Lessons learned from the Netherlands in improving city centre accessibility

With a case study and implementation in Berlin

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Abstract

Due to climate change, a trends that shows a transformation towards more sustainable, liveable, and healthier city centres is seen. One of these changing cities in Berlin. Berlin has set challenging goals for their city, therefore transformation is needed. One possible measure is switching to more sustainable transportation methods, one of this methods is cycling. The Netherlands has always been a frontrunner related to cycling infrastructure. This research took a look at what could be learned from the Netherlands and be used in Berlin to boost bicycle usage. The outcome of the research showed that many residents already owned a bicycle, but regarding shared bicycles the best applicable option would be to implement an improved system that allowed the user to rent a bicycle for one or a few days that could be picked up from points spread out throughout the streets. Most improvements, that would have a significant impact on cycling usage, could be made on the following aspects; quality of infrastructure, parking facilities, transport system management, and prioritization. Improving these measures would result in a safer city centre as well as a safer bicycle experience.

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1. Introduction

Background

By now almost everyone in the Western world is aware of climate change. The average temperature is rising, more severe storms are happening, there is an increase of drought, and many other problems arise due to the increasement of CO2 in the atmosphere (Stainforth et al., 2013). Therefore there is need of change. Adaptation strategies are needed at local, regional, national, EU, and international levels in order to adverse the effects of climate change and prevent the damage that climate change might cause (Frankhauser, 2017). Therefore, European cities are getting more focussed on battling climate change, with a specific focus on climate adaptation (Biesbroek et al., 2010). One of these European cities is Berlin. Berlin, located in the east of Germany, housing more than 3.6 million residents, and it is expected that the city will reach 4.0 million by 2030 (Berlin.de, 2022). Berlin has set challenging goals for the coming years, by 2030, it wants to reduce its CO2 emissions by at least 70 percent, followed by 90 percent in 2040 (compared to 1990). It also aims to become climate-neutral by 2045 at the latest.

Mobility is certainly one of the most delicate issues regarding climate adaptation. A switch of polluting transport modes to more environmentally friendly transport modes can be one of the solutions in decreasing CO2 emissions (Beiler, 2017). Besides that, more sustainable transport modes will have a positive impact on cities, regions, and nations. Such as decreasing noise pollution, increasing air quality, boosting social interactions, and making room for more liveable cities (Shokoohyar et al., 2022). One of the switches that can be made is the switch from private car usage to cycling. A decrease in private car usage, and an increase in cyclists would result in an increase in health, ease of congestions, save money, use less space, and provide efficient transportation with zero CO2 emissions (Delucchi & Kurani, 2014).

The Netherlands has been known for their large share in bicycle infrastructure and users (Harms et al., 2016). With 36 percent of the Dutch population listing their bicycle as the most frequent way of commuting on a typical day (European Commission, 2014). In some cities this is even higher, such as Amsterdam (38 percent), and Zwolle (45 percent).

In the Netherlands, the bicycle has a modal share of 27 percent of all trips, nationwide (Ministry of Transport, 2009). In Berlin this share of bicycle trips is 13 percent, which is less than half compared to the Netherlands, which is noteworthy (Otto, 2011). The type of bicycle ownership depends, most people own their own bicycle, but other types of bicycle ownership are also common, such as bicycle renting, which is a popular option along students (DvhN, 2020).

Relevance

As mentioned above, there is an urgent need for more sustainable transport methods to reach the climate adaptation targets set by numerous organisations such as the European Union (Panenko, 2021). It is crucial that cities and nations are able to learn from one another in making the switch to more sustainable transport methods, therefore sharing knowledge and learning from one another is key to making quicker and more considerate decisions (Fernandez et al., 2020). Thus, the knowledge and facts that are available in the Netherlands can be used as an example in improving the bicycle infrastructure of other cities, such as Berlin. Practises that have been practiced for many years can be implemented, and used as a tool to make cycling more attractive. Besides, it is important to see how an increase in cycling can have a positive impact on urban development, and allow for more healthy, efficient, and liveable cities. Which is a goal that all European cities share (Delucchi & Kurani, 2014).

One plan worth mentioning is the plan to make the inner S-Bahn-Ring car free (figure 1). The organisation Volksentscheid Berlin proposed to make the area between the Ring-Bahn 41 and Ring-Bahn 42 (figure 1) car free, meaning that almost all private vehicles would be banned (with small exceptions for e.g. handicapped residents). The proposal has been signed by more than fifty-thousand residents. Although many speculations expect the plan to not develop soon, it does show the progressiveness of Berlin, and the movements pleading for car free city centres (Volksentscheid Berlin, 2022). Although implementation of a plan like this would take massive effort and sacrifices, it would allow for a more safer and liveable city centre.

Figure 1. *Inner S-Bahn-Ring, the proposed car-free area.(Wikimedia, 2021).*

Research objective

Although the plan to make the inner S-Bahn-Ring car free is currently just a plan, it does shed light on an interesting idea; what if the inner S-Bahn-Ring would be car free? It would be the world's biggest car free city centre, and would serve as an inspiration for many other cities around the globe (Volksentscheid Berlin, 2022). It would also help Berlin massively with reaching their set climate adaptation change goals. Reaching these goals does mean that there is need for change, and this change needs to happen as soon as possible.

This research will take a look at what Berlin can learn from Dutch cycling infrastructure and cycling renting practises, and which of these would actually suit to be implemented in the city centre. To do this the research can be split up into three different parts. First it will discuss the theoretical framework about three different parts; Dutch bicycle ownership and renting practices, concepts that influence bicycle renting system accessibility, and concepts that influence accessibility of city centres by bicycles. In the second part data is gather using a mixed method approach. This collected data is then used to build on the third part, which uses all collected data to give a constructed advice of what can be implemented in the city centre of Berlin to increase bicycle usage and therefore decreasing car usage.

To help guide the research, the following main question is formulated:

What can be learned from the Netherlands cycling infrastructure, to help increase bicycle usage in the city centre of Berlin?

To assist answering the main research questions the following three sub-questions are formulated:
1. What can be learned about Dutch bicycle renting practices?
2. What concepts influence bicycle renting system accessibility?
3. Which of these lessons and concepts can be used to help increase the bicycle accessibility of Berlin's city centre?

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Outline
The next chapter, chapter 2, discusses the theoretical framework that is used for the study. It includes a theoretical framework that visualises the different concepts. In this chapter most groundwork and basic knowledge will be defined and explained. In chapter 3, methodology, the research process and data collection process will be described. Followed by chapter 4, in which the results of chapter 2, and the data collected using the methods explained by chapter 3, will be discussed. In chapter 5, conclusion, all knowledge collected by the previous chapters will be combined to give in-depth advice to what measures can be implemented in Berlin, based on the insights gathered during the research. In the last chapter, chapter 6 reflection and future research, a critical reflection of the research is given, and advice for future research is presented.

2. Theoretical Framework

In this chapter, the relevant concepts and theories that are used in the study will be defined. At the end a conceptual model is given that gives an overview of how the concepts and theories intertwine with one another.

Different bicycle usage in the Netherlands

In the Netherlands, bicycle ownership can be split up into four different methods; *private bicycle ownership, private renting (temporarily), private renting (subscription),* and *shared bicycles*. A short overview of each different method is given below.

The first method discussed is *private bicycle ownership*: in 2017, there were around 22.5 million bicycles in the Netherlands. This means that on average a Dutch resident owns 1.3 bicycles. An 0.55 difference compared to Germany (0.75 bicycles per capita) (Bicycle Dutch, 2018 & Deutchland.de, 2017). In the Netherlands this seems to be the most popular way of bicycle ownership. With a wide variety of users, young and old, and regardless of their social and economic situation.

Another method is *private temporal renting*, in this study that means renting a bicycle for a limited amount of time. Private temporal renting can be split up into two uses; leisure (e.g. tourism or going out for a mountain biking weekend trip), or commuting (e.g. going from a train station to work, and back). In this study, the second form, commuting, is discussed. A popular Dutch example of private temporal renting is the OV-fiets (Openbaar Vervoer Fiets, or: Public Transport Bicycle). These bicycles are present (only) at most train stations, and can be rented for up to a few days. They can be returned at any OV-fiets renting spot (figure 2, right) (Villwock-Witte & van Grol, 2015). Renting an OV-fiets is getting more and more popular in the Netherlands, although a small decline is noticeable due to COVID (Treinreiziger, 2021)

A third method is *private renting (subscription)*. Besides temporal renting services there are also longer rental services present. Here, the user gets its own bicycle for a set amount of time, which is usually monthly renewed. The most popular example in the Netherlands is the 'Swapfiets', a monthly bicycle renting service in which the user gets its own bicycle, along with unlimited repairs and the right for a working bicycle at any time (figure 2, middle) (Ma et al., 2020). The Swapfiets is an particularly popular option among students.

The last method discussed is *shared bicycles*. These shared bicycles, which are popular in many capital European cities, allow the user to temporarily rent a bicycle (usually for five minutes up to an hour). These shared bicycles can be retrieved at certain points spread throughout the city, and have to be returned at any of these spots. An example of these bicycle-sharing system is Donkey Republic in Amsterdam, which owns multiple spots throughout the city where you can rent a shared bicycle for a small sum of money (figure 2, left) (Donkey Republic, 2022). This method of bicycle renting is popular among capital cities such as Warsaw, Budapest, and also Berlin (de Chardon et al., 2017). The difference between this method and the OV-fiets is that the OV-fiets is only located at train stations, and commonly used for one or a few days, while the shared bicycles mentioned above are meant for short (usually ten to thirty minutes) trips.

Figure 2. Different bicycle options in the Netherlands.(left Bike Europe, 2022; middle Verkeersnet, 2019; right Treinreiziger, 2021)

Concepts that influence shared bicycle accessibility
There are many factors that influence the quality of the different bicycle ownership methods mentioned above. In this study the ability for these different methods to work is divided into six different characteristics; *performance expectancy, effort expectancy, facilitating conditions, social influence, price value, and perceived safety*. These characteristics are based on the Unified Theory of Acceptance and Use of Technology (UTAUT), as discussed by Jahanshahi et al. (2020). Each of the four categories mentioned above can be described using these six characteristics. For each of the characteristics a short clarification, combined with a discussion from various academic authors, is given below.

Performance expectancy relates to the usefulness of a system. Regarding bicycles this would mean that it would make sense to use a bicycle instead of using another mode of transport such as the car, or going by foot. For a long distance of more than 90 minutes it would mean that most of the time it would not make sense to use a bicycle. This effect is also discussed by Litman (2013) in his study.

Effort expectancy relates to the easy of using a system. In this study that would mean that the easiness of using a bicycle or bicycle sharing system is enough to convince the user to use a bicycle (sharing service) instead of another mode of transport.

The *facilitating conditions* represent the quality of infrastructure and environmental conditions that are required using the system. Here, it would imply that the state of the infrastructure of Berlin is sufficient enough to be comfortable enough for the user. It also means that the environmental conditions are appropriate for the user to cycle in a proper manner. Jahanshahi et al. (2020) argues that this might be the most important factor to focus on to improve cycling infrastructure.

Another method is *social influence,* social influence relates to the influence of other people's opinion on the acceptance or rejection of an individual of a method. In terms of this research it would imply that the user feels confident using a (shared) cycling method, and not feels degraded and therefore hesitant. Tan et al. (2021) also remarks this in their study; if a certain method is more popular than another method, users are more likely to choose the popular method as they would feel more confident about their choice.

Price value is the degree to which users perceive the value (be it by a subscription or a onetime cost) of using the system as reasonable. Regarding bicycles (sharing) methods, it would mean that the price aligns with the value that the user will receive in return. De Chardon et al. (2017) mentioned that if a method is too expensive, or sometimes also too cheap, the user will doubt the worthiness of a method and likely not use it.

The last method discussed is *perceived safety*, this is the extent to which users perceive feeling safe using the system. In terms of this research it is the degree to which the users of the cycling infrastructure in Berlin feel safe and confident cycling around the city centre. If perceived safety is too low users will hesitate to use a bicycle, as mentioned in the study of Schepers et al. (2013). It is also worth noting that a too high perceived safety that does not align with the actual safety can be dangerous as well. This would result in more accidents and casualties, which would then setback perceived safety.

Concepts that influence city centre accessibility
As well as there are characteristics that influence bicycle accessibility, there are also factors that influence the accessibility of city centres. In this study the city centre of Berlin. To assess the factors on which Berlin's city centre can be improved, a division of nine different characteristics has been made: *transportation demand and activity, quality of infrastructure, transportation options, integration & terminals & parking, affordability, land use factors, transport network connectivity, transportation system management,* and *prioritization*. These characteristics are based on the model by Litman (2013) that was used to improve city accessibility in American cities. A short description of each characteristic is mentioned below.

Transportation demand and activity (TDA): here, transportation demand refers to the amount of network users under various conditions. People typically make around two to four daily trips outside their home. With bigger demands for residents who commute to work or school, and also those who have higher incomes (Beaudoin and Lawell, 2018).

Besides transportation demand and activity, *quality and infrastructure* also play an important role. Just like *facilitating conditions* mentioned in the paragraph above, to the quality of infrastructure and environmental conditions that are required using the system. Again, in this study it would imply that the state of the infrastructure of Berlin is sufficient enough to be comfortable enough for the user. Which again can be one of the most important factors, as discussed by Jahanshahi et al. (2020), in their study.

The *transportation options* in this study refer to the quantity and quality of available transport modes and services available in Berlin. The different modes of transport differ in their capabilities, but also in their limitations (Damidavicius, 2020). Therefore they are appropriate for serving different demands. As mentioned in *performance expectancy* sometimes it makes more sense to take the car (for longer distances), or to go by foot (small distances).

Accessibility is affected by the quality of the integration of the method, which can be summed up in *integration, terminals, and parking (ITP)*. Some examples are the quality of stations and terminals, parking convenience (e.g. having enough and safe bicycle parking spots), and easiness of transferring between modes. The difference between the integration levels of transportation modes varies significantly. For example in some places the car can be used more efficiently and safer than using a bicycle, as mentioned in studies by Stipdonk & Reurings (2012).

Affordability: just like *price value*, is the degree to which users perceive the value (be it by a subscription or one time cost) of using the system as reasonable. Regarding bicycles (sharing methods) it would mean that the price aligns with the value that the user will receive in return.

Land use factors (LUF) affect accessibility, including connectivity, density, mix, and walkability. A more accessible land use pattern would mean that less mobility is needed to reach specific activities and destinations, as suggested in the study Wang et al. (2022); for example improving the variety of services in a neighbourhood or worksite intends to increase accessibility and reduce the need for mobility.

Transportation network connectivity (TNC): in terms of this research connectivity refers to the density of connections in a transport network. An increase in connectivity tends to increase accessibility, which was shown in the study of Gehrke et al. (2020). A more dense path or cycling network with shorter blocks and more connections tends to provide better accessibility due to multiple routes, more direct connections, and worth noting: narrower streets with lower traffic speeds that are more suitable for cycling (Wang et al., 2022).

The management of the shared bicycle systems can be summed up in *transportation system management (TDM)*. These are the various factors that can affect mobility and accessibility. It includes various programs and policies targeted at encouraging more efficient use of transportation, such as incentives to encourage travellers to use space-efficient modes, as proposed by Holmgren (2014).

As last *prioritization* is discussed, prioritization are incentives to give certain transport modes a higher priority compared to other transport modes. These incentives can vary greatly, some examples are: increasing road pricing and/or increasing parking prices to make car usage less attractive, providing subsidies for bicycle sharing methods, swapping car lanes for bicycle lanes, or location-efficient planning which increases accessibility.

Conceptual model

To help clarify the relationship between the models and theories used in this study, the following conceptual model is given (figure 3).
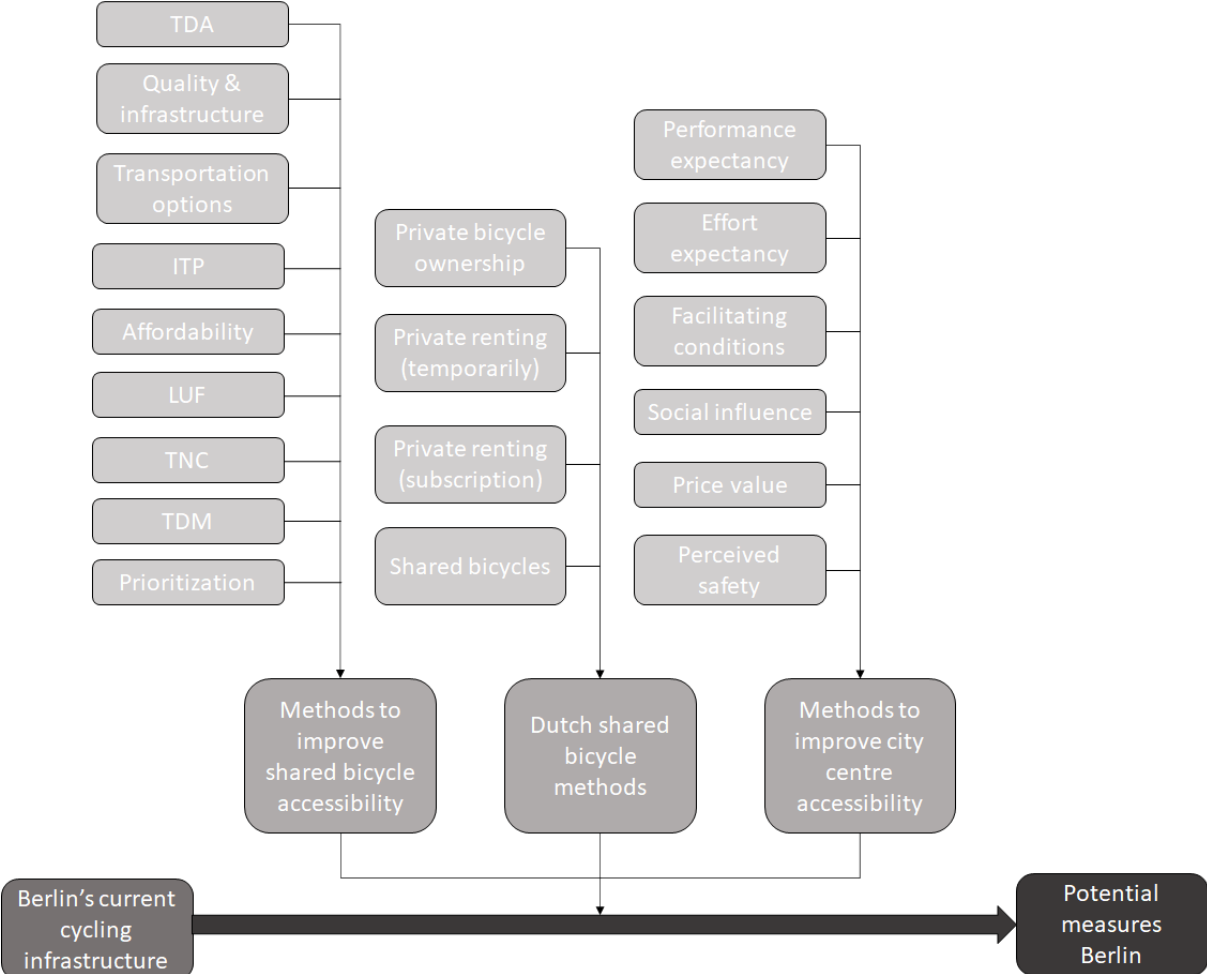

Figure 3. *Conceptual model of the study.*

3. Methodology

To answer the main research question, and the sub questions that were derived from the main question, a mixed method will be adopted. On top of that an observational study in the Netherlands was done, and another layer was added by implementing a week of field research in Berlin (STOURIE project). The main research question and the sub-questions were all answered using the multiple methods of research. Figure 4 gives an overview of which methods have been used at which sub-question. The main research question has been answered by combining the three sub-questions.

Sub-question	Literature review	Desk research	STOURIE	Survey
1. Lessons learned from Dutch bicycle renting	X	X		
2. Concepts influencing bicycle renting	X	X		
3. Increasing bicycle accessibility of Berlin	X	X	X	X

Figure 4. Methods used per sub-question.

Research area

The research was conducted in one area; *Berlin's Mitte*. Berlin's Mitte in this research is qualified as the inner area between S-Bahn 41, and S-Bahn Line 42 (figure 1). This area is the most central area of Berlin. Land use mostly consists out of offices, and the area is used as a through fare for most cyclists.

Mixed methods data collection

To provide as much information as possible, multiple methods of data collection were applied. A combination of literature reviews, desk research, surveys, and observations were done. Additionally, the STOURIE project helped with getting a good view of the state of Berlin's cycling infrastructure and its users. For an explanation of what the STOURIE project was and how it was implemented, see *STOURIE* below. The advantage of using mixed methods data collection was that a wide variety of different data was collected. This different data helped answering the various research questions from lots of different angles. Please see appendix 1 for an advanced overview of which methods or categories were answered using which data collection method.

Survey residents Berlin

In the whole study, two surveys have taken place; one about residents in Berlin (discussed in this paragraph), and one additional survey during the STOURIE project, see *STOURIE*. The survey that was directed towards residents of Berlin consisted out of 12 questions to support the knowledge acquired in the theoretical framework. The questions were based on the different cycling rental methods to get a wide amount of information based on every subject mentioned. See appendix 2 for the questions. To increase the performance of the survey, a translation in German was made. See appendix 3 for the results. The survey had thirty-three respondents (n=33). Please notice that in this survey 1 aligns with the maximum score, and 10 aligns with the minimum score, as this is a common system used in Germany. The survey was created to research and obtain a reliable view of how Berlin's cyclist were viewing the current state of cycling infrastructure and to see what shared bicycle practices could potentially work in Berlin. Together with STOURIE (see *STOURIE*), there were a total of eighty-eight individual participants involved in this research (n=88).

STOURIE

As an addition research was done in the city centre of Berlin, under the STOURIE (Sustainable Transformation Of Urban Regions In Europe) project. This project took a total of seven intensive days on which data was collected, analysed, and presented, together with two students from Stockholm University and two students from Humboldt University (Berlin). In advance a research proposal and a
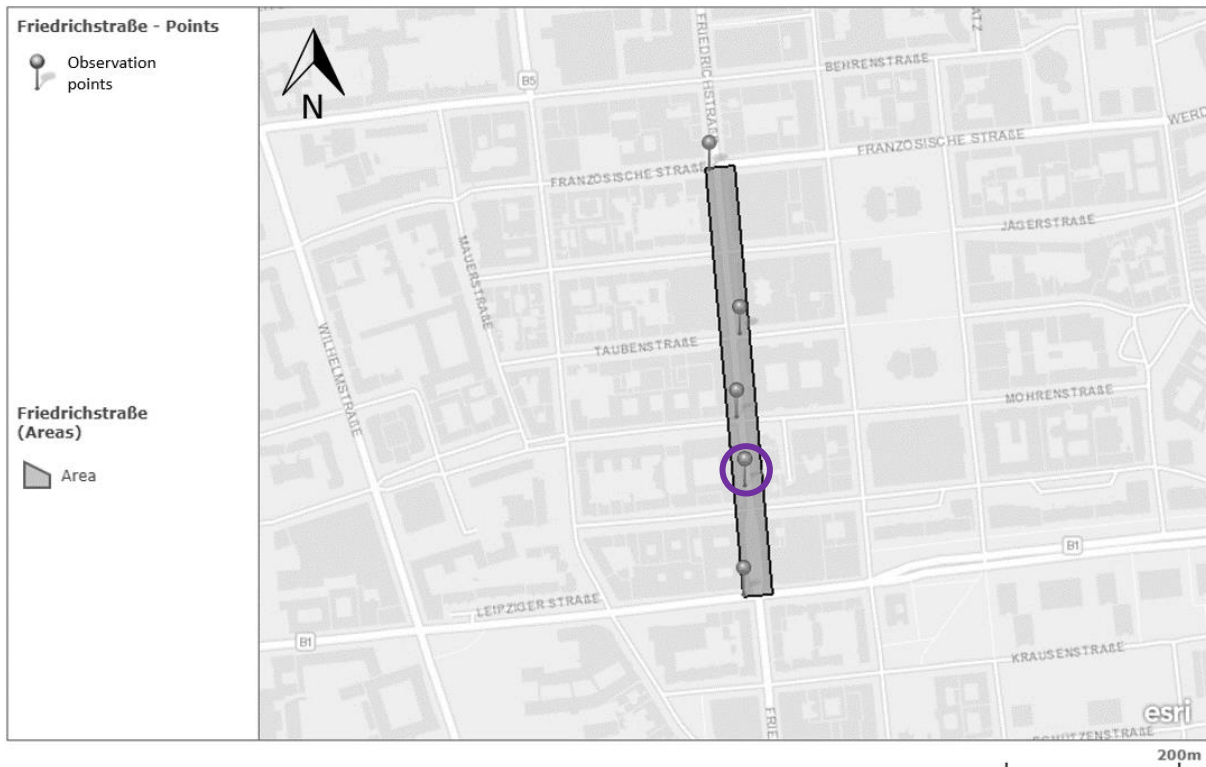
data collection plan were made. During the first days data was collected at Friedrichsstraße and Oranienjenstraße (in Berlin's Mitte) (figure 5).
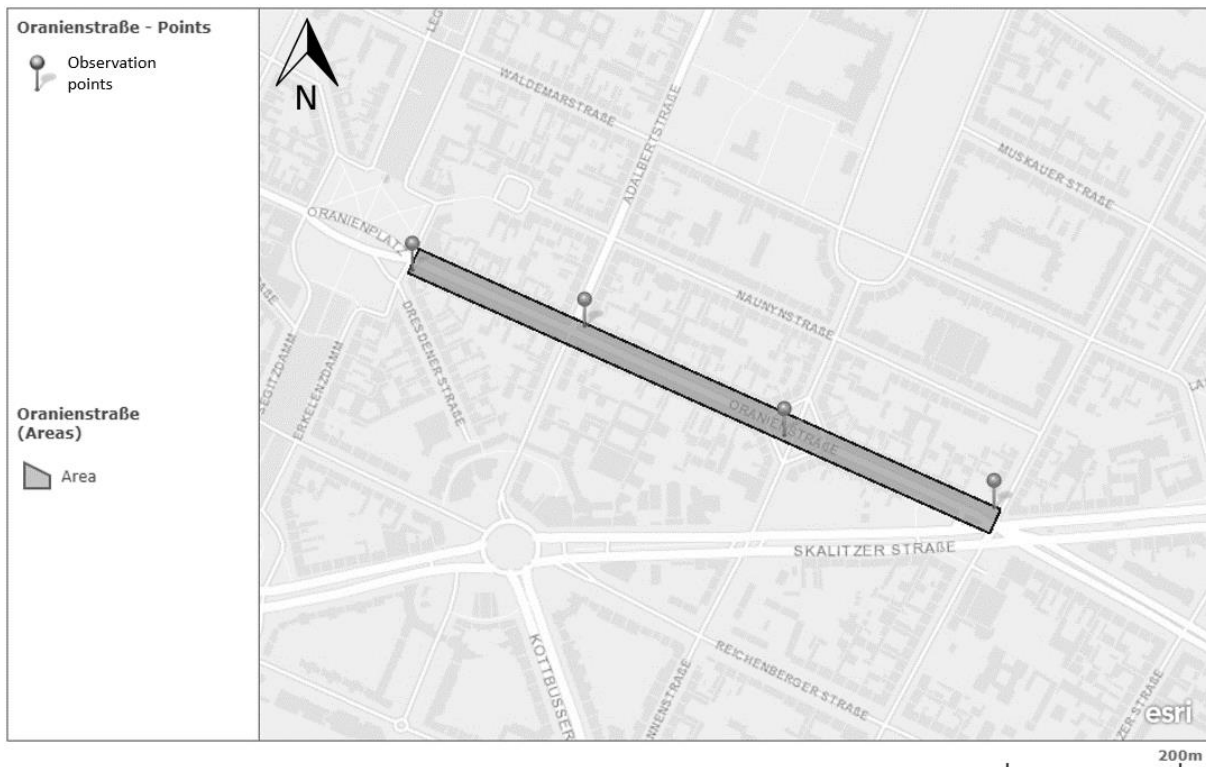

Geoportal Berlin, Esri, HERE, Garmin, USGS | Esri, HERE

Figure 5. *Location of Friedrichsstraße and Oranienjenstraße.*

Data was collected in three different forms; *observations*, *short interviews,* and a *survey*. The observations were focussed on the cyclists crossing these two streets, all noteworthy observations were noted and analysed, see figure 6 and 7 for the observation points, and see appendix 4 for the results. Please note that Friedrichsstraße contains an extra observation point (circled in purple) compared to Oranienjenstraße, this is because that point was at a pedestrian crossing, and was decided to be an interesting spot. See appendix 5 for the crossing. The short interviews took place on the two streets, interviewing random inhabitants that were cycling or carried a bicycle. The question topics and results can be found in appendix 6. A total of twenty interviews (n=20) were taken.

Figure 6. *Observation points at Friedrichsstraße.*

Figure 7. *Observation points at Oranienjenstraße.*

The survey got sent into numerous bicycle groups in Berlin, on the media platform Facebook. The questions and results can be found in appendix 7. The survey had thirty-five respondents (n=35). In the last days, the collected data was analysed and conclusions were drawn and presented. This

additional research helped tremendously with helping to make correct predictions of what could benefit Berlin regarding cycling accessibility. It should be noted that because these specific bicycle groups in Berlin were approached, a potential bias was created. These bicycle groups consisted mainly out of bicycle enthusiasts, meaning that the respondents to this survey consisted mainly out of residents who are more eager to take their bicycle, also in more unsafe situations. This means that the respondents to the survey might not show a full representable group for all the cyclists in Berlin. Therefore, the data collected here was approached with more consideration.

Research process
To derive to the conclusion of the research, the research was conducted as the following; first a theoretical framework was established to gather as much base knowledge as possible, this was done by doing desk research and conducting a literature review study. Then, the state of Berlins cycling infrastructure and its potential was concluded based on the research done at STOURIE (see *STOURIE*), a survey, and desk research. Then the information gathered in the first part was reviewed and combined with all the data collected in the second step. Based on this, and additional literature reviews, conclusions were drawn and advice was given what could potentially work in Berlin (see *conclusion*). A systematic overview can be found below (figure 8). In appendix 1 an overview can be found of which methods or categories were answered using which data.
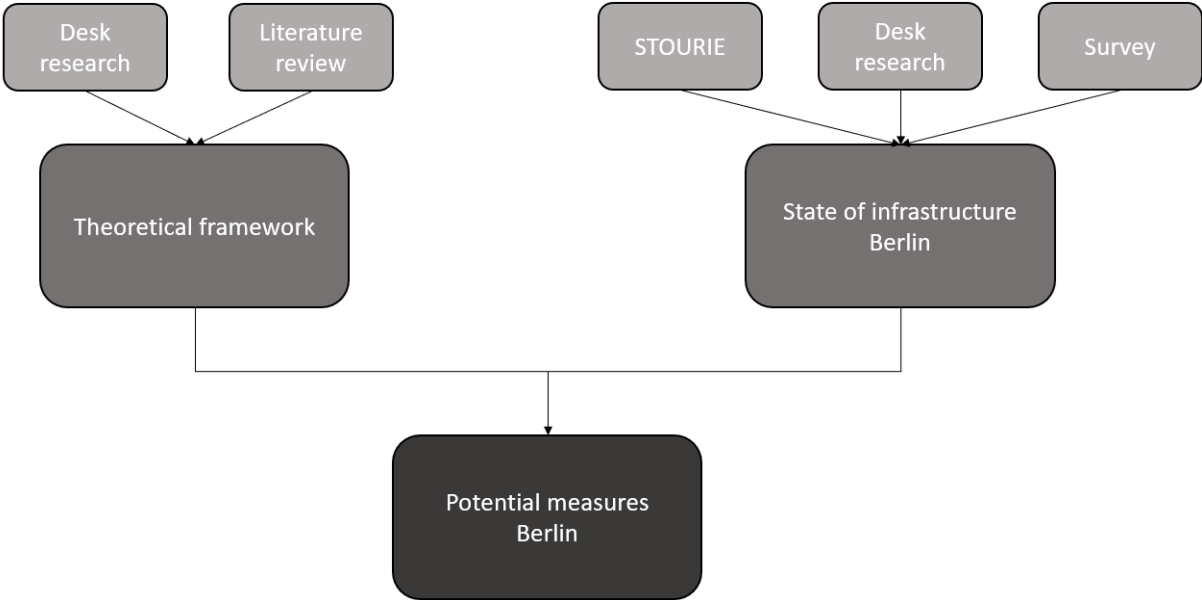

Figure 8. *Conceptual model of research process.*

Ethical considerations
During the research it was essential to be transparent about the intentions and objectives of the research, also during the process of data collection and analysis. No personal data, except age group, was collected on the users of the survey, and users were informed about how the data would be analysed, used, and stored. Pictures and videos taken during the observations were blurred so that no personal information was stored anywhere.
It should be noted that assumptions and statements about cyclists in Berlin are being made based on the observations, surveys, and short interviews (STOURIE). These assumptions are based on the results, and therefore are not meant to put a specific label on the Berlin's cyclists community.

Reliability
Because of the eagerness of the respondents, it was expected that the answers given were reliable and honest. It seemed that the respondents were not hesitant to hold back information as they without doubt would mention all kinds of negative aspects of cycling infrastructure and most of the time seemed to be enjoying to discuss the subject. The observations and interviews done during STOURIE were done by five different students from different universities, thus giving a wide amount of different, usable, and

reliable data. The desk research and literature review that were conducted included a variety of subjects, authors, and articles. Most articles that were used were from recent years, improving trustworthiness. Because of this an extensive amount of varied data was collected. As mentioned earlier it should be noted that because of the choice of respondents for the STOURIE survey a potential bias was created, as mostly bicycle enthusiasts were approached during this method of data collection. This could mean that respondents to this survey would perhaps choose a bicycle quicker than an average Berlin resident. Therefore, careful consideration was taken while analysing this data.

4. Research outcome

As mentioned in the methodology, in appendix 1 an overview can be found of which methods or categories were answered using which data. The first paragraph helps to answer to answer the first sub-question. The second- and third paragraph help answer the second sub question. Combining this whole chapter aids in answering the third sub question; *which of these lessons and concepts can be used to help increase the bicycle accessibility of Berlin's city centre?*

Bicycle renting practices

To help answer the sub-question; '*what can be learned about Dutch bicycle renting practices?*' data from the surveys, interviews, and desk research was combined. The most interesting data is presented here.

Regarding *private bicycle ownership* it was interesting to see that all respondents owned a bicycle themselves. Of the respondents of the surveys, 63 were using the bicycle in Berlin's inner city (appendix 3, 6, 7). From all respondents of the survey, half (51.5%) seemed to be interested in using private temporarily bicycles such as the OV-bike. In the follow up question, asking respondents why they would not use a temporarily private rental bicycle, most indicated that this was due to the fact that they already owned a bicycle themselves. Two respondents mentioned that they would not use this method in Berlin, but that it would be interesting in other cities where they did not own a bicycle (appendix 3). These two reactions seem to align with the usage of the OV-bicycles in the Netherlands, as discussed in the theoretical framework.

When asked about *private renting subscription*, it seemed to be a less favourable option. In total 26 of the 33 respondents were not interested in using a system like this. However of these 26, 23 indicated that this was because they already owned a bicycle themselves (appendix 3). From the other 3, one indicated that it was because it was too expensive, which is related to *price* value, discussed by Jahanshahi et al. (2020). Another respondent mentioned that it was because he/she/they did not like to cycle in the city centre, which can relate to many different factors (appendix 3). *Shared bicycles* seemed to yield to the same result as the OV-bicycle; half of the respondents was interested (51.5%). This similar result can be explained due to the fact that both methods are quite identical. It is worth mentioning that one of the respondents that replied 'no' here explained that he/she/they could not understand how the app was working (see *effort expectancy)* (appendix 3).

It should be noted however that during STOURIE, only one interview was taken of two people who were using rented bicycles. Although the other interviewed cyclists are likely to give a good impression of the cycling infrastructure and situation, a lack of information about rented bicycles is present.

Concepts that influence bicycle renting accessibility

In the following two paragraphs, the sub question; '*What concepts influence bicycle renting system accessibility?*' will be discussed. The most intriguing data is found below.

Gathered data confirmed that bicycles are definitely useful in the city centre of Berlin. Of all the 88 respondents, every respondent was using a bicycle (appendix 3, 6, 7). Most were also convinced that it was easier to use a bicycle than to use a car (appendix 3, 6, 7). For the respondents, it made sense to take their bicycle as it was a good option to get from place A to B (appendix 3). Although just one respondent mentioned it, effort expectancy, mentioned by Jahanshahi et al. (2020) could be an hinderance for the current bicycle sharing systems. The reaction could indicate that it might be a problem for more users (appendix 3). Another respondent mentioned that there were too little points to access shared bicycles, which is something that could definitely hinder the amount of users using shared bicycles (appendix 3). Facilitating conditions, as also described by Litman (2013) as *quality and infrastructure* was a factor that came back almost at every interview or survey. Although around half of the respondents gave the current cycling infrastructure a high rating (<5), it was usually followed-up by a long critical bickering of the actual cycling infrastructure. Then, followed by a long range of possible upgrades that would help with improving the current cycling infrastructure (appendix 3, 6, 7). These results indicate that there is plenty of room in Berlin's city centre to improve and make it more cycle-friendly. It is interesting to mention that during the observations, a difference can be seen between Dutch cyclists and Berlin's cyclists; a significant amount of cyclists wearing a helmet can be seen compared to Dutch cyclists

(appendix 4). Which could indicate that users feel less safe, and/or that users feel more comfortable wearing helmets in Berlin.

Although the factor *price value* was only mentioned twice by the respondents (appendix 3), it does indicate that this is something that can influence the accessibility of the shared bicycle methods. But regarding the lack of respondents shedding light on this subject, it can be assumed that the current price value is fine and is not having any significant effects on the usability of the shared bicycle system.

Especially during STOURIE, a lot of data was collected on perceived safety. The data collected from both surveys and the interviews show that the average is about a 5, with some exceptions of respondents feeling unquestionable safe, and some respondents feeling highly unsafe (appendix 6, 7). Most comments that were given about improving the cycling infrastructure often indicated sheltering bicycle lanes and paths from car roads. An example;

> "I feel most safe in thirty km/u zones on cycle paths separated from cars by bollards. Why? So cars can't run me over" – Anonymous respondent (appendix 7.5)

This indicates that most cyclists would feel more safe if they had their own private cycling lanes and paths. From the STOURIE study it was found that cyclists felt remarkably more safe at private cycle lanes and paths (appendix 6, 7).

Concepts that influence city centre accessibility

To help aid answering the sub question '*what concepts influence bicycle renting system accessibility?*', an additional part of this study was directed to research city centre accessibility by bicycle. Like the previous paragraphs, the most interesting findings are discussed here.

There seems to be a clear *transportation demand and activity* for cyclists in Berlin's inner city centre. Most respondents were in the area to either go to; a job, picking up their kids, or meeting colleagues and/or friends (appendix 4, 6). The city centre is bustling with traffic, indicating that this area will likely stay a busy area in the future. This also suggests that change in infrastructure can be useful and a positive thing to invest in. As mentioned in the paragraph above, the *quality of infrastructure* was a category that came back in almost every conversation with respondents (appendix 6). Jahanshahi et al. (2020) predicted it well, it seems to be one of the most important categories.

Although the inner city has a good coverage of public transportation, preference to a bicycle was given by respondents. No respondent seemed to mention anything about why they were choosing their bicycle instead of using public transport. Respondents did however mention that it was or sometimes even 'impossible' to use a car in Berlin's city centre. This indicates that it was already difficult, and thus also more unattractive, to use a car in the centre. The factors mentioned in the theoretical framework and by Litman (2013) about *integration, terminals,* and *parking* were mentioned by a few respondents. Out of the 33 respondents, 21 were unhappy (>5) about the current bicycle parking options. Besides that many respondents of the STOURIE survey indicated that it would be good to increase the amount of parking spaces for bicycles (appendix 3, 6, 7). Besides, one respondent mentioned that there were not enough spaces to park a cargo bicycle (appendix 6).

The observations and desk research shows that the city centre is mainly used for leisure- and work related activities. Although this is not something that can be changed in short- or medium term it could be beneficial if Berlin focussed more on creating different centres throughout the whole city. This would allow a less busy inner centre, and relief the area with the huge amount of transportation demand that it is receiving now.

The survey shows that on average the *transport network connectivity* is rated a 5, with 16 respondents being happy with the connectivity, and seventeen being rather unhappy (appendix 3). The city centre has a grid-like structure, and it seemed that not much could be changed regarding creating new and extra roads. This indicates that if transport network connectivity would have to be increased, it would require to take space for cars (such as roads and parking spaces), and transforming these into bicycle infrastructure (such as bicycle lanes and bicycle parking spaces).

Out of the collected data it became unanimously clear that respondents were agreeing that more policies, incentives, and programs could be created to decrease car usage and increase bicycle usage. Out of the 33 respondents, just 4 were not confident about increasing current measures (appendix 3). Besides that, many respondents during STOURIE mentioned policies in their solutions to decrease car usage and

increase bicycle usage. Measures like making the city centre car free, reducing the maximum speed, and giving cars less space were mentioned (appendix 3). Increasing *prioritization,* a measure prosed by Holmgren (2014) for bicycles seemed to be a favourable solution as well, again showing just 4 respondents not being confident. In addition, many STOURIE respondents mentioned that cars should be given less priority, and cyclists should be given more. It was also suggested that if cyclists could cycle around faster (by having more priority), more people would consider cycling (appendix 3, 6, 7).

5. Conclusion

What could work in Berlin

The aim of this research was to answer the main research question; '*What can be learned from the Netherlands cycling infrastructure, to help increase bicycle usage in the city centre of Berlin'*. Research and data collected shows that on many methods and factors improvements can be made. However, some subjects seemed to be given more emphasis by respondents, and popped up more during the research. These 'highlighted' subjects will be discussed and explained here.

Concerning the four different cycling methods from the Netherlands (*private bicycle ownership, private renting (temporarily), private renting (subscription),* and *shared bicycles)*, the shared bicycles seemed to be the most likeable option. The OV-bicycle and the NextBike share similar results as being successful to implement. Therefore it might be good to create a system that acts as a combination of both system. This means having pick up points spread through the city centre (with emphasis on public transportation stops and other important hotspots), that allow the user to rent a bicycle for a short amount of time, but also for one or a few days. There are two important concepts to focus on. One, taking a critical look at making it as easy as possible to use the system, as discussed earlier. And two, creating incentives and/or policies to increase the amount and frequency of users.

The study showed that most cyclists in Berlin's city centre owned their own private bicycle. Besides that, there seems to be a clear demand for cyclists in Berlin's Mitte. This means that it is important to take a look at the other factors that influence city centre accessibility as well. The most important factors that were introduced in the theoretical framework to focus on are improving; *quality of infrastructure, parking facilities, transport system management,* and *prioritization*. Improving these concepts would benefit the cyclists massively. Quality of infrastructure was perhaps the most mentioned factor to be improved on mentioned by respondents. According to them, there were countless different ways at which the city centre could improve, as predicted by Jahanshahi et al. (2020). To sum up, most suggestions were about; creating more space for cyclists, sheltering bicycle lanes, increasing the amount of cycling lanes, and transforming more streets into bicycle streets or streets on which cars are forbidden. Besides this, there seemed to be a lack of bicycle parking spaces.

More policies should be created to boost cyclists and decrease car use. This also includes making driving less attractive. It also means educating traffic users (including cyclists) about cycling usage, a measure mentioned by Litman (2013).

As last it is important to take a look at prioritization. Prioritization can be increased whilst changing the quality of infrastructure. To boost bicycle usage, it is important to make cycling a better and faster option. This would include giving cyclists more priority, and thus increasing cycling usage, as recommended by many respondents.

Improving these measures would result in a safer city centre as well as a safer bicycle experience. This would result in the city centre slowly transforming into a more liveable, sustainable, and healthier place to live in, which is a goal shared by everyone involved.

6. Reflection

Reproducibility
Although every city is unique and faces their own challenges, the framework and structure of this research should be reproducible to achieve similar results in other cities. The framework of this thesis can be used to research the state of shared bicycle systems and the condition of bicycle accessibility in city centres. Therefore it should allow researchers to come up with specific statements to improve the accessibility of the city centre using shared bicycles and bicycle infrastructure.

Limitations
Although much information was gathered and clear results were achieved, room for improvement is present. The research had its limitations. One of these limitations was the fact that during the data collection mostly cyclists were approached. It would have been interesting if also non-cyclists were approached, to see why they were not choosing to take their bicycle and instead used public transportation, their car, or any other method of mobility.
Another limitation was the lack of research regarding the link between public transportation and cycling. It was not established whether cyclists were using a combination of their bicycle and public transportation (multi model transportation).
Also because cyclist enthusiasts were approached during the STOURIE survey, there is a slight bias towards bicycle enthusiasts. It would have been good during this method to take a look at more 'regular' cyclists as well, to see if any other results would have been produced.
A last limitation was the lack of research regarding social influence. No questions regarding this subject have been asked, and no respondents mentioned anything like this.

Future research
Based on the limitations of this research follow up research about the following subjects is suggested; because this research was mainly conducted on residents that were already cycling, research directed towards residents that are not using a bicycle is a good idea. This research would answer the question why residents are not cycling and thus measures can be created that will stimulate this group to use their bicycle. Research directed towards the link between public transportation and bicycles would also be a good idea, is this happening currently in Berlin? And how can this be improved?
Because this research failed to represent users of rented/shared bicycles, research to this group could also be interesting. Questions like why are they using the rented bicycle? And how can these systems be improved? would help with improving shared bicycle systems. As last, research towards the effect of social influence on rented/shared bicycle systems could help improve these systems, as right now it is unclear if this effect is having an impact.

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Appendix

Appendix 1. *Which method or category was answered using which research methods.*

SQ[1]	Method/Category	Literature review	Desk research	Survey	Observations (ST[2])	Survey (ST[2])	Interviews (ST[2])
1	**Dutch bicycle rental methods**						
1	Private bicycle ownership	X	X	X		X	X
1	Private renting (temporary)	X	X	X			
1	Private renting (subscription)	X	X	X			
1	Shared bicycles	X	X	X	X		
2	**Concepts that influence shared bicycle accessibility**						
2	Performance expectancy	X	X	X	X	X	X
2	Effort expectancy	X	X	X		X	
2	Facilitating conditions	X	X	X	X	X	X
2	Social influence	X	X		X		
2	Price value	X	X	X			
2	Perceived safety	X	X	X	X	X	X
3	**Berlin's city centre accessibility**						
3	Transportation demand and activity	X	X	X	X	X	X
3	Quality of infrastructure	X	X	X	X	X	X
3	Transportation options	X	X	X			
3	Integration, terminals, and parking	X	X	X	X	X	X
3	Affordability	X	X	X			
3	Land use factors	X	X		X		
3	Transport network connectivity	X	X	X	X		
3	Transportation system management	X	X	X		X	X
3	Prioritization	X	X	X	X	X	X

[1]Sub-question [2]STOURIE

Appendix 2. Survey questions.

Number	Question	Possible Answer
1	To which age group do you belong?	0-18, 19-34, 35-50, 51-69, 70+
2	Do you own a bicycle yourself?	Yes, no
3	Do you cycle in the city centre of Berlin?	Yes, no
4	* image and explanation of the OV-fiets * Would you consider using an 'OV-Fiets' if this was possible in Berlin's city centre?	Yes, no (if not, why not? *open answer*)
5	* image and explanation of the Swapfiets * Would you consider using an Swapfiets if this was possible in Berlin's city centre?	Yes, no because I own my own bicycle, no (if not, why not? *open answer*)
6	* image and explanation of the NextBike * Have you ever used the NextBike in Berlin's city centre?	Yes, no (if not, why not? *open answer*)
7	I am happy with the current state of bicycle infrastructure in Berlin's city centre	1 (maximum) − 10 (minimum)
8	I am happy with the bicycle parking facilities in Berlin's city centre	1 (maximum) − 10 (minimum)
9	I am happy with the connectiveness (getting from place A to B) in Berlin's city centre	1 (maximum) − 10 (minimum)
10	I think bicycles priority should be increase in Berlin's city centre	1 (maximum) − 10 (minimum)
11	I think that more measures should be taken to decrease car traffic in Berlin's city centre	1 (maximum) − 10 (minimum)
12	Do you have any other suggestions/notes to improve the bicycle infrastructure in Berlin's city centre?	*Open answer*

Appendix 3. Survey results.

1

Zu welcher Altersgruppe gehören Sie?
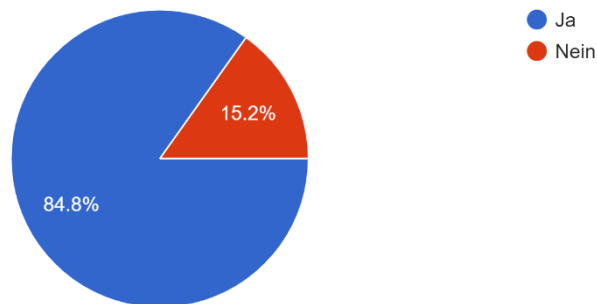33 responses
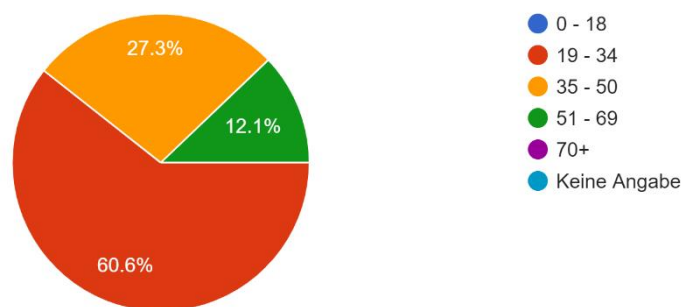
2

Besitzen Sie selbst ein Fahrrad?
33 responses

Ja
Nein

100%
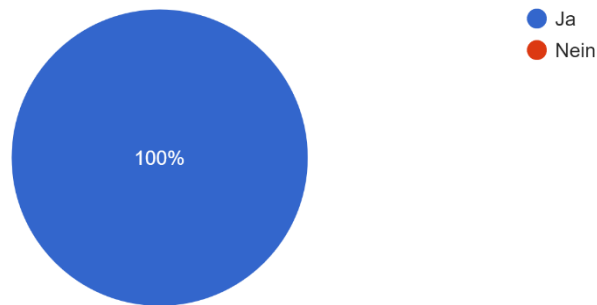
3

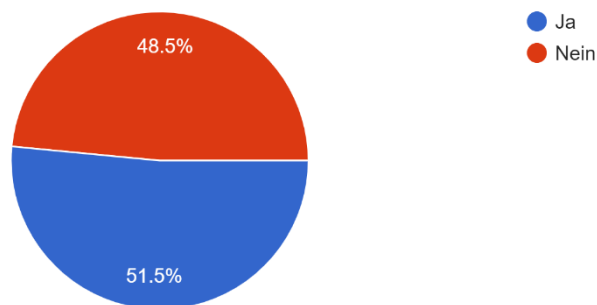## Fahren Sie Fahrrad in der Berliner Innenstadt?
33 responses

Ja
Nein

15.2%

84.8%

4a

Auf dem Bild sehen Sie ein Beispiel für 'OV-Fiets', ein niederländisches Fahrradverleihsystem. Hier können Sie an jedem Bahnhof für eine begrenzte Z...wenn es in der Berliner Innenstadt möglich wäre?
33 responses

Ja
Nein

48.5%

51.5%

4b If not, why not? (roughly translated from German to English) 11 responses

Because I own a bike
Have a bike
I have a bike

I don't need it in my hometown. In other cities I would rent it if necessary.

-

Prefer to ride my own bike

Own bike

Did not like to go by bike

since I would use my own bike in Berlin, I would like to use it in other cities.

have a wheel

already have a bike

5a

Auf dem Bild sehen Sie ein Beispiel für 'Swapfiets', ein niederländisches Fahrradverleihsystem. Hier können Sie ein Fahrrad für ein monatliches Abonne...wenn es in der Berliner Innenstadt möglich wäre?

33 responses

- Ja
- Nein, weil ich ein eigenes Fahrrad besitze.
- Nein

69.7% 9.1% 21.2%
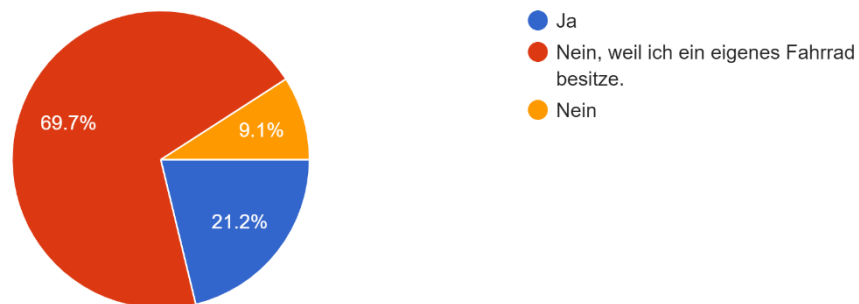
5b If not, why not? (roughly translated from German to English) 4 responses

For me, having my own bike is important. Basically, I think it's a good thing.

too expensive

Did not like to drive

Too long

6a

Auf dem Bild sehen Sie ein Beispiel für 'NextBike', ein öffentliches Fahrradverleihsystem. Hier können Sie an jeder NextBike-Station für eine begr...wie 'NextBike' in der Berliner Innenstadt genutzt?

33 responses

- Ja
- Nein

48.5% 51.5%
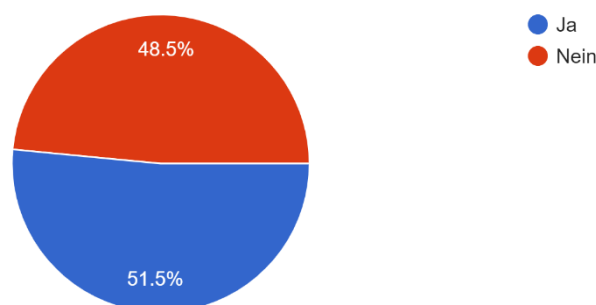
6b If not, why not? (roughly translated from German to English) 8 responses

Because I own my own bike.
Own bikes available.
I don't live in Berlin
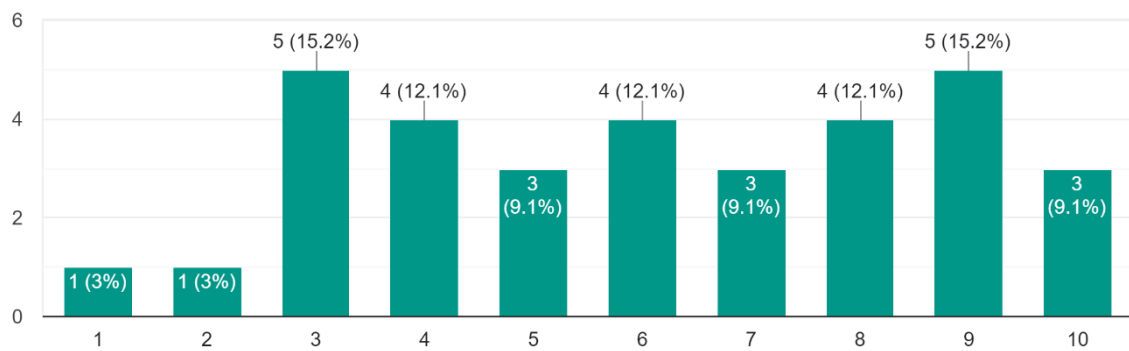Drive my own
No idea actually
too expensive
I have a bike
Didn't manage that with the app and borrowing time was sometimes too short for me

7

Ich bin mit dem derzeitigen Zustand der Radverkehrsinfrastruktur in der Berliner Innenstadt zufrieden.
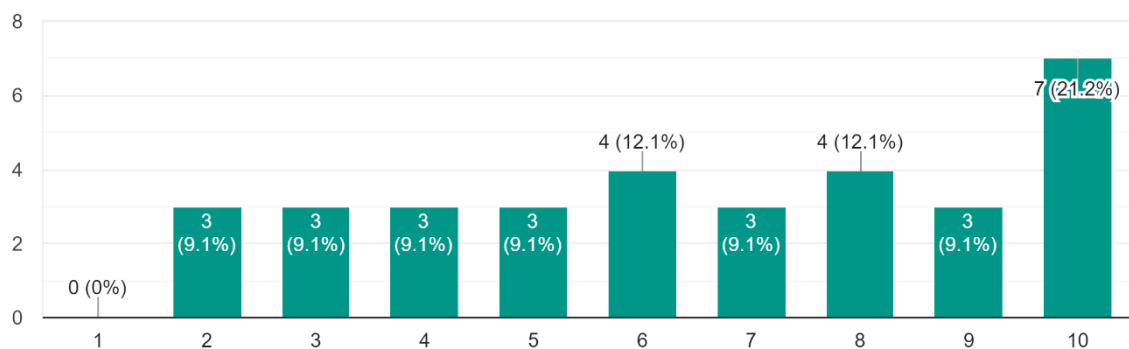33 responses

8

Ich bin mit den bestehenden Fahrradabstellmöglichkeiten in der Berliner Innenstadt zufrieden.
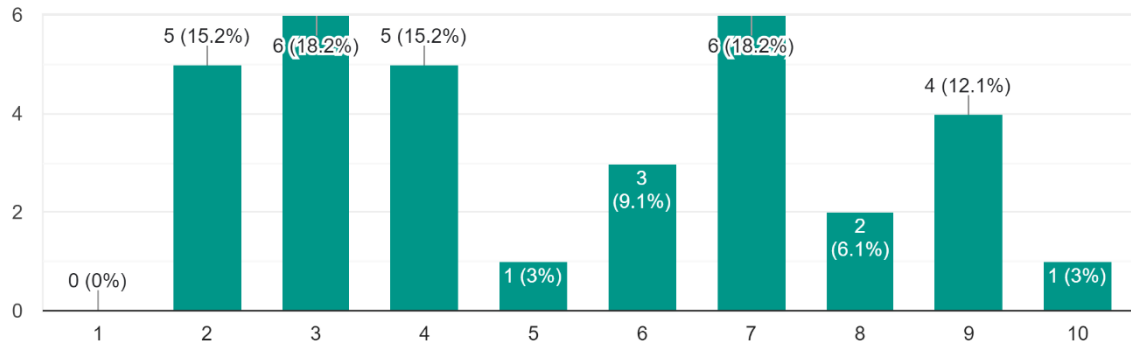33 responses

Ich bin mit der Verbindungen (sprich von A nach B zu kommen) in der Berliner Innenstadt zufrieden.

33 responses

Meiner Meinung nach sollte der Vorrang für Fahrradfahrende in der Berliner Innenstadt erhöht werden.
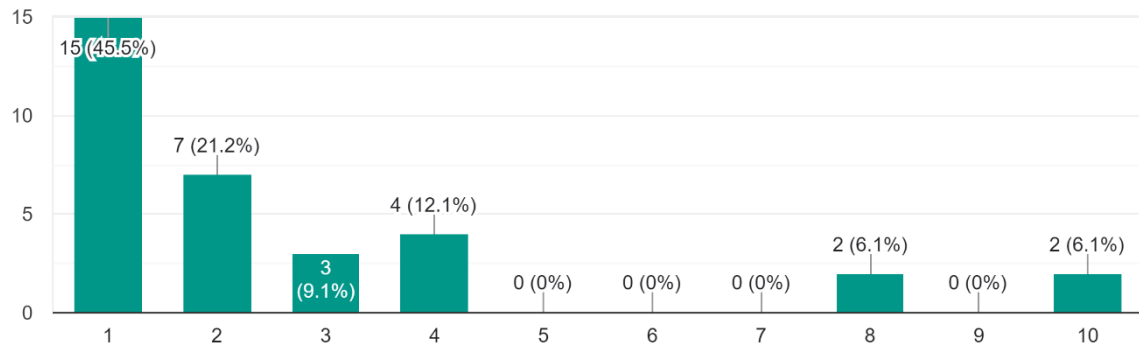
33 responses
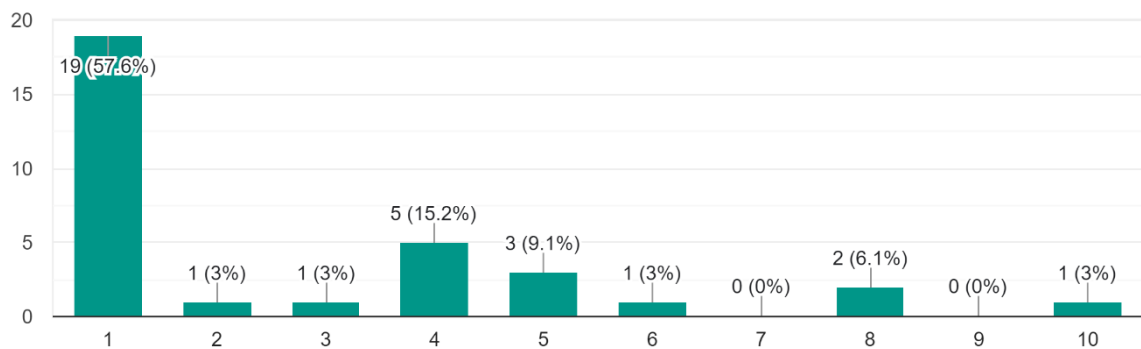
11

Ich denke, es sollten mehr Maßnahmen ergriffen werden, um den Autoverkehr zu reduzieren und
es unattraktiv zu machen, Autos in der Berliner Innenstadt zu benutzen.

33 responses

12 Do you have any other suggestions that would help improve the cycling infrastructure in
Berlin's city centre? (roughly translated from German to English) 7 responses

More bicycle traffic lights, more paths. Storage facilities for cargo bikes.
Reduce parking spaces and radically increase the price of the remaining ones (at least 50/month).
Massive expansion of public transport, especially on the outskirts of the city
30 km/h nationwide. Tow more wrong-way parkers.
more drop points for bikes, safer drop points
Merh nature and car-free zones
Own traffic light circuit for right-turning vehicles!!! never at the same time as cyclists or pedestrians!
Cars out of the city

Appendix 4. STOURIE Observation results (roughly translated to English from German/Swedish).

Friedrichsstraße:
 lot of cyclists at once, then for a time nobody
 some cyclists look while crossing Friedrichstraße, others not
 one woman pushes her bike only
 some people going with helmet, others with warning west
 one man drives with an cargobike transporting two
 kids
 some people driving with lights

 when traffic lights turn orange cyclist going faster
 one time nearly accident which an car turning left before carfree zone starts
 another time one woman stopped and walked backwards to let a car turning left

 one woman turnes at the end of the carfree zone and goes the same way back

 3 police officers with bikes passed

one man uses a bench as a footstand

when the other streets where closed down for cars because of a convoy cyclists could still continue driving, they had
after police was gone 4 cyclists drived by red (one straight, 3 turned right)

It is cloudy and a bit chilly. The street is calm, we can hear sound från bikes passing by. Distant traffic sounds are heard. The cyclists are both men and women at different ages. Most seem to be on their way to work. No kids or elderly people were seen biking. Both electrical scooters and normal bikes were seen, also cargo bikes and bikes with wagons. Some had chairs for kids on the carrier. Every other cyclist had a helmet on.
The impression is that there are lots of bikes but never too many. It is easy for the bikers to pass one and other and possible to ride quickly. There is potential for more traffic. In general the cyclists keeps an even phase, they don't need to speed up or slow down. The cyclist bikes in the correct file and can pass other cyclists without driving in the wrong lane. Some still did it though. Some cyclists ride without holding the steerer and some ride side by side talking. The cyclists can ride through the whole street (which most do) without interruption from pedestrians and cyclists can cross or enter easily (flow), cyclists can relax.
Dangerous when cars pass or drive on the bike lane, most drivers were carefull however. Most of the cyclists doesn't stop for pedestrians at the crosswalk. The pedestrians usually look carefully and run over the street when there are no bikes visible. Instead of stopping, the cyclists go around the pedestrians.

Oranienstraße:

Oranienstrase was very busy with lots of noise from traffic. Here we also saw lots of different bikes and people at various ages. Opposed to Fredrichstrase, we saw kids biking beside their parents on the bike lanes or on the sidewalks. Even some kids cycled past the street but on the fahradstaße, Bike lane only at this small place of the street other is absent of bike lanes,
Large amounts of traffic by both car and bikes. The cyclists go in an uneven phase since they have to adjust their phase to pass the traffic light or other cyclists.
Pedestrians and cyclists cross oftenly from one park to the other and they do so with no hesitation, most seen experienced, more pressure on cyclists and drivers, they need to focus but it seems to work well, (Busdriver and cyclist communication)
the lane with both bus and bike works well since not too many busses
Narrow streets with cyclists between parked cars and driving cars. Cars are parked on the road so it gets very narrow. It is not possible to bike beside two cars meeting. Buses take up the full street when they are passing. The cyclists ride beside the bike lane to pass one and other. Some ride on the sidewalk. One cyclist has to make way for a car driving out from a side street to avoid a collision. A car on the street had to turn left to not collide with the cyclist.

Appendix 5. Extra observation point at Friedrichsstraße.

Appendix 6. STOURIE Short interview questions and answers

Where do you feel particularly safe while cycling in Berlin? Why?

Apart from car traffic (exclusive cycle/hiking trails)

On bike paths delimited by traffic

On mutually separate bike paths

On the wide green bike paths with a yellow "bollard" limitation, why is it clear: D

On bike paths away from streets

Bicycle paths protected with bollards due to better protection against cars

When commuting because there are no leisure cyclists and no excursion cars. I also know the route best.

Physically separate bike paths of cars and pedestrians, because less risk of accidents.

If bike paths are well fastened, the structures of the cars, parked cars and footpath are separated from the r
people.

Parts of Mitte, Friedrichshain and Lichtenberg

in parks and one -way street + generally WOS is calmer and clearer

E.g. wall cycle path because no cars

In daily paths ... because of routine and good centories/daily observation of the traffic situation/traffic lights/

Pankow/P.Berg/Stadtmitte

on bus traces, since there is plenty of space and you are not rarely (too) closely overtaken by car

Wide cycle paths, in spring and autumn

Crown Prinessinenweg - only for pedestrians and cyclists !!

Protected Bike Lanes

On structurally protected cycling systems

Bicycle path that is separated from cars by bollards; Reason: car can't run over me

On bike strips that lie parallel to the road on the street. Best visibility for drivers.

On secured bike paths with bollards

Protected Bike Lane

Protected Bike Lanes

On separate bike paths

Only where you are separated from motor vehicle traffic.

On the few pure bicycle streets

On boosted bike paths. Because cars have no way to park briefly.

In 30s and on expanded bike paths away from streets

Pop-up cycle path Kantstraße, because of the visibility

On dedicated bike paths, since you do not have direct contact with the other street participants (cars and co

Where do you feel particularly unsure about cycling in Berlin? Why?

Crossings (turning), tight roads (on/parking vehicles, dooring, overtaking), certain districts are more uncomf

Parking cars on unemployed intersections and on their sides on their sides that open doors uncontrollably a

E.g. Alexanderplatz and other places where cars cross the bike path when turning.

"Fast" streets without bike paths, sometimes some crossings without a bike light or .. but with no green in fro

On streets with old and unsuitable cycling infrastructure, but to use the situation often forces the situation

On streets and unprotected cycle paths and bike paths in the dooring zone. Because drivers often overtake

On unknown routes

On main roads without bike paths, cars overtake too dense and fast.

On routes where people have to share the road with car driving persons, or just a bike protective strip witho
Kreuzberg, Neukölln, Wedding, Tegel, Schöneberg

Full/confusing roads, streets with tram tracks on it, on strange crossings, tight streets, where you are afraid

In the event of overtaking processes by other road users (especially trucks, buses) on streets without bike p

When cycle paths are not intended/built and "suddenly" end in the middle of nowhere .. with parked bike pat
path

Wedding/ City Center> Friedrichstrasse/ Alex is chaos> too many pedestrians and car traffic badly regulated

In narrow streets parked on both sides, as it is often very tightly overtaken there

Narrow bike paths in tourist times when the erollers are added

Overall!! Despite bike paths on my daily tours, always dangerous because you have the feeling of not being

No bike paths or on "protective" stripes

Storkower Str

Downtown districts

Wherever cars and cyclists share the roadway

Large streets without a bike path with cars parked on the right; Reason: Danger of two sides

On bike paths that run on the pedestrian path. You are regularly overlooked by cars.

Especially in rush hour traffic, including Attilastr in Tempelhof, Leonorenstr (Steglitz), Lankwitz Church (Steg

Protective strip

Normal main roads without bicycle infra

Muellerstrasse in Wedding, at all (!) Crossings

Wherever you come into contact with the motor vehicle.

On main roads without a bike path

Wherever bike and car have to share the room.

On streets without bike paths, especially with tram rails. If cars in 2 row or parking or holding or holding it wi

Heerstraße Höhe Siemenswerder (outdated outdate), obligation to cycle path on dilapidated sidewalk with p

Roots on main roads without a strike separation of bike path and road and on poorly built bike paths with ey

Do you have suggestions that can be improved to improve safe cycling in Berlin?
Separate traffic lights for right-wing turns, wider bike paths, ideally still physically separated from the road (F
parks

Remove car traffic from the city

Lighting spaces on bike paths at traffic lights, wider bike paths, better controls of bicycle roads

Reflow the cycling camps in front of Autoampel .. and teach some cyclists.

^^ I thought the survey should be done in 3 minutes? Yes, there are a thousand approaches that all have to

Structurally protected cycle paths.; Implementation of the parking ban on bike paths

Better cycling markings, which are also separated with bollards in the intersection.

More physically separate bike paths.
Reduce car deposits in the city center.
Bicycle paths that are wide enough from the street are wide enough to surely overtake slower bicycle driving
Better planning of the transport infrastructure with attention to protection for poor road users.
Old, also modernize and repair bike paths that are not subject to use.
Temporary circuits separated from the car light with lead time for people driving.

better signposted/wider bike paths, maybe. generally separate paths from the streets + more bicycle lights

Separate bicycle traffic routes from other traffic routes. Structural or spatial. Improving the condition of the b
Remove cycling lanes .. fewer parking places on the roadside ... Crossings make it clearer/cyclist lights/floo
enforce the applicable traffic rules
Bicycle kinks, e.g. exaggeration of rights on traffic routes, only drive side by side for overtaking, etc.
A better one with each other! Rad tracks, which (as in Copenhagen) are separated from the roadway with a
Consistently redeem the parking spaces to Protected Bike Lanes on each main street.
Bicycle paths according to Dutch model
Implement Mobility Act quickly.; Distribute the traffic area fairly.

More space for the bike
More bike paths / more bicycle streets / limitation Number of cars in the city

More secure cycle paths, separated from car traffic and pedestrian
More Protected Bike Lanes
Berlin car-free in the S-Bahn ring
Create more space for cyclists
Safe crossings
Only necessary power traffic, separate and protected bike tracks and separate traffic lights for power traffic,

More boosted bike paths.
Remove bicycle roads away/parallel from main traffic routes
More bike tracks on the road. More crossing one -way streets (for motor vehicle) reduce right -hand vehicles
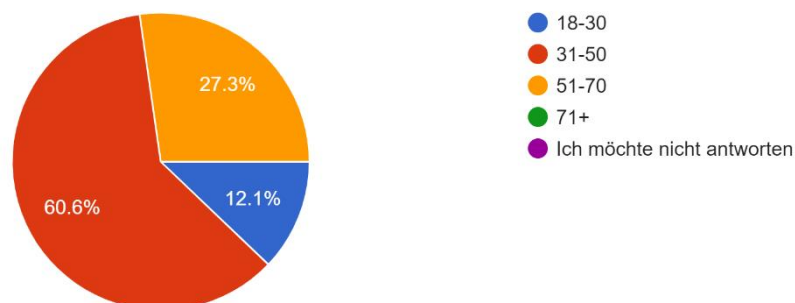Reduce car traffic

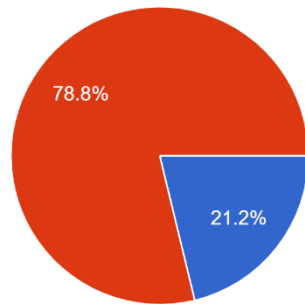**Appendix 7.** STOURIE Survey questions and results

1

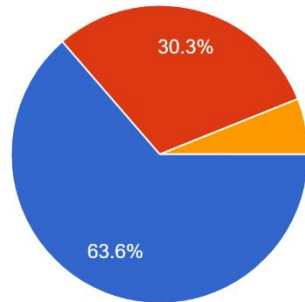Wie alt sind Sie? (in Jahren)
33 responses

- 18-30
- 31-50
- 51-70
- 71+
- Ich möchte nicht antworten

27.3%
12.1%
60.6%

2

Geschlecht
33 responses

- Weiblich
- Männlich
- Divers
- Ich möchte nicht antworten
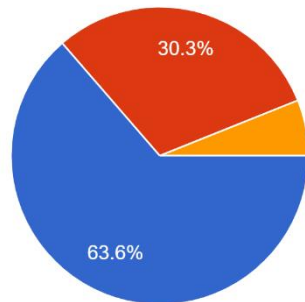
78.8%

21.2%

3

Fahren Sie mit dem Fahrrad? (Tage pro Woche)
33 responses

- Ja (5-7)
- Ja (3-4)
- Ja (1-2)
- Nein

30.3%

63.6%

4

Fahren Sie mit dem Fahrrad? (Tage pro Woche)
33 responses

- Ja (5-7)
- Ja (3-4)
- Ja (1-2)
- Nein

30.3%

63.6%

5

Where do you feel particularly safe when cycling in Berlin? Why? 29 responses

Protected Bike Lanes
Away from car traffic (excluding cycling/hiking trails)

Z.B. Mauerradweg, because no cars

on dedicated cycle paths, as you do not have direct contact with the other road participants (cars and Co)

Pop-up cycle path Kantstraße, because of visibility

in parks and one-way streets + generally where it is quieter and clearer

On structurally protected cycling facilities

In zones of 30 and on developed cycle paths away from roads

cycle path separated from cars by bollards; Reason: Car can't run me over

When commuting, because there are no recreational cyclists and no excursion cars on the way. I also know the track best.

On cycle paths demarcated from traffic

Protected Bike Lane

Physically separated cycle paths of cars and pedestrians, as there is less risk of accidents.

On the wide green cycle paths with yellow "bollard" boundary, why is it clear :D

on bus lanes, because there is a lot of space and you are not / only rarely (too) closely overtaken by car

on secured cycle paths, which are equipped with bollards

Only where you are separated from motor vehicle traffic.

In the case of well-paved cycle paths, which is structurally separated from the roadway of cars, parked cars and footpaths and has a minimum width to safely overtake slower cyclists. Parts of Mitte, Friedrichshain and Lichtenberg

On bike lanes that are parallel to the road, on the road. Best visibility for motorists.

Bicycle paths protected with bollards, due to better protection against cars

On separate cycle paths

On separate cycle paths

On off-road bike paths

On the few pure bicycle roads

Kronprinsessinenweg - only for pedestrians and cyclists!!

on daily routes... due to routine and good knowledge/daily observation of the traffic situation/traffic lights/danger spots... . Pankow/P.berg/City Center

On polished cycle paths. Because cars there have no possibility to park even for a short time.

Wide cycle paths, in spring and autumn

6 (roughly translated from German to English)

Where do you feel particularly unsafe when cycling in Berlin? Why? 31 responses

Intersections (turners), narrow streets (parking/exiting vehicles, dooring, overtaking), certain districts are more unpleasant for the public than others

No cycle paths or on "protective" strips

When overtaking other road users (especially trucks, buses) on roads without wheel protection lanes, because safety distances are rarely maintained.

Inner City Districts

On main roads without strike separation of cycle path and road and on poorly built cycle paths with burst roots

Heerstraße Höhe Siemenswerder (especially out of town), cycle path obligation on dilapidated sidewalk with pedestrians who walk their dogs with cross-country lines. Trucks speed past a few centimeters.

full/confusing streets, streets with tram tracks on them, at strange intersections, narrow streets where you are afraid to bang against a door, unfavorable exits

Wherever cars and cyclists share the road

On roads without cycle paths, especially with tram tracks. If then still cars in 2 row or wrong park or stop it will be particularly unsafe

Large roads without a bike path with cars parked on the right; Reason: Danger from two sides

On unknown routes

Parking cars on unruly intersections and on roads on their sides, which open doors uncontrollably and plug in and out

Guard bar

On main roads without bike paths, cars overtake too densely and quickly.

"fast" roads without cycle paths, sometimes some intersections without cycle traffic lights or with but without green in front of the turning car traffic

in narrow, two-sided parked streets, as there is often very close overtaking

Especially in rush hour traffic, e.g. Attilastr in Tempelhof, Leonorenstr (Steglitz), intersection Lankwitz Kirche (Steglitz)

Wherever you come into contact with the motor vehicle.

On routes where people have to share the road with motor vehicle drivers, or only a wheel protection strip without structural separation from the roadway and parked cars. Kreuzberg, Neukölln, Wedding, Tegel, Schöneberg

On cycle paths that run along the pedestrian path. You are regularly overlooked by cars.

On roads and unprotected cycle paths and cycle paths in the dooring zone. Because motorists often overtake without distance, park on cycle paths or open the door to the cycle path inattentively

E.b. Alexanderplatz and other places where cars cross the cycle path when turning.

Storkower Str

Muellerstrasse in Wedding, at all(!) Crossings

On roads with old and unsuitable cycling infrastructure, but often forced to use them by the situation

On main roads without a bike path

Everywhere!! Despite bike paths on my daily tours always dangerous, because you have the feeling of not being noticed as a cyclist. I look left, right, backwards, but still. At painted bike lanes, Kantstr, Reichstr, dangerous situations wg parked cars on the bike lanes.

Normal main roads without bicycle infrastructure

if cycle paths are not thought through/built to the end and "suddenly" end in nowhere. with parked cycle paths... between parked cars and roadway... on crowded bike paths/city center due to many unsafe cyclists/occasional riders and e-scooter traffic increase. when restaurants leave their outdoor gastronomy directly adjacent to the cycle path Wedding/city centre > Friedrichstrasse/Alex is chaos> too many pedestrians and car traffic poorly regulated/ Marzahn and Lichtenberg unsafe>less cycle paths.. wide streets multi-lane without bicycle lanes / Lichtenberger Bridge / area around S Bhf-Marzahn e.g.

Wherever bicycle and car have to share the space.

Narrow cycle paths in tourist times, when the eRoller rides are added

7 (roughly translated from German to English)

Do you have any suggestions on what can be improved to improve safe cycling in Berlin? 30 responses

Separate traffic light circuits for right-hand turns, wider cycle paths, preferably still physically separated from the road (bollards or similar), red floor markings of cycle paths at all intersections and exits(!), more controls by the public order office for second-lane and cycle path parkers

Consistently rededicate the parking spaces to Protected Bike Lanes on every main road.

Separate cycle routes from other traffic routes. Structurally or spatially. Improving the condition of cycle paths (floor covering), widening cycle paths, adapting traffic lights to cyclists, Green Arrow at intersections, ...

Implement the Mobility Act quickly. Distribute traffic space fairly.

Berlin car-free in the S-Bahn ring

Reduce car traffic

More bike lanes on the road. More cross-crossing one-way streets (for cars) reduce right-turning vehicles.

better signposted/wider cycle paths, vllt. generally separate paths from the streets + more bicycle traffic lights

More space for the bike

Expand bicycle roads off/parallel from main traffic routes

More bike lanes / More bike lanes / Limit number of cars in the city

Better cycle path markings, which are also separated with bollards in the intersection area.

Remove car traffic from the city

Mehr Protected Bike Lanes

More physically separate cycle paths.

Pre-connect the cycle traffic light before the traffic light.. and teach some cyclists to stop there too. enforce the applicable traffic rules

More secured cycle paths, separated from car traffic and pedestrians

Only necessary road traffic, separate and protected cycle lanes and separate traffic lights for motor traffic, bicycles and pedestrians.

Reduce car occurrence in the city centre. From the road structurally separated bike paths that are wide enough to safely overtake slower cyclists. Better planning of the transport infrastructure with a focus on protection for vulnerable road users. Modernise and repair old cycle paths that are not subject to use. Traffic light circuits separate from the traffic light with lead time for cyclists.

Structurally protected cycle paths. Enforcement of the parking ban on cycle paths

Turning places on cycle paths at traffic lights, wider cycle paths, better controls of cycle roads

Cycle paths based on the Dutch model

Safe crossings

😁 I thought the survey should be done in 3 minutes? Yes, there are a thousand approaches, all of which interlock and must be enforced!

A better one with each other! Bike lanes, which (as in Copenhagen) with a higher edge, is separated from the roadway

Creating more space for cyclists

Expand cycle lanes.. fewer parking spaces on the roadside.. . Making intersections clearer / Cyclist traffic lights / Floor markings... There should be more bicycle police to intervene faster in the case of "crazy" motorists/minimum distance/parking on cycle paths etc..
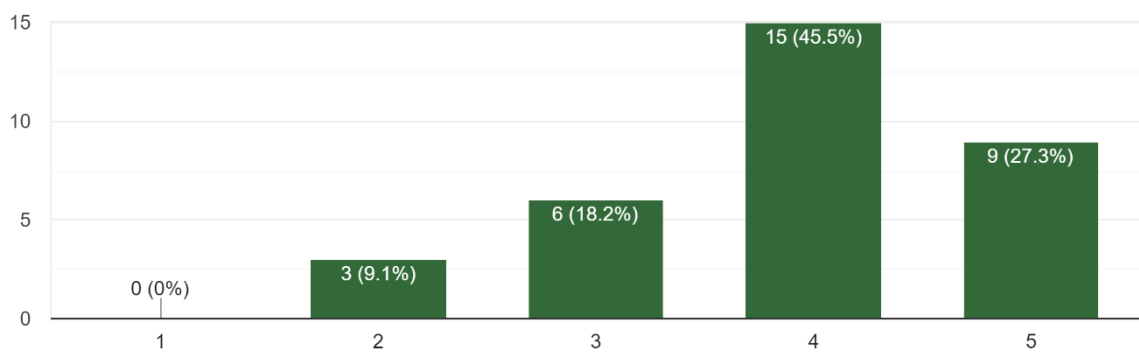
More bollarded bike paths.

Bicycle kinks, e.B. right overtaking on traffic routes, driving next to each other only for overtaking, etc.

8

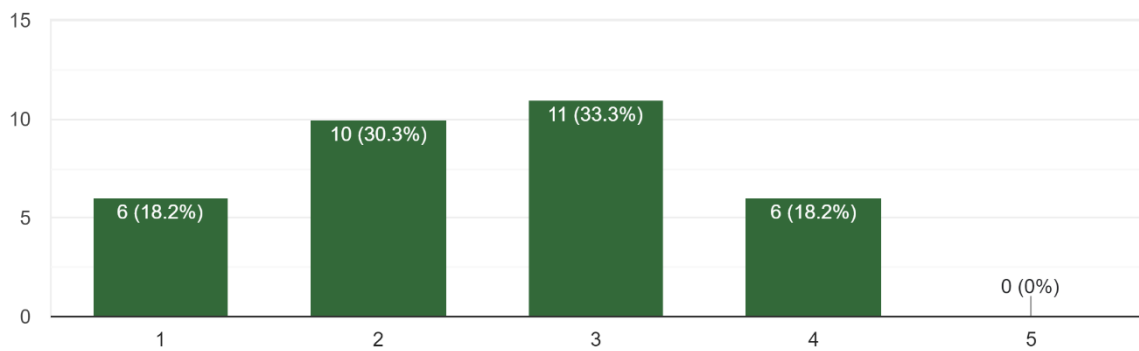Wie sicher fühlen Sie sich hier beim Fahrradfahren?

33 responses
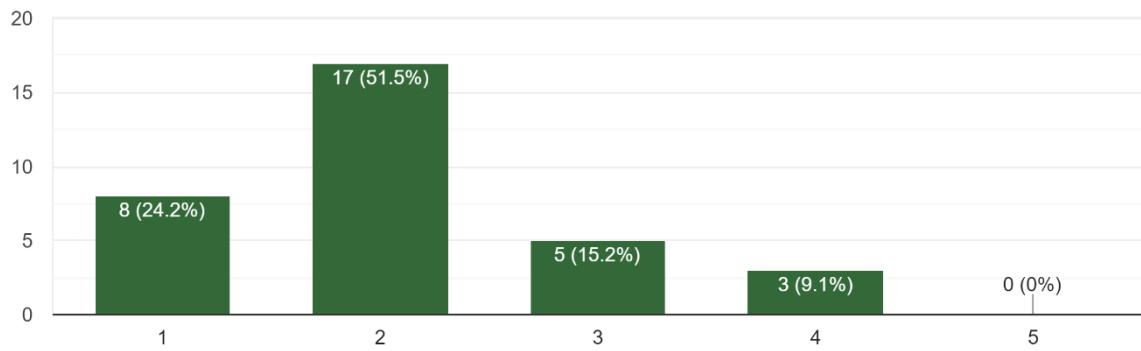

9

Wie sicher fühlen Sie sich hier beim Fahrradfahren?

33 responses

10

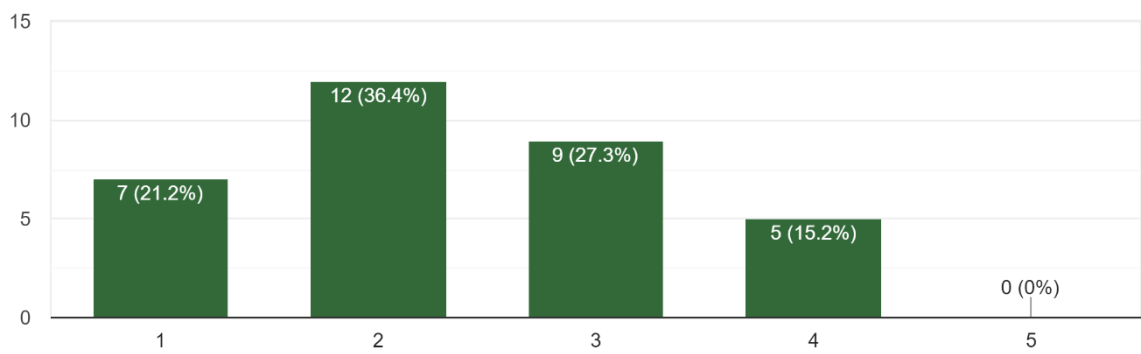Wie sicher fühlen Sie sich hier beim Fahrradfahren?

33 responses

11

Wie sicher fühlen Sie sich hier beim Fahrradfahren?

33 responses

12

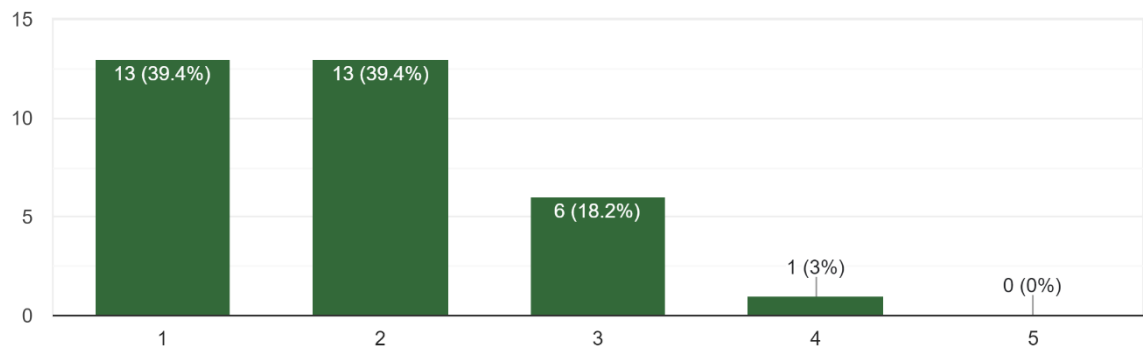Wie sicher fühlen Sie sich hier beim Fahrradfahren?
33 responses

13

Wie sicher fühlen Sie sich hier beim Fahrradfahren?

33 responses