a car-parking	Since January it is now allowed for e-scooters to park for free on public parking spaces designated for cars.
Parked in a car lane	Obstruction and safety risk for cars.
Parked in a buffer zone	Area between car lane and bike lane/sidewalk.
Sidewalk elements	
Parked on a sidewalk	It is not allowed to park on a sidewalk according to German laws or e-scooter operators.
Parked on a parking-rack for e-scooters	Designed areas for e-scooters. Administered by e-scooter operators.
Parked on a parking-rack for bicycles	Designed areas for bicycles. Allowed for e-scooters.
Parked within 3 meters of a designated parking area	The e-scooter is parked outside of a designated parking area but within 3 meters from it.
Parked leaning on a bench	Obstruction for the public and damaging property.
Parked on a landscaped planting/tree/street lamp/street billboard	Damaging the landscape and properties.
Parked at a bus stop	Obstruction for passengers.
Parked leaning on a garbage bin	Obstruction for users.
Other elements	

Parked in front of restaurant/residence/shop	Preventing accessibility and constitutes as an obstruction.
Parked elsewhere	The e-scooter is parked somewhere else not included in the list.

Scooter:	**Date and time:**	**Notes:**

Appendix 2: Survey

Aim for the study: This study is focusing on the parking of rental e-scooters in Berlin. It will be used for a small-scale research in the University of Groningen. You will be completely anonymous and you can choose to cancel the survey at any time. It consists of 8 questions on attitude and what you know about rental e-scooters for shared use.

Zweck der Studie: Diese Studie konzentriert sich auf das Parken von Mietwagen in Berlin. Es wird für Kleinforschung an der Universität in Groningen genutzt. Sie bleiben vollkommen anonym und können die Umfrage jederzeit abbrechen. Es besteht aus 8 Fragen zur Einstellung und was Sie über das Mieten von E-Scootern zur Mitbenutzung wissen.

Do you agree to participate in this survey and with us using your answers for our research? / Sind Sie damit einverstanden, dass wir diese als Daten für unsere Forschung verwenden?

Yes/Ja	No/Nein

Survey on e-scooter parking in Berlin / Umfrage zum Parken von E-Scooter in Berlin

Q.1 Do you live in Berlin? / Wohnen Sie in Berlin?

Yes/Ja	No/Nein	I don't want to share/Ich möchte nicht teilen

Q.2 Are you positive or negative towards the parking of rental e-scooters in Berlin? Rate from 1-10, where 1 is very bad and 10 is very good. / Stehen Sie dem Parken von Leih-E-Scootern in Berlin positiv oder negativ gegenüber? Bewerten Sie von 1-10, wobei 1 sehr schlecht und 10 sehr gut ist.

Answer/Antwort: _____

Q.3 Have you experienced that parked rental e-scooters are blocking your way as a pedestrian? Rate from 1-10, where 1 is never and 10 is always. / Haben Sie die Erfahrung gemacht, dass geparkte Miet-E-Scooter Ihnen als Fußgänger den Weg versperren? Bewerten Sie von 1-10, wobei 1 nie und 10 immer bedeutet.

Answer/Antwort: _____

Q.4 Are you aware of what rules apply for the parking of e-scooters? / Ist Ihnen bekannt, welche Richtlinien für das Parken von E-Scootern gelten?

Yes/Ja	No/Nein	No opinion/keine Meinung

Schedule for the data collection:
Sunday: Pre-work including a review of the areas to see if it's suitable for our study. Mapping out car-parkings, e-scooter parking and the operators "no-parking zones".
Monday: Continuing the pre-work. Additional mapping if needed.
Tuesday: 13-16 o'clock observation and surveys of the commercial and residential area.
Wednesday: 18-20 o'clock observation of the commercial area and residential area, as well as surveys.
Thursday: Compilation of the data and extra room for additional data collection if needed.
Friday: Compilation of the data and extra room for additional data collection if needed.

Appendix 3: Results observational data

AM, section 1-6, cloudy	S. 1				S.2						
Number of e-scooters	1-3	4-6	7	8-10	11-12	13	14-15	16	17	18	19
General e-scooter parking guidelines											
1. Parked in a no-parking zone			1							1	1
2. Parked within the reffered parking-zone	3	3		3	2	1	2	1	1		
3- Parked standing up	3	3	1	3	2	1		1	1	1	
Street element											
4. Parked on a bike lane											1
5. Parked in a public car-parking											
6. Parked in a car lane											
7. Parked in a buffer zone				3							
Sidewalk elements											
8. Parked in a sidewalk			1								1
9. Parked on a parking-rack (parking-lot) for e-scooters	3	3			2	1	2	1	1		
10. Parked on a parking-rack for bicycles											
11. Parked within 3 meters of a designates parking area										1	
12. Parked leaning on a bench											
13. Parked on a landscaped planting/tree/street lamp/street billbord											
14. Parked at a bus stop											
15. Parked leaning on a garbage bin											
Other elements											
16. Parked in front of a resturant/residence/shop											
17. Parked elsewhere											

S.3									S.4										S.5
20	21	22	23	24	25-30	31	32	33	34	35	36	37	38	39	40	41	42-44	45-51	52
	1							1	1	1	1	1	1	1	1				
1		1	1	1	6	1	1									1	3	7	1
1	1	1	1	1	6	1	1	1	1	1	1	1	1	1	1	1	3	7	1
								1											
													1						
								1				1							1
1		1	1	1	6	1	1									1	3	7	
									1	1	1			1	1				
	1																		

									S. 6															Total:
53-54	55	56	57	58	59-60	61	62	63-64	65	66	67	68	69	70	71-77	78	79	80	81	82	83	84-88	89	89
			1																					13
2	1	1		1	2	1	1	2	1	1	1	1	1	1	7	1	1	1	1	1	1	5	1	76
2	1	1	1	1	2	1	1	2	1	1	1	1	1	1	7	1	1	1	1	1	1	5	1	86
																								2
																								0
																								0
2																								6
	1	1	1	1	2	1	1	2	1				1	1			1		1	1	1			22
															7							5	1	49
										1					7			1				5	1	20
											1	1				1								5
																								0
																								0
																								0
																								0
																			1					1
																								0

PM, section 1-6. Sunny.	S.1							S.2			
Number of e-scooters	1-2	3	4-15	16	17	18	19-20	21	22	23	24
General e-scooter parking guidelines											
1. Parked in a no-parking zone	2					1		1	1		
2. Parked within the reffered parking-zone		1	12	1	1		2			1	1
3- Parked standing up	2	1	12	1	1	1	2	1	1	1	1
Street element											
4. Parked on a bike lane											
5. Parked in a public car-parking											
6. Parked in a car lane									1		
7. Parked in a buffer zone	2	1				1	2				
Sidewalk elements											
8. Parked in a sidewalk	2	1				1		1			
9. Parked on a parking-rack (parking-lot) for e-scooters			12	1	1					1	1
10. Parked on a parking-rack for bicycles											
11. Parked within 3 meters of a designates parking area		1							1		
12. Parked leaning on a bench											
13. Parked on a landscaped planting/tree/street lamp/street billbord	2										
14. Parked at a bus stop											
15. Parked leaning on a garbage bin											
Other elements											
16. Parked in front of a resturant/residence/shop								1			
17. Parked elsewhere											

		S.3				S.4			S.5											S.6							Total
25	26-33	34	35-42	43- 57	58-70	71	72	73	74-75	76	77-79	80-82	83	84	85	86-89	89	90	91	92	93	94	95	96	97	98	98
		1				1	1	1											1								10
1	8		8	14	13				2	1	3	3	1	1	1	4	1	1		1	1	1	1	1	1	1	88
1	8	1	8	14	13	1	1	1	2	1	3	3	1	1	1	4	1	1	1	1	1	1	1	1	1	1	98
		1																									1
																											0
																											1
							1						1	1	1	4											14
		1					1		2	1	3	3		1				1	1								19
1	1		8	14	13															1		1	1	1	1	1	59
			8	14		1		1												1		1	1	1	1	1	30
																4	1				1	1					9
																											0
												3						1									6
																											0
																			1								1
							1																				2
																											0

AM Section 1-6, Sunny	S.1-3										
Number of e-scooters	1	2-12	13-17	18	19	20	21-25	26-28	29-31	32-33	34
General e-scooter parking guidelines											
1. Parked in a no-parking zone	1										1
2. Parked within the reffered parking-zone		11	5	1	1	1	5	3	3	2	
3- Parked standing up	1	11	5		1	1	5	3	3	2	1
Street element											
4. Parked on a bike lane											
5. Parked in a public car-parking											
6. Parked in a car lane											
7. Parked in a buffer zone											
Sidewalk elements											
8. Parked in a sidewalk	1					1			3		1
9. Parked on a parking-rack (parking-lot) for e-scooters		11					5	3		2	
10. Parked on a parking-rack for bicycles											
11. Parked within 3 meters of a designates parking area			5		1						
12. Parked leaning on a bench											
13. Parked on a landscaped planting/tree/street lamp/street billbord	1										
14. Parked at a bus stop											
15. Parked leaning on a garbage bin											
Other elements											
16. Parked in front of a resturant/residence/shop											
17. Parked elsewhere											

		S.4-6													Total:
35-43	44-51		52	53	54	55	56-62	63	64-66	67	68	69	70	71	72	72
			1	1				1							1	6
9	8				1	1	7		3	1	1	1	1	1		66
9	8		1	1	1	1	7	1	3	1	1	1	1	1	1	71
																0
																0
																0
						1							1			2
			1	1	1	1		1		1	1	1			1	15
9	8						7									45
							7		3					1		11
																6
																0
																1
																0
																0
																0
																0

PM, Section 1-6 Sunny	S.1-3							S.4-6		
Number of e-scooters	1	2	3-19	20	21-44	45-60	61-62	63	64-68	69-79
General e-scooter parking guidelines										
1. Parked in a no-parking zone	1						2			
2. Parked within the reffered parking-zone		1	17	1	24	16		1	5	11
3- Parked standing up	1	1	17		24	16	2	1	5	11
Street element										
4. Parked on a bike lane										
5. Parked in a public car-parking										
6. Parked in a car lane										
7. Parked in a buffer zone	1	1		1						
Sidewalk elements										
8. Parked in a sidewalk	1	1		1			2			
9. Parked on a parking-rack (parking-lot) for e-scooters			17		24	16			5	11
10. Parked on a parking-rack for bicycles										
11. Parked within 3 meters of a designates parking area										
12. Parked leaning on a bench										
13. Parked on a landscaped planting/tree/street lamp/street billbord										
14. Parked at a bus stop										
15. Parked leaning on a garbage bin										
Other elements										
16. Parked in front of a resturant/residence/shop										
17. Parked elsewhere										

80	81	82	83-84	85-86	87	88-90	91	92	93	94	95	96-97	98-101	102	103	Total:
								1				2				6
1	1	1	2	2	1	3	1		1	1	1		4	1	1	97
1	1	1	2	2	1	3	1	1	1	1	1	2	4	1	1	102
																0
																0
																0
		1	2		1			1								8
	1	1				3					1	2				13
1									1	1			4	1		81
				2	1		1								1	5
			2													2
																0
																0
																0
																0
																0
																0

AM Section 1-6, Sunny	S.1				S.2				S.3		
Number of e-scooters	1	2	3	4	5	6-8	9-13	14-15	16	17-25	26-28
General e-scooter parking guidelines											
1. Parked in a no-parking zone					1			2			
2. Parked within the reffered parking-zone	1	1	1	1		3	5		1	9	3
3- Parked standing up	1	1	1	1	1	3	5	2	1	9	3
Street element											
4. Parked on a bike lane											
5. Parked in a public car-parking											
6. Parked in a car lane											
7. Parked in a buffer zone					1						
Sidewalk elements											
8. Parked in a sidewalk	1				1			2			
9. Parked on a parking-rack (parking-lot) for e-scooters		1	1	1		3	5		1	9	3
10. Parked on a parking-rack for bicycles											
11. Parked within 3 meters of a designates parking area											
12. Parked leaning on a bench											
13. Parked on a landscaped planting/tree/street lamp/street billbord											
14. Parked at a bus stop											
15. Parked leaning on a garbage bin											
Other elements											
16. Parked in front of a resturant/residence/shop											
17. Parked elsewhere											

						S.4					S.5				S.6				
29	30-36	37-39	40	41	42-43	44	45-47	48-50	51-54	55	56	57	58	59-61	62	63	64-65	66	67
										1									
1	7	3	1	1	2	1	3	3	4		1	1	1	3	1	1	2	1	1
1	7	3	1	1	2	1	3	3	4	1	1	1	1	3	1	1	2	1	1
											1	1	1	3					
										1	1	1	1	3					
1	7	3	1			1	3	3	4								2	1	1
															1				
					2									3		1			

68	69	70	71	72	73
	1		1	1	
1		1			1
1	1	1	1	1	1
	1				
			1	1	1
		1			
1					

Total:
73
7
66
73
0
0
0
8
14
52
1
7
0
0
0
0
0
0

Appendix 4: Results survey

Respodent:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Q.1	Do you live in Berlin?																															Tot:
	Yes	1	1	1	1	1		1	1			1	1	1	1		1	1	1			1	1	1	1	1	1	1		1	1	23
	no						1			1	1					1				1	1								1			7
	I don't want to share																															
Q.2	Are you positive or negative towards the parking of rental e-scooters in Berlin? Rate from 1-10, where 1 is very bad and 10 is very good.																															Average
	Svar:	5	8	7	5	2	4	1	2	5	8	6	5	8	5	4	3	9	9	5	8	6	3	5	1	1	10	1	9	3	3	5,0333
Q.3	Have you experienced that parked rental e-scooters are blocking your way as a pedestrian? Rate from 1-10, where 1 is never and 10 is always.																															Average
	Svar:	2	7	1	5	10	7	9	6	1	1	3	3	1	6	7	5	3	4	6	2	3	5	5	10	10	1	10	1	6	6	4,8667
Q.4	Are you aware of what rules apply for the parking of e-scooters?																															Tot:
	Yes			1							1					1		1	1				1	1	1		1			1	1	11
	no				1	1	1	1	1	1		1	1	1	1		1				1	1				1		1	1			16
	I don't want to share	1	1																	1												3