



HOW TO BIKE SHARE FOR THE LAST MILE?

A research in the way bike sharing as a last mile solution should
be organized.

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Masterthesis Spatial Planning

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Management summary

In our society there is a noticeable shift towards more awareness of living in a way that makes that we leave this world in a way that future generations can still inhabit this planet. When it comes to mobility and the way we move around, this means we need to be looking to ways to travel in a more sustainable way. This could mean stimulating the use of active modes of transport like walking or cycling or the use of public transport.

In the Netherlands this shift towards stimulating more sustainable ways of moving around is also present. In the public transport sector one way transport operators are looking to make their public transport lines and bus lines especially more attractive towards travelers is by 'stretching' their lines. This means, not going through a village, but using the ring roads around it. This saves time for travelers in general, but a problem it takes with it, is the fact that the bus stop will generally be further away from someone's home or destination than before. In other words, the first- and last mile is growing. A way to cover this growing is by bike, but especially on the last mile of a trip, people usually do not have a bike to their disposal. For these people who would be able to cover the first- and last mile by bike, but do not have a bike to their disposal, a shared bike could be a solution and a way to make public transport ultimately a more attractive option for the car.

One way to organize the shared bike for the first- and last mile is to include it into the public transport concession. This research tries to uncover what the influential factors are of whether it is desirable for bike sharing systems aimed at the first- or last mile to be included in the public transport concession.

This research has been conducted to answer a research question that is as follows: *To what extent is it desirable for bike sharing systems aimed at the last mile trip from bus stops to be included in the public transport concession?* Because of the qualitative nature of this question, the data to answer this question has been collected by conducting interviews with stakeholders that are of importance when it comes to public transport concessions and bike sharing systems. To create a sufficient variety in the conducted interviews four different cases have been chosen. In each case the way the bike sharing system is organized is different from the organizational structure of the other cases.

This research found that there is a large difference of the level of desirability between private and public stakeholders. Where private stakeholders have more reservations about the integration of both systems, public stakeholders have a more positive attitude towards the integration. But also, the previous experiences of stakeholders with this organizational structure is of importance. Stakeholders with previous experience with public transport concessions where bike sharing was integrated, generally have a more positive attitude towards the subject.

The spatial context of a concession area is also an important influential factor. This research finds that the stakeholders who operate in urban areas are less likely to have a positive attitude towards the integration of the shared bikes into the public transport concession. While stakeholders who operate in more rural areas are more likely to have a positive attitude towards integration of both systems. A likely explanation for this, is the fact that in urban areas, shared mobility systems are more likely to exist already, because of a more viable business case. While in rural areas providers are more likely to have to be (financially) stimulated to start op business, as the business case in these areas is less viable normally.

The main conclusion to answer the research question is that the concession process needs a certain amount of customization and that every concession area needs to be examined closely when thinking about the 'ketenconcessie' or the integration of shared bikes in the concession.

Preface

Dear reader,

Before you lies my master thesis, a research in the way that bike sharing as a last mile solution should be organized. This research was performed as a part of the master Spatial Planning at Radboud University Nijmegen. For the largest part of the data collection and literature research for this research, I worked as an intern at Mobycon, a consultancy on the topic of mobility. During this internship I did not only perform my research, but I also worked on projects in the field of mobility. Besides good input for my master thesis, this internship gave me an insight in the work that consultants do on a daily basis and learned me a lot about the topic of mobility. For this reason, I would like to thank my colleagues at Mobycon and especially my internship-supervisor Robin Kleine. He gave me a lot of input and feedback for completing my research.

In addition, I would like to thank my supervisor Henk Meurs for his guidance during this research. His feedback helped me in keeping on track and eventually finishing this research.

A final word of thanks goes to all the different respondents in The Hague, Rotterdam, Utrecht and Drechtsteden, who were interviewed for this research. Each respondent gave me new insights, which eventually helped me come to the results that are presented in this thesis.

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Chapter 1: Introduction

To make the public transportation in the Netherlands more attractive, transport operators are making bus lines more direct (“stretching of lines”). Public transport operators do this to make these lines faster and cheaper to operate. However, this trend of “stretching lines” potentially has disadvantages for the traveler. One of these disadvantages is the fact that the bus stops are not as close to their homes or their destinations as they were before the lines were stretched. This makes for a longer travel to or from the bus stops and therefore a longer first/last mile (Veeneman, 2018). The distance between destination/origin and public transport stop is often referred to as the first or last mile. The term ‘first or last mile problem’ it is most often used when describing the level of service, or the lack thereof, on this first or last mile (Wang & Odoni, 2012). The concept of the First or Last Mile Problem raises different issues for different groups of travelers. Elderly people, for example, are less mobile than students. This gives these elderly people other needs for the first and last mile (Tight, Rajé & Timms, 2016). It is important that these differences in needs are identified and met, because the first and last mile are an integral part of the journey of the traveler. As the first and last mile are an integral part of the journey, it is important to make the first and last mile more attractive, when addressing the attractiveness of the whole journey. A shift towards a higher public transport use is a good step in to making the sustainability goals that have been made and are being made on (inter)national level. And this shows why it is important to create and maintain a good first and last mile for the public transport journey. Research with regard to this topic is now often focused on train stations as these are more sparse and therefore the distances between stations and destination are longer. But with this trend of “stretching lines” in the Netherlands the bus stops should not be forgotten when talking about the combination of bike and public transport. An article of Bram Nieuwstraten in *Ov-Magazine* (2017) shows the importance of the bicycle as a feeder mode to busses, especially with these increasing distances. This importance is corroborated by a report of the KiM (Knowledge institute for Mobility Policy in the Netherlands). This report shows that for the first mile to a bus stop (distance of residence to bus stop) 40% travels by bike. This result is in stark contrast with the combination of bike and bus on the last mile (bus stop to destination) were only around 5% travels by bike (KiM, 2014). The range of a stop on a High-Quality Line (HOV) is around 800 meters when walking. But this range increases to around 2 kilometers when taking the bike into account, which means it more than doubles the range (Van der Blij, Veger & Slebos, 2010). By providing bicycle amenities at bus stops it can increase ridership for these busses. Besides the importance of bicycle amenities Nieuwstraten also states that shared bicycles could be useful, especially, in covering the last mile. Where Nieuwstraten (2017) does not specify this, Franckx & Mayeres (2015) are of the opinion that this application of shared bikes is most promising in low density areas. This would be the case, as in these areas the amount of mobility options is limited and a bike sharing program would be a way to add an option to these areas. The idea of shared bicycles at bus stops of Nieuwstraten (2017) does not come out of thin

air. In recent history at a number of bus stops in the Netherlands shared bicycle facilities were created (f.e. Keobike in the province of Gelderland or Connexion in the Amstelland-Meerlanden area). This is partly the result of a new way of approach of the franchise model used for public transport in the Netherlands. In the last couple of years, a number of “concessions” were publicized in a way that the operators had to take the complete travel chain into account, the so-called ‘Ketenconcessie’. This is an evolution of the traditional form of the franchise model, in which the operators just had to focus on traditional public transport modes (bus, train, tram or metro). In these ‘Ketenconcessies’ the operators have to think of ways that the travelers can go to or from the public transport hub and shared bicycles is one way in which the operators think they can do this (Veeneman, 2018).

1.2 Social relevance

With the emergence of the phenomenon of “the stretching of lines” in the Netherlands, the distances between bus stops and destination will increase on average (Nieuwstraten, 2017). As governments try to support sustainable mobility, they want to stimulate people to travel by public transport or bike. But in combination with these increasing distances to the final destination makes the bus, for example, less attractive. This means that there needs to be a solution for the last mile, to keep public transport an attractive way of getting around and shared bicycles could be a suitable way to do that.

In some public transport concessions in the Netherlands the bike sharing system is included in the concession, but other authorities are more hesitant to do the same. This research tries to find the most desired way of organizing a bike sharing system for the last mile. When the pros and cons of the different organizational forms are displayed against one another, involved stakeholders can make more educated decisions when dealing with this subject. This will hopefully lead to a better public transport system, with a well-organized last mile. This will make public transport more attractive and a good alternative for the use of the private car.

1.3 Scientific relevance

Research regarding the first and last mile is often concentrated on the main public transport hubs, usually train stations. But in some areas the train is not an option but the first and last mile is still a big issue in these areas. The importance of the first and last mile on bus stops in these areas is very large, especially with regard to sustainable mobility. This research tries to explore the organizational forms that are currently used for organizing bike sharing systems on the last mile. As ‘ketenconcessies’ are being used more frequently in the Netherlands, it is important to have a look what needs to be included in them and how this form of concessioning influences the public transport itself. Despite the importance of this,

there currently is a lack of research on the 'ketenconcessies' and this research tries to contribute to this knowledge gap about this form of concession. Besides the obvious practical and social use, this research will contribute to the knowledge building about the workings of the 'ketenconcessie'.

1.4 Research objective

This research will look at the possibilities for bike sharing to solve the last mile problem on bus stops and if it is desired by the involved stakeholders to include bike sharing systems in the public transport concession. To find the preferred organizational form of bike sharing as a last mile solution, different, currently-existing organizational forms will be examined as case studies. The involved stakeholders in each case will be interviewed to see how the current structure has come to be and what these stakeholders would see as preferable. Besides this the pros and cons of all the organizational forms will be examined from practice and theory. These findings can provide input for theory building about the provision of additional mobility services and what works when.

The objective of this research is as follows: *The objective of this research is two-fold. Firstly to gain insight in how bike sharing as a last mile solution can be organized and the pros and cons of the different organizational forms. And secondly, to get a better understanding of how the involved stakeholders feel about including bike sharing systems in the public transport concession.*

1.5 Research questions

Main research question: To what extent is it desirable for bike sharing systems aimed at the last mile trip from bus stops to be included in the public transport concession?

To answer the main research question, the following questions need to be asked in the process:

- *What are the benefits of the different organizational forms for bike sharing systems?*
To determine why an organizational form is chosen it is important to understand the benefits and disadvantages of the different organizational forms. This question will be answered partly from research of the literature but also from the conducted research and the experiences that these respondents have had.

To get an understanding of what sort of organizational form is desirable for organizing bike sharing systems, it is important to know what involved stakeholders think is the most desirable way to organize them.

- *What is the preferred organizational form for a bike sharing system by public authorities?*
As the grantor of the public transport concessions these public authorities have an important role in the eventual outcome of the organizational form that will be decided on. That is why it is important to know what these organizations is their preferred way of

organizing a bike sharing system and what they see as the effects of the different organizational forms.

- *What is the preferred organizational form for a bike sharing system by public transport providers?*

As an important player in the public transport market it is important to know what the desired way of organizing is for the providers and what they see as the effects of the different organizational forms.

- *What is the preferred organizational form for a bike sharing system by providers of bike sharing systems?*

As the providers of the service in question, it is important to know their desired way of organizing bike sharing and what they think are the effects of the different organizational forms.

Chapter 2: Theory

2.1 Theoretical Framework

2.1.1 The First/Last Mile Problem

The Last Mile Problem is referring to the provision of a travel service from an origin to the nearest public transport stop (“first mile”) or the other way around (“last mile”) (Wang & Odoni, 2012). When this service is not available, the public transport is not as accessible and that can be seen as a problem. This is especially the case of certain (vulnerable) groups of the society like children, seniors or disabled, because these are groups with less mobility of themselves. Currently the most used solutions for the First/Last Mile Problem in the Netherlands are walking, cycling or the car (Wang & Odoni, 2012). However, this approach of Wang & Odoni (2012) is pretty rigid and does not take travel preferences in to account. The stop closest by does not have to be the stop that the traveler wants to use, for example because the stop further away has a faster or more direct route to the eventual destination. To take this discrepancy in to account, Welzen (2014) uses the following definition of ‘first and last mile’: the distance between the residence/destination to the closest transportation hub, from which they can continue their trip. Both definitions, but especially the last one, shows that the first and last mile are very dependent on the person, their routes and their preferences (Welzen, 2014). The definition of Welzen (2014) may especially be applicable on the Dutch case as the Dutch cycling culture makes that the Dutch cycle more often relative to other countries. Research shows that cycling more than doubles the range of a bus stop for example (Van der Blij et al., 2010). This means that when cycling the chance is higher that there are multiple public transport possibilities in someone’s range and that someone does not have to settle for the closest stop. This is why you see that on the first mile a large number of people uses the bike, for the bus this is around 40%. For the last mile this is drastically different, as only around 5% of bus travelers uses the bike to bridge the last mile. For the train this percentage is marginally larger (around 10%), but this can most likely be attributed to the Ov-Fiets (‘Public Transport-Bike’) and the better quality of the parking facilities at train stations (KiM, 2014). The exact distribution is displayed in image 1.

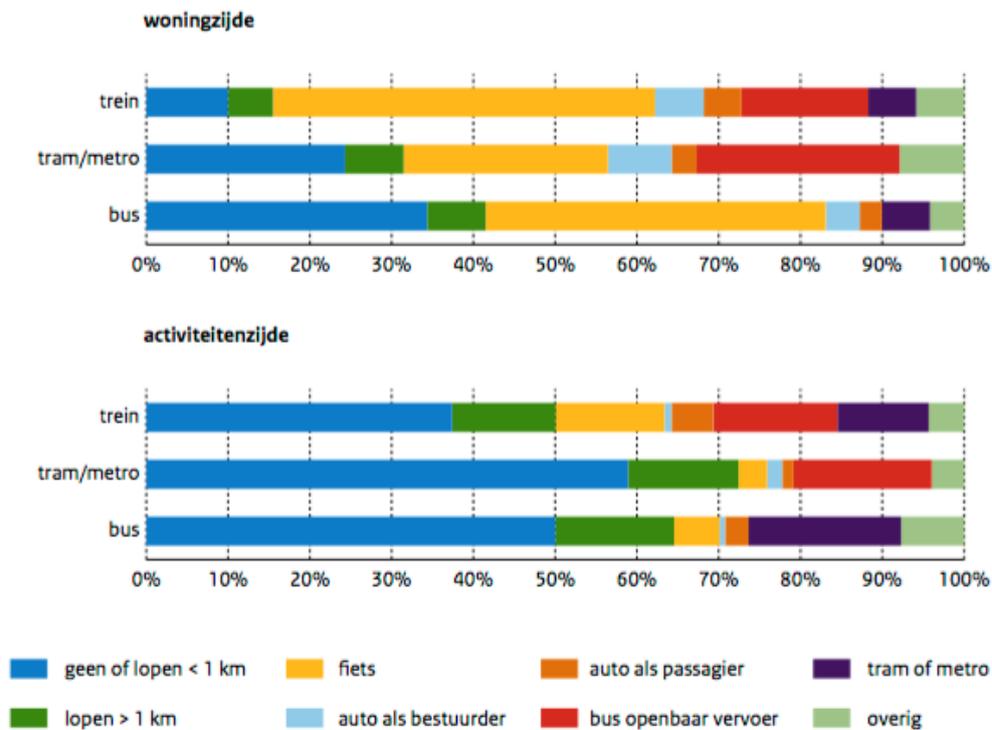


Image 1: Modal split on the first and last mile in the Netherlands (KiM, 2014)

Boarnet et al. (2017) have researched the opportunities that good access to public transport have for people, especially low-income people. When people cannot use a car for whatever reason they need to have another option otherwise you deny them from complete participation in society. Boarnet et al. (2017) think that the rise of ride hailing services (like Uber or Lyft) might be a cost-effective solution for this problem, but they also name bike sharing services as a possibility. They only state that the bikes have to be easily findable and need to be sufficiently close to a stop of the next mode they want to use.

The combination of public transport and shared bicycles as a solution for the last mile is not new. In the Netherlands we know the concept of the Ov-fiets. These are operated by the national rail operator of the Netherlands (NS) and are almost exclusively available at train stations. Other bike sharing systems have a large supply of their bikes at large transport hubs like railway stations. In Los Angeles for example, there is a public bike sharing system with a thousand bikes at 65 metro stations. This system is the first bike sharing system in North America that is operated by a public transport agency, the Los Angeles County Metropolitan Transportation Authority (Shaheen & Chan, 2016).

Other 'innovative' ways of covering the last mile are being tested across the globe. From shared electric scooters that are flooding cities across the world to autonomous vehicles that shuttle travelers from their public transport stop to their destination.

2.1.2 Bike & Bus

The combination of bike and bus seems to have been ignored for quite some time in the Netherlands as the bike is often seen as a competitor of bus lines. This is quite strange as

the combination of bike and bus is pretty prominent, especially on the first mile. On the first mile, around 40% travel by bike to a bus stop. It is however remarkable that on the last mile the bike does not play an important role with only 5% of last mile trips being made by bike (KiM, 2014). These stats show that there is a lot of room for improvement for the bike on the last mile. An explanation for the disparity between the bike usage in the first and last mile might be the fact that a lot of Dutch people have a bike at home and will use it for their first mile trip, but they do not often have a bike for the last mile.

Besides the competition aspect, another problem is the fact that the division of responsibilities between PT-operators, municipalities, regional authorities and national authorities is very unclear (Martens, 2007). This neglect of the bus-bike combination can be seen in the fact that a relatively low number of bus stops are provided with bike parking facilities, with only 20% of bus stops having this kind of facilities (in 2007). The results of a pilot in the province of Noord-Brabant shows that when bus stops are provided with bike parking facilities increases the ridership on these stops. Besides this 9% of the travelers changes their travel behaviour as they changed their access mode to the bike instead of something else (Martens, 2007). Martens (2007) besides this states that the Dutch context is quite special in the way that just by providing the facilities to park your bike at a bus stop will increase the ridership. He states that this will most likely not be the case in other countries. In addition to this, Médard de Chardon et al. (2017) note that it is not the amount of bus or rail stops that matter with regard to the success of a bike sharing service, but the frequency of the public transport is the most important factor. This means that bike sharing services are most likely to be successful as last mile solution for high volume lines (for example HOV-lines).

There seems to be a combination possible for public transport and shared bikes. In their survey of users of Flickbike Van Waes, Münzel & Harms (2018b) found that 32% of respondents gave as a reason for using Flickbike that the public transport stop was too far away. Of these same respondents 42% stated that their most important destination they visited by Flickbike was their home. Combining both results makes it look like the Flickbike was often used for a first or last mile trip. This would be promising for the combination of shared bike and bus. In their research on the 'gender-gap' in bike sharing in New York City, Wang & Akar (2019) found that women are less likely to combine their shared bike trip with the public transport. They hypothesize that this is because men are more likely to commute by shared bike than woman. And they state that this is likely to be the explanation for the lack of multimodal use of bike sharing by women.

2.1.3 Bike sharing

In the last years the number of public accessible shared bikes has exploded. Where there were 700.000 in 2013, this amount has almost quadrupled to 2.3 million publicly accessible shared bikes. China is frontrunner in the bicycle sharing field with 430 different bike sharing programs across the country (Richter, 2018).

Typology

Not every bike-sharing system is the same. In this paragraph, the different types of systems we be reviewed shortly (Van Waes et al., 2018a) (CROW, 2018).

Two-way station-based (Back-to-One)

Two-way station-based means that you hand in the bike at the same spot that you rented the bike. During reception of the bike and handing in the bike, it is exclusively available for the 'renter'. This type of system is often largely ingrained in a public transport system and seen as an extension of the public transport system and a way to tackle the last mile problem. A disadvantage of this system is that the bikes can only be rented out a limited number of times a day, as the 'usage time' is relatively long (CROW, 2018). An example in the Netherlands of this system is the Ov-fiets, which is available on a large number of train stations across the country.

One-way station-based

In this kind of system someone is able to hand in the shared bike at any designated docking station as they wish. This does not have to be the same as they rented the bike (which is the case in the two-way variant). This system is mostly used to facilitate local transport within an area. This type of system is not used as often in the Netherlands, as the dependency on docks makes it less scalable than systems which are not depending on these docks. A disadvantage on the user side is the fact that the bike 'does not wait for the user'. This means that the user does not have the guarantee that a bike will be there when they want to return to their original starting point. One-way station-based systems in the Netherlands are for example Hopperpoint in Eindhoven and Tilburg or Nextbike, who are actively working together with public transport operator Arriva.

One-way free-floating

This type of system lets a user take and drop off a bike without any physical infrastructure. With the use of a smartphone application the bikes can be localized and unlocked. When the bike is locked after it is used, it is ready to take for another user. Some providers try to limit the freedom of where to lock the bike by geofencing. This makes sure that bikes cannot be locked on certain locations. These locations are often public spaces where "wild parked" bikes can be a nuisance (f.e. railway stations). The municipality of Rotterdam (2018) hypothesized that one-way free-floating bikes are most likely to be preferred by local residents. This is under the condition that this system would have a high density in areas where

"Peer-to-peer"

In this system people can rent someone else's bike through an online platform. The existing platforms (Listnride and Spinlister) seem to focus more on a niche market of bikes like e-bikes, cargo bikes and racing bikes. This can be understood by the fact that these kinds of bikes are more rare than regular bikes and are therefore more in demand for rental.

Provision models

The way of providing the shared bike systems can differ quite drastically. There are systems that are completely provided by governments. In this case the bike-sharing system operates as any other transit service provided by the government. A downside of this approach is that governments may lack the knowledge or experience to successfully set up a bike-sharing system (DeMaio, 2009). A slightly less public way of organizing such a system is by making a public transport authority organize the system. Examples in the Netherlands are the bikes of Connexion in Amstelland-Meerlanden and the shared bikes of Keobike on the Veluwe and in Utrecht (Nieuwstraten, 2017). A benefit of such a provision structure is that these providers might have experience elsewhere which they can apply in new cases (DeMaio, 2009). A possible disadvantage is the fact that public transport operators can change, with the start of a new concession. Systems that are set up by the non-profit model are systems that are run by organizations that fold the bike sharing systems into their existing interests. These types of systems are often mostly relying on public subsidies to remain in existence. The opposite of the non-profit model is the for-profit model. In the for-profit model the bike sharing system is provided by a private company with little to no involvement of governmental parties. These companies are in the business to make money and not necessarily aimed at solving all the mobility issues in the area. Although for-profit organizations do not have a lot of governmental support, they most likely have to work together with governments as they will have to use public space to realize their docking stations (unless all stations are realized on private property) (DeMaio, 2009).

Although there is no one size fits all when it comes to type of provision, Médard de Chardon, Caruso & Thomas (2017) found that the type of provision has an influence on the success of a system. In this case the success of a system in the research of Médard de Chardon et al. (2017) is measured in trips per day per bike. The higher the number; the more successful the system. Non-profit bike sharing systems seem to be the least likely to be successful in comparison to systems run by private parties, advertisers or public transport authorities. Private parties (f.e. Mobike or Donkey Republic), seem to be the most successful operators of bike sharing services. This seems most likely to be explained by the fact that these private parties will try and maximize their profit and therefore look for the most efficient system (Médard de Chardon et al., 2017).

The CROW (2018) (a Dutch non-profit knowledge institute on the topic of mobility & policy) has created a guideline for municipalities on which these municipalities can base their own strategy with regard to shared bikes. They suggest three possible strategies that municipalities can have with regard to bike sharing in their area:

- Freedom of the market: this essentially means that the municipality will not make any policy regarding bike sharing. There will be no extra regulations and shared bikes will have to comply to the same rules as regular bikes. A disadvantage of this approach is the fact that when the bikes cause a nuisance it is more difficult to intervene in the situation.

- Regulating the market: this is probably done out of fear of wild growth of bike sharing systems. This scenario operates out of the assumption that the municipalities do not finance or create the bike sharing systems themselves. To regulate the market the CROW (2018) suggests that municipalities first ban bike sharing services from the city and then grant a license to operators to operate within the city. By doing this, a municipality can build restrictions within the license they grant to operators to which they have to comply to.
- Stimulate the market: this approach is most likely when there is no (real) interest from the market, but a municipality sees in shared bikes a way to accomplish certain social objectives. This will most likely be the case in middle- to small cities or in cases where the municipality wants a certain goal accomplished but it turns out that this goal is not commercially viable. A large advantage to this approach is the fact that the municipality has a bigger say in the supply of the shared bikes in its own city. For public transport authorities this approach to bike sharing systems, is the reason that they would include bike sharing systems within their public transport concession. They would like to see bike sharing systems as a last mile solution and try to force the public transport companies to provide this.

Influencing factors

Where it seems that socio-economic factors do not have a significant impact on travel behaviour in general there seems to be a patron in what kind of people use shared bikes. When Ricci (2015) combined a couple of other researches they concluded that the general bike sharing user base is: white, male, employed, young, wealthy, highly educated and already drawn to cycling in the first place. The result of Ricci (2015) is pretty much the same as Van Waes, Münzel & Harms (2018b) when they looked at the data of the 4 months that Flickbike was operable in Amsterdam before they left¹. These 'early adopters' of Flickbike were white, wealthy, highly educated males. In their research, Wang & Akar (2019) tried to find reasons for the fact that women are underrepresented in the bike sharing demographic. One thing they found was that a larger portion of trips of women is taken during the day. This might be related towards the feeling of safety, which is most likely lower at night. Women are also more susceptible for perceived traffic (un)safety and this feeling of safety is of a larger influence on the bike sharing of women than of that of men (Wang & Akar, 2019). A large hiatus in our knowledge of shared bicycle systems is the fact that there is no real insight in what people do not use them, this includes their motives of not using them. This makes it quite hard to try and make them use the shared bicycles (Franckx & Mayeres, 2015).

When creating their policy with regard to bike sharing within Rotterdam, the municipality of this city created some profiles of what certain groups might prefer in their bike sharing

¹ Flickbike left Amsterdam after 4 months of operation because the CEO of Flickbike was of the opinion that the city of Amsterdam was too conservative for a concept as progressive as Flickbike (Kruyswijk, 2017).

system. In this case local residents of Rotterdam were expected to prefer a one-way station-based or a free-floating system. Commuters were expected to prefer a one of the station-based types and tourists would benefit of a system with the most important feature that docking stations are close to touristic attractions (Gemeente Rotterdam, 2018).

Environmental factors, like temperature or perspiration, do factor into the demand of shared bikes. Regular shared bikes will benefit most from trip distances which are relatively short and seem therefore to be a good fit as a solution on the first or last mile (Campbell et al., 2016). Even though it seems that way, Campbell et al. (2016) state that is still unclear if these bikes will actually be used on the first or last mile or just as substitute for the original mode of the user. DeMaio (2009) however, did find that shared bikes are primarily used on the last mile and that they generally lead to more trips by public transport. Because of the larger range that e-bikes bring with them, these vehicles seem to be less suited as a solution on the first or last mile. Although this might depend on the specific context in which they are placed. Bike sharing systems might be most successful in relatively low-density areas (Franckx & Mayeres, 2015). However, Rixey (2013) found in his research on three bike sharing systems in the United States, that ridership of the systems was higher in areas with a high population density. Also, areas with a high density of retail jobs had a high ridership. This last one might be explained by the fact these areas are often attractive shopping streets/districts and therefore attract a high number of people. In addition to this, DeMaio (2009) states that although bike sharing does in some cases negatively impact the amount of public transport trips in a city, the net effect of shared bikes is most often positive. A last influential factor of the built environment is the amount of bike sharing station in the proximity of other stations. El Assi, Mahmoud & Hamoun (2017) found that the more other stations there are in a 200-meter buffer around a station, the more attractive this station becomes to use for the traveler. This means that the higher the density of stations, the more attractive a station.

When thinking about the shared bike in relation to the private bike they seem to be competitors of each other. But Castillo-Manzano et al. (2016) state that these two modes are complementary to each other. The shared bike is not used for trips that are normally made by private bike. Besides that, the private bike is in general used for longer distances than the shared bike. Having access to both will give greater flexibility to users (Castillo-Manzano et al., 2016). This is probably why bike sharing in the Netherlands will most likely be used as a last mile transportation. Because for the first mile Dutch people will most likely use their personal bike.

As stated before, the ridership of bike sharing systems has been found to be higher for areas with a high population density (Rixey, 2013). But this is not the only factor in determining the ridership. Rixey (2013) also found that areas with a relatively high income and/or high level of education, have a high level of ridership in comparison to other areas. The level of people that do not commute by car also has a positive influence on the ridership of systems (Rixey, 2013).

Negative externalities of sharing and shared bicycles

With the rise of the amount of shared bicycle systems, research in their externalities was also performed. Much of this research however took place in foreign countries and mostly in China, as shared bikes are a big thing there. There are however a couple of things that can be learned from the Chinese case and are things that we have encountered ourselves in the Netherlands. Yiyun Sun (2018) looked at how the free-floating shared bikes shaped the city of Beijing and saw so called 'zombie bikes'. These are bikes that were placed randomly in places where they stood in the way for example. With the introduction of Flickbike in Amsterdam the same concern was noticed and was one of the reasons why the city of Amsterdam banned shared bicycles from the city. The city of Amsterdam did this because the bikes were lowering the livability of the

Another thing that Sun (2018) notices is the fact that the lack of sense of ownership makes people not handle their bikes with care and others even so. With the arrival of the Witte fietsenplan in Amsterdam (the first shared bike system in the world) in the 1960's the same thing came up. As people would drop the bikes everywhere and eventually they all would be found at the bottom of the canals (DeMaio, 2009).

2.1.4 Provision of transport services

Transport services, like public transportation or bike sharing systems, can be provided to the consumer in different ways. The biggest distinction lies in the party that takes the initiative to provide the service. Van der Velde (2004) makes the distinction in services provided by initiative from market parties and services provided by initiative from authorities or governmental parties. For governments there are two main reasons to interfere in the provision of transport services (Van der Velde, 2004).

The first reason for governmental interference is if the free market process functions inadequately, which means that there is some kind of market failure present.

The second possible reason for governmental interference is if governmental authorities are dissatisfied with the outcome of the market process from a socio-political point of view. This means that the authorities are trying to defend the public interest in these cases. This kind of governmental interference can be traced back to the political wishes to achieve specific goals. This can, for example, be related to even distribution of a service or cost of the service.

Not all market lead initiatives have the same organizational forms. In the following paragraph the different structures will be explained.

Forms of market initiative

The first form that can be distinguished is the 'open entry regime'. This system allows operators to compete freely and on their own initiative with competitors. Micro-economically seen, this form of governance is only possible when all the conditions for the absence of market failure are being fulfilled, but in practice this is almost never the case. Van der Velde (2004) states that even in a free market regime intervention of authorities is fully absent. This is because even in this governance form, involved parties often need to give proof of reliability or credit-worthiness for example.

The authority can also choose to set some 'rules of the game' to which every involved market party needs to hold themselves. These rules can be seen as a form of governmental interference and are ultimately used to take away any forms of market failure that might occur. Rules that one might think of in this instance for example, is that all providers use the same ticketing system or that they coordinate their timetables with their competitors (Van der Velde, 2004).

The next governance form which is led by market initiative has more governmental interference involved in it than the previous two. Van der Velde (2004) calls it the system of 'authorisation regimes'. Within this form of governance, the market suppliers are still the initiators of the transport services, but they have to obtain a license for provision of the controlling authority. Market parties need the license of the authority to start their provision of the transport service. This system can be compared to the licensing system that the municipality of Utrecht has organized for the provision of bike sharing in the city.

Forms of authority initiative

The governance forms that fall under this category means that services can only exist after a conscious action of the authority. This means that only when the authority takes action and finds something desirable, the service can take form.

The first governance form is the form of 'concessioning'. This is the way that almost all the public transport in the Netherlands is organized and this model will be explained in greater detail in paragraph 2.1.6.

Besides 'concessioning', Van der Velde (2004) also distinguishes public ownership regimes, which in case can be distinguished into two different forms. The first variant is 'public management'. This implies that the whole system, including all vehicles and other installations are owned and operated by the public authority or by a publicly owned company. This form of governance can be compared to the way that the national railways in the Netherlands are operated, as these are run by the NS (Nationale Spoorwegen), which is a publicly owned company. The second variant is the one of 'delegated management'. In this model the authority makes (financial) assets available for an operating party, which will arrange the management of the network.

2.1.5 Competitive tendering & the franchisemodel

The way that bike sharing systems are organized has proven to be important in the success of the system (Médard de Chardon et al., 2017). Additionally, when you want to integrate public transport and bike sharing in the way of shared bikes at bus stops, it might be worth looking at how the public transport is organized and if there are possibilities to integrate them in a successful way.

In the last decades countries across Europe saw a large change in the way the public transportation was being organized. Where authorities were organizing the busses and trains themselves, in the 1990's and 2000's a lot of countries shifted this responsibility towards the free market in the form of competitive tendering.

In 2001 it became obligatory in the Netherlands to competitively tender the right to accommodate the public transport in a region. All 12 provinces and 2 metropolitan areas (Amsterdam and Rotterdam and The Hague) were obliged to do so. The only exception on this are the city services of Amsterdam, Rotterdam and The Hague which are allowed to be handed to the municipal travel operators (respectively GVB, RET and HTM). In recent years a lot of change has been happening in the way these concessions are being carried out. This way of competitive tendering is sometimes said to discourage innovation in the field of public transportation. The only moment when innovation was taking place was at the introduction of the new tender. This is because after concession is granted there is no incentive to innovate, which makes innovation merely a risk for the operators (Bakker & Konings, 2018). To try and combat this lack of incentive to innovate the province of Utrecht tried to incentivize the operators to increase the amount of travelers. The province did this by structuring the operating subsidy in such a way that the operator would benefit for two years instead of one. This meant double the reward for their innovation which lessens the risks. As a result of this the options for both operator and province with regard to public transport increased and it was easier to react on societal changes (Van Dijk & Golstein, 2017).

Veeneman (2018) saw three changes in the way that these concessions were being approached. The first change is the increased focus on the high demand routes. To make bus lines more attractive operators are making these lines more direct, making the connections faster. A downside to this approach is that the average distance between one's house and the bus stop increases. This leads to operators and authorities needing to find solutions for the first and last mile.

Another change is the way in which multimodal concessions ("Ketenconcessies" in Dutch) are becoming more mainstream. This means that operators need to shift their approach from procuring the capacity towards the provision of services, which can be very diverse. While some provinces have embraced these 'ketenconcessies' in recent years, some have stayed away from them. The advocates of the 'ketenconcessie' think that by providing all the mobility services themselves, they make use of the synergy effects that come with the provision of all these services themselves (OV-Pro, 2019). The opponents of the ketenconcessie on the other hand are of the opinion that the current concession model

does not give enough space for these innovative systems. They do not want to bother these systems with the governmental hassle that will come when such a system will be included in the concession. Another argument the opponents have, is the fact that public transport providers often do not have the expertise that is needed to, for example, set up a bike sharing system themselves. This means that these providers will need to have external expertise. This does not make it very efficient to place these last mile solutions in the concession (OV-Pro, 2019).

For operators to be able to adapt to all these changes and future changes as well, authorities are looking for a way to make the concessions more flexible but not to lose control over the public transportation in their region (Veeneman, 2018). This is often done by making room for operators to make changes to their service during the concession (Bakker & Konings, 2018). A good example of the how flexibility is built into the concession for the province Utrecht. In 2013 Q-Buzz won the tender for the public transport (bus and tram) in the region Utrecht. In this concession they have the province and Q-Buzz have an agreement that Q-Buzz can increase the travel supply without making any additional arrangements. In this case this is possible because Q-Buzz get a subsidy for exploitation that is dependent on their performance. This means that when the number of travellers grows, Q-Buzz gets more money. The extra money gives Q-Buzz the possibility to increase their travel supply and make it a better fit with current developments and challenges. This is less possible in traditional concessions, where the operator cannot get more money without new arrangements with the province. This is the case even if the number of travelers increases (Van Dijk & Golstein, 2017). The example of Utrecht shows the way flexibility can be implemented in the provision of busses, but it can also be preferred to phase out unprofitable busses and provide the traveler with alternatives. This discussion is currently taking place in the province of Gelderland. In Gelderland they have identified lines they do not want to lose ('Vastnet' and 'Stadsnet') and lines that are not profitable and for which they want to look for alternatives ('Flexnet'). However, the province is struggling with the implementation of these alternatives and how to position these alternatives in their tenders. The province is actively testing their 'flex'-initiatives with 30 pilots. These pilots range from shared e-bikes to carsharing to demand responsive transport and are all aimed at replacing unprofitable bus lines (Gommers & Van der Veen, 2017).

The fact that there is a trend going of growing flexibility within the tendering process and the concession themselves raises the question if this is a desirable development. This especially the case for the inclusion of things other than regular public transport in the concession.

An important reason for public authorities to put certain aspects in a concession is so that they can have a directing role over it. This can also be the case for a bike sharing system. It also means that they do not have to wait on initiatives from the market, but they actively look for parties to address the issues that they see.

Another important reason is to create a good or service that is to the liking of the public authority. This means that the good/service will be tailored to the wishes of the province or municipality, which means that it can be brought together better with other services. This means that market parties can not 'cherry-pick' certain parts or aspects of a system (AKD, 2018). In the case of a bike sharing system this means that a company will have to serve areas that may not be that profitable, if the grantor deems these areas as desirable to be part of a network.

There are also certain risks associated with placing certain thing within a concession. One is addressed earlier and concerns the fact that there is sometimes a lack of flexibility within concession contracts (Veeneman, 2018). In a number of public transport concession in the Netherlands the flexibility is growing, but when this flexibility is not there or not enough this can limit the innovation and the adaptability of the concession holder. Another risk concerns the possible change of concession holders and the impacts this can have on additional mobility services, like a bike sharing system. A new concession holder may have other regular subcontractors than the previous concession holder and without good agreements between both parties about transfer, this can lead to degradation of the quality of service. A concession where this transfer went well was in Dordrecht, in the Drechtsteden, Molenlanden & Gorinchem concession in the province of Zuid-Holland. Here, Arriva was the original concession holder and they set up the system of NextBike. But in 2018 they lost the concession to QBuzz and with good agreements about the transfer of NextBike, they made sure that the system remained in existence.

2.1.6 Integration of Bike sharing and Public transport

Integration has been a discussion point in a lot of policy making, but it can be broadly interpreted (May, Kelly & Shephard, 2006). May, Kelly & Shephard (2006) define integration on a more strategic level, and they define it as follows: *"integration of policy instruments to achieve greater performance from the overall strategy."*

There are two types of integration on a strategic level that are being used: the pursuit of synergy and the removal of barriers (May, Kelly & Shephard, 2006).

In 'the pursuit of synergy' the integration policies have to goal to reinforce each other and eventually achieve changes in the public transport system. An example of this is the provision of park and rides at larger train- or bus stations.

'The removal of barriers'-approach looks at what type of things obstruct the implementation of a desirable policy. This can be for example financial reasons, but also a negative public opinion.

When looking at the case of the integration of a bike sharing system in the public transport system, it is obvious that this is done to make the use of public transport more attractive as a mode. The evidence of whether these two systems are beneficial to each other is mixed however. Where some research sees that bike sharing on the last mile leads to more public

transport trips, other research shows that shared bikes might also lead to substitution of public transport trips (DeMaio, 2009)(Campbell et al., 2016).

May, Kelly & Shephard (2006) state that there are four types of benefits that integration can have when looking at synergy.

1. Complementarity: Both parts complement each other. This means that the benefits of the combination of the two parts is higher than the use of either one.
2. Additivity: This means that the values of both components add up to each other and are not diminished by the existence of the other component. The values of both parts are just simply added up.
3. Synergy: The combined benefits of using both is higher than the value of both components added up. This means that the existence of both components adds extra value on top of the value of the separate components.
4. Perfect substitutability: This means that the existence of one instrument completely eliminates the value of the other component. The value of the existence of the systems is the same as the value of the systems separately.

In the case of the integration of bike sharing systems into other public transport systems, 'complementarity' is the most logical form of benefit. Not everyone will use the shared bike as a last mile solution, which means that the benefit of both systems cannot simply be added up. The benefit would probably not be as high as the added value of the entire bike sharing system. This would mean that complementarity should be aimed at. Jäppinen, Toivonen & Salonen (2013) have found that in Helsinki the average travel time of public transport travelers dropped with 10 percent, since the integration of the bike sharing system and the public transport in the city. These time savings make the public transport system in general more attractive to use, due to the shorter travel time. This is a good example of the way that bike sharing can be complementary to the public transport system.

The integration of additional services to the public transport system is a question where there is no uniform answer to. But why would consumers (travelers), PT-providers and public authorities want to have additional services, like bike sharing systems integrated in the public transport system? That is what will be outlined in the coming paragraphs.

Vision of consumers on integration

The perspective of the consumer (or the traveler in this case) focusses on the traveler experience. Seen from this perspective, the integration of services in the public transport system should lead to a more pleasant trip for the consumer in a for the consumer cost-effective way. Elements that are relevant to a traveler's experience are for example: the information of available services, the ticketing systems and the coordination between the services. When these things are coordinated optimally, the public transport system will get more attractive to a traveler (Van de Velde, 2004).

Trustworthy information is desired by travelers when they travel as travelers would like to travel as hassle-free as possible. That is one of the reasons why clear and centralized information is desired by travelers conducting a multimodal trip. Travelers do not want to look for their next mode, also because this increases the travel time of them (Grotenhuis, Wiegmans & Rietveld, 2007). Besides that, travelers can feel powerless when there is a lack of accurate travel information. People want to be in control of their trip and accurate information helps them with this (Hine & Scott, 2000). Integration of different modes into the public transport, could make it possible for the multimodal travel information to be more centralized and therefore probably be easier to find for the traveler (Grotenhuis, Wiegmans & Rietveld, 2007).

The integration of public transport services should not lead to a decrease, especially when the aim of integration is often to improve the attractiveness of the public transport. Therefore, it is important to look at what the vision of the consumer/traveler is on the integration of public transport systems.

One thing that can be integrated are the fare- and ticketing systems. When these systems of different modes or service providers are integrated and there is a common ticketing system, the travel cost and inconvenience are reduced. This is because they would be no transfer fee for example or travelers do not have to check in and out for each service provider (which is currently the case on several train stations in the Netherlands). Reducing the travel cost and inconvenience for the traveler will therefore make the public transport in general more attractive. This all is under the premise that all modes and services will get the same ticketing system or tickets for the entire trip can be booked beforehand (Sharaby & Shiftan, 2012). In the Netherlands the ticketing systems are somewhat integrated with the arrival of the OV-chipcard. This is a ticket that gives people access to all public transport in the country. Shared bikes (except the OV-bike) are not included on this card however. When they would be regarded as a valiant last mile solution, integration on the ov-card could be a start.

The transfer is one of the biggest dissatisfiers in a multimodal trip (Van Hagen & De Bruyn, 2015). This means that when a transfer is not accommodated well, the trip will be valued less. Aspects of a transfer that have been identified to be of influence of the value of the transfer are: the time of the transfer, the safety and comfort of the transfer, the provision of the information on the transfer and the distance between modes (Chowdhury & Ceder, 2015) (Hine & Scott, 2000). When integrating and alignment of transport services especially the transfer time, the provision of information of the transfer and the distances between modes can be improved.

Because of the concession-model that is used in the Netherlands, it is possible that concession holder that provides a bike sharing system loses the concession and therefore can no longer provide the public transport in the area. This can have consequences for the

continuity of the system for the traveler. The traveler should preferably not be negatively impacted by a change in the concession holder. When choosing a governance model this is something that should be considered (BRON!). <Misschien dat Nextbike voorbeeld van hoe het wel moet>

The traveler does presumably not take the cost-efficiency for the public transport provider into account when wishing for integrating systems/services. The wishes from the traveler and the perceived wishes of the traveler by the public transport provider have the tendency to differ sometimes. For providers, it is therefore really important to know what travelers would want when integrating services, as the traveler will be the eventual user of the integrated systems (NEA, 2003).

Vision of PT-providers on integration

Public transport providers are the companies that provide the busses, trains or trams. In the Netherlands this are always companies that have won the monopoly in a certain area by getting the concession for this area. This means that within the concession area they are the only one providing this sort of public transport, with the exception of lines who cross concession borders.

Most of public transport companies are companies that aim to make profit by conducting their business. However, in the Netherlands there are currently three public transport providers which shares are all in the hands of governmental organizations (mostly the municipalities in which they provide the public transport). These companies are the GVB in Amsterdam, the RET in Rotterdam and HTM in The Hague. Besides these three companies the providers in the Netherlands are all for-profit companies. The fact that these companies are for profit makes that if they are going to integrate services that the cost-benefit balance needs to be positive for them. The extra revenues they will gather need to outweigh the extra cost they will have to make to integrate the services.

Vision of public authorities on integration

Generally, public authorities are the ones on the table that are tasked by serving the public interests. The question whether to integrate or not is for public authorities therefore also important from the perspective of the fact if it improves the social value. This can be the value of the public transport in general, but also for specific groups, like the less fortunate. But the specific goals will differ on the scope of the authority. Where municipalities will serve the more local interests, like the accessibility of a certain neighborhood, the national government would like to make public transport in general more attractive for everyone (Van de Velde, 2004).

The integration of a bike sharing system into the public transport system would have to be of social value in the eyes of the public authority for them to want to integrate both systems. The specific challenge that is being looked at during this research is the matter of

the last mile problem from bus stops. Overcoming this last mile can make public transport more accessible to people living further away from public transport stops, which in turn will be beneficial to their societal participation.

2.2 Conceptual Model

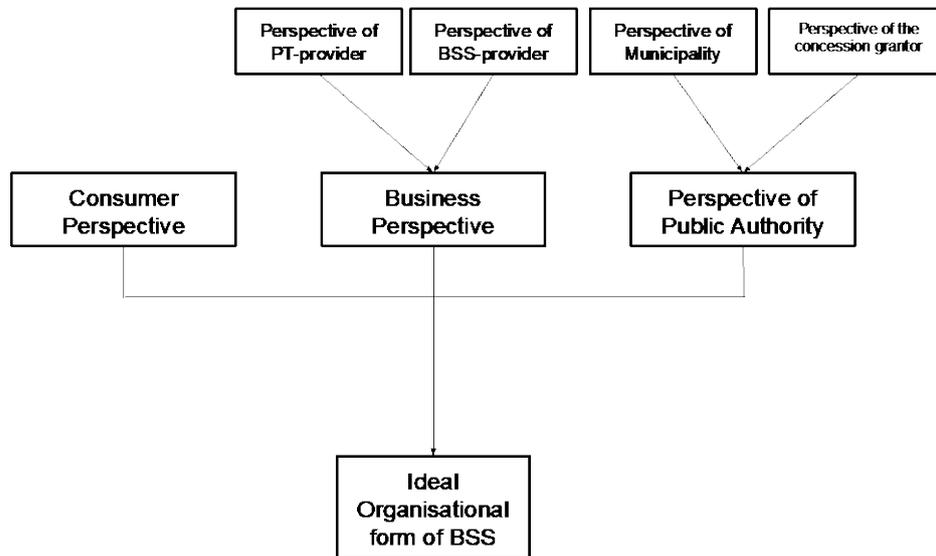


Figure 1: Conceptual model used during this research (Own creation, 2019)²

The conceptual model as seen above is based on the previous paragraphs. As mentioned before the ideal organizational form of a bike sharing system will be determined by looking at the perspectives of the different stakeholders. The different stakeholders that have been identified are the consumers, the businesses involved and the public authorities that are involved. In the business perspective on the organization of bike sharing, a distinction is made between the public transport operators and the providers of the bike sharing systems. As their roles in the process are different they will not be immediately merged together. This is also the case for the perspective of the public authorities. As municipalities and concessionary parties have different roles within the process, their perspectives will firstly be looked at separately.

² BSS is the abbreviation of the term: bike sharing system

Chapter 3: Methodology

This research will be conducted by a qualitative approach, which will be applied in a case study. A case study is a research, in which the researcher tries to get a deeper and more integral understanding of one or more specified objects or processes (Verschuren & Doorewaard, 2007). This research method has been chosen to get a deeper understanding of the opinions and point of view about their preferred organizational form of the bike sharing system.

The first step is the selection of the cases, which in this case means the cities of which the stakeholders will be interviewed. These cases will be selected on the bases of how their bike sharing systems are organized. To create an image that is as complete as possible all four cases will have a bike sharing system that is organized differently from the other cases. In the following paragraph the selection procedure will be explained in greater detail.

The advantage of a qualitative approach in a case study is the fact that in the semi structured interviews no answers are predetermined. This means that the respondent can elaborate on topics they deem of importance, something that is harder to do when conducting research by way of a survey. This means that during the interviews with the respondents topics can be discussed that were previously not thought to be of importance. This can lead to new insights, which is important for discovering the underlying motivations for choices by the respondents in their organizational form of the bike sharing system in question.

A factor that one needs to be aware of when conducting research by case study is the fact that the reliability and internal validity of the research can be harmed. When looking at the reliability of a research it is important that when the same research would be conducted in another case, the results would be the same. In other words, the research must be replicable without changing results. Because of the fact that qualitative research is very dependent on the context it is important that conclusions can be traced back in a logical and understandable way to the collected data.

The data that is collected by way of interviews with the respondents is analyzed by the use of Atlas TI. This makes it possible to structure the data collected of the different interviews and make the collection of the collected data more clearly.

3.2 Research material

The secondary material that is used for this research is by the way of policy documents, when available, and interviews with involved stakeholders. Policy documents however, are not always available for every case and not every stakeholder places their official opinion or policy online. That is why is chosen for additional interviews with the involved stakeholders. For each selected case the aim was to conduct four interviews, to get a complete image of the all the angles of the stakeholders. The involved stakeholders for each case have been narrowed down to: the municipality, the public authority that grants the concession for public transport (after this referred to as: concessionary authority), the public transport

operator and the operator of the bike sharing system. Interviews with all four stakeholders will give insight in the way how all the involved parties look at the organizational form of the bike sharing system and will give a better understanding in the advantages and disadvantages for all involved parties.

With the selection of the cases for this research the selection criterion was the organizational form of the bike sharing system in the city. This so the motivations and opinions behind the choice for the organizational form in question can be compared to each other. The four organizational forms that will be addressed in this research are:

- A free market for bike sharing providers
- A bike sharing system that is operated by the public transport operator
- A licensing system with one provider active in the city, giving this company sort of a monopoly
- A bike sharing system included within the public transport concession

The reason why these certain organizational forms are chosen because they all differ in the amount of market control that the public authorities (municipalities and provinces in these cases) put on the realization of a bike sharing system. Besides this, these organizational forms can all be found in the ‘Gemeentelijke leidraad voor deelfietsen’ (Municipal guideline for bike sharing) by the CROW (2018), except for the inclusion of bike sharing in the public transport concession. A possible reason why this last form is not in this guideline is because municipalities are not the concessionary public authorities. Provinces or special metropolitan- and city regions are the authorities that are responsible for the concession. The eventual cases that have been chosen can be seen in the table below:

Organizational form	Case
Free market	Rotterdam
Bike sharing system by the public transport operator	The Hague
Licensing system with a single provider	Utrecht
Inclusion within the public transport concession	Dordrecht, Molenlanden & Gorinchem-concession (DMG)

The context of all cases and the involved stakeholders will be set forth in the next paragraph.

3.3 Case description

3.3.1 Rotterdam

The city of Rotterdam is the second largest city of the Netherlands with around 635.000 inhabitants. Rotterdam is located in the province of Zuid-Holland on the southern flank of the Randstad. Together with the Hague and Amsterdam, Rotterdam is one of the three cities in the Netherlands that is allowed to grant the public transport rights by way of limited

tendering. This results in the fact that the Rotterdamse Elektrische Tram (RET) has hold the rights for providing public transport in the city for a long time now. The provided services of the RET do not stop at busses, but also include trams, metros and ferries. The former trainline from Schiedam to Hoek van Holland (the Hoeksche Lijn) has also been granted to the RET by the MRDH in 2017. This was done to expand the metro network of Rotterdam, which means that the former train tracks had to be electrified, which will be finished in 2021. After being part of the municipality of Rotterdam for over 80 years the RET became an independent company in 2007, but all its shares are owned by the municipality of Rotterdam. Another thing that is the same between Rotterdam and The Hague is the fact that the MRDH is the public authority that is responsible for the public transport. Rotterdam was the first city in the Netherlands to implement the shared bikes from the fourth generation, as identified by DeMaio (2009). In 2017 already four shared bicycle providers were active in Rotterdam, namely: oBike, Gobike, Donkey Republic and MoBike. Residents of the city however, were not happy about the arrival of all these shared bikes. These bikes were said to make the streets messy and their image became worse and worse. Because the municipality of Rotterdam did see a lot of benefits of these bikes they determined they wanted to keep them. That is why the municipality put a trial period in place for the providers. From February 2018 the shared bicycle providers had the chance until the 1st of August 2018 to show that they could reduce the amount of nuisance their bike produced. During this trial, the municipality were authorized to remove any bike of these companies that was parked incorrectly. In August of 2018 one of the biggest nuisances to the inhabitants of Rotterdam, the Chinese company oBike, went out of business and thereafter left the city. In part due to oBike, the shared bike had a bad image in the city and because the city still believed in the good impacts that the bikes could have, they tried to enhance the image of the shared bicycle. They also made dedicated bike parking facilities across the city and especially at two large train stations. The efforts to improve the image of the shared bike were combined with the announcement of the municipality that as of the 1st of January 2020 bike sharing providers need to have a permit from the municipality to offer shared bicycles. This was done to get a better grip on the bikes and the companies that operate them.

3.3.2 The Hague

The city of The Hague is the home of the legislative power in the Netherlands and the 3rd largest city in the country with more than 500.000 residents. The Hague is located in the province of Zuid-Holland, on the southern flank of the Randstad. The Hague is one of the three cities that are allowed to grant the public transport rights by way of limited tendering. They do this to the 'Haagsche Tram Maatschappij' or HTM. The HTM is a company that is currently for 100% owned by the municipality of The Hague, but the metropole region of Rotterdam and The Hague (MRDH) has a share that gives them special rights. The HTM is responsible for all trams, busses in the municipality of The Hague and for the Randstadrail-

connection to Zoetermeer. These public transport concessions are all the responsibility of the MRDH and they will be seen as the public transport authority in this research.

In the city of The Hague, the phenomenon of shared bicycles is relatively new, especially compared to the neighboring city of Rotterdam. In March of 2019 the municipality of The Hague started with an experiment on a large scale. The municipality has chosen five parties that have the 'monopoly' to supply the city with shared mobility services. There are three companies that offer regular shared bicycles (Mobike, GoAbout and HTM). This means that the HTM is not only the public transport operator, but they also provide a bike sharing service themselves. The other two providers are Cargoroo and Felyx. They are respectively a provider for shared cargo bikes and a provider of shared e-scooters. The municipality of The Hague has made a couple of clear rules for the five providers (Gemeente Den Haag, 2019):

- Parking rules for shared bikes are the same as those for regular, private bikes.
- Every provider starts with the determined amount of vehicles
- Every provider has set locations for renting and handing in the vehicles
- The providers have to make sure that vehicles do not stay long at places where they will not be used.

3.3.3 Utrecht

The city of Utrecht is the fourth largest city in the Netherlands with around 345.000 inhabitants. The city is located in the province of Utrecht and on the northern side of the Randstad. The city's main railroad station is the biggest train hub in the Netherlands. By law, the public transport in Utrecht is allowed to be granted by way of limited tendering, but this is currently not being done. The busses and trams in the city are operated by Qbuzz. Qbuzz is a former daughter company of the Dutch Railroads, but after a scandal the company is now under Italian ownership. The company operates all the public transport in the city of Utrecht under the brand of U-OV. This concession was granted by the Bestuursregio Utrecht (BRU) but since Qbuzz became active in Utrecht, the BRU has ceased to exist. Since the dissolution of the BRU, the province of Utrecht has taken over the role of public authority responsible for the public transport in the city.

The city of Utrecht has long held off on the arrival of bike sharing in the city. Providers of shared mobility services got the possibility to present their plans for shared mobility in the city and only a couple providers would be allowed to realize their plans. Currently there are only two bike sharing systems active in the municipality of Utrecht. Donkey Republic has its system spread out over the whole of the city, while GoAbout focusses on the campus of the university of Utrecht (the Uithof) and the area in and around business park De Wetering.

3.3.4 DMG-concession

The DMG-area is an area that is located at the south side of the Randstad in the province of Zuid-Holland. Dordrecht is the city with most inhabitants (around 120.000) which is located in this area. Other cities within this area are: Alblasserdam, Gorinchem, Hendrik-Ido-

Ambacht, Papendrecht, Sliedrecht and Zwijndrecht. The region of the concession however, is split up in several islands by the multiple rivers that cross the area. This brings certain challenges with it in regard to mobility and a relative reliability on bridges to cross the rivers and go from island to island.

Since 2007 Arriva provided the public transport (bus and one trainline) and did this quite successful as the amount of bus kilometers made in the area rose with 48% and the amount of train kilometers increased with 53%. To provide a last mile solution for public transport travelers in the city of Dordrecht, Arriva worked together with German shared bicycle provider NextBike to set up a bike sharing network in the city.

However, when the concession expired in December of 2018, Arriva lost the tender to public transport operator Qbuzz. This tendering process was one of the first 'ketenconcessies' in the Netherlands, which resulted in the fact that Qbuzz also offered to implement a bike sharing system in the concession-area. As a start, Qbuzz took over the NextBike system that was previously operated by Arriva. In the following months the amount of rental stations of NextBike in Dordrecht was expanded and there are currently 12 bike sharing stations across the city. The transfer of the concession from Arriva to Qbuzz was one with a couple of huge changes. As in other parts of the country was also the case, also in the DMG-area a lot of bus lines were stretched way more than they used to be. These enormous changes were not implemented that well, which led to disapproval of the travelers. This stormy transition between operators made that Qbuzz first of all had to focus more on the core tasks they have, like letting the regular busses ride correctly. This made that the other chain modalities they had offered in first instance had to wait for everything to settle down.

Chapter 4: Cases

In the previous chapter all cases have briefly been introduced. In this chapter the results of the interviews will be outlined per case. The perspectives of the different stakeholders will be addressed individually so that distinction in the results can be made more easily.

4.1 Drechtsteden, Molenlanden and Gorinchem-concession (DMG)

Role	Organization	Contact
Public transport authority	Province of Zuid-Holland	Sebastiaan van der Vliet
Public transport operator	Qbuzz	Maurits Vink
Bike sharing system operator	NextBike	-
Municipality	Municipality of Dordrecht	Peter Vissers

As previously stated, per case four different stakeholders have been identified. As it sometimes was not possible to interview all the involved stakeholders, some perspectives will be better outlined and highlighted than others. Their perspectives have been distilled from the other conducted interviews.

4.1.2 Business perspective

An important distinction within this perspective is the fact that there are the perspective of the public transport operator and the perspective of the bike sharing operator.

Perspective of the public transport operator

The public transport in the DMG-area is provided by Qbuzz. Besides in the DMG-area, Qbuzz also provides the public transport in the city of Utrecht and the surrounding area and in the provinces of Groningen and Drenthe.

The province of Zuid-Holland, who were the concessioning authority in this case, gave the 'ketenplan' of the tenderers a relative high weight. That is an important reason for why Qbuzz offered an extensive 'ketenplan' which included a bike sharing system, flexible busses and flexible transport by way of electric golf carts, among others. The vision of Qbuzz is that as they are a classic public transport provider and that providing these traditional forms of public transport is what they should focus on. This means that Qbuzz only provides the bus transport and the trainline that falls under the DMG-concession and they use subcontractors to operate the extra chain modalities for them. Qbuzz says that they do not have the necessary expertise to run systems like this and therefore subcontracting parties that are more experienced with a certain system. For example, for their flexible bus system, Bestelbuzz, they subcontracted local taxi services, as they are more experienced with such a system. That is also the reason of why Qbuzz has chosen NextBike, a German bike sharing provider, to run the offered bike sharing system. In their turn Qbuzz makes sure that all

these services provided by the hired subcontractors will connect to the bus and train schedule and can be recognizable by travellers. This means that Qbuzz takes a more hands-off approach with regard to the additional chain modalities.

The current concession for the DMG-area is only active since December of 2018 and the transition of the concession from Arriva to Qbuzz did not go as smooth as the involved parties had wished. During the first months of the concession the technical equipment of Qbuzz would regularly malfunction and bus drivers did not always know their routes. According to Sebastiaan van der Vliet (personal communication, 2019) this led to a primary priority on fixing the issues at hand and a lesser priority on the extra chain modalities that the company had offered initially. These chain modalities were in place however, because of good arrangements with the subcontractors that the company had made ahead of the transition of the concession.

Perspective of the bike sharing provider

Because of the fact NextBike, the bike sharing provider in the DMG-area, could not be interviewed their perspectives on integration into the public transport concession can not be determined completely. But through the other interviews in relation to the DMG-concession some insights into their perspective can be determined.

NextBike is only active in the Netherlands in Dordrecht and Maastricht. This means that their Dutch network is quite small. According to Sebastiaan van der Vliet of the province of Zuid-Holland the bike sharing market was not large enough in Dordrecht for a system to be set up on their own. But because Arriva saw an opportunity for bike sharing in relation to their bus operations they partnered with Nextbike to set up a bike sharing system in Dordrecht. This partnership with Arriva was formally not integrated in the public transport concession. Only after Arriva lost the DMG-concession to Qbuzz and Qbuzz took over the Nextbike network and it became integrated into the public transport concession.

In the current situation NextBike and Qbuzz are together responsible for the realization of the sharing stations. These however have to be applied for at the municipality because of the strict APV of Dordrecht (see paragraph 5.1). This means that the realization of new stations is not that flexible, even though the municipality is not that strict when dealing with these applications, according to Peter Vissers of the municipality Dordrecht. Vissers also states that his overall experience with Nextbike is positive and that they generally listen when the municipality receive complaints about the bikes.

4.1.3 Perspective of public authorities

Perspective of the municipality

The municipality of Dordrecht has played an important role in the realization of the NextBike-system that is currently deployed across the DMG-concession. The municipality sees an important role for shared mobility solutions in the mobility transition and were therefore interested when Arriva suggested to roll out their NextBike system in the city.

Before the arrival of the NextBike-system, Dordrecht were already looking for a way of making an open market model work in the city. But when talking to cities which already had shared bicycles, they realized that they would most likely heavily needed to subsidize such a system, which were something they were not willing to do. For the pilot with NextBike however was no municipal subsidy necessary as in the concession was a budget included intended for experimental innovations.

After a year of the bike sharing pilot with Arriva, Arriva lost the concession to Qbuzz, which offered to take over the bike sharing scheme from NextBike. This process went in good harmony between the two companies and according to Peter Vissers of the municipality Dordrecht, the consumer hardly noticed the switch of operator.

Vissers states that the municipality is generally satisfied with the cooperation they have with the other stakeholders. Every six weeks all stakeholders have a meeting in which they evaluate the things that happened, the user numbers and for example, look how they can expand in the future. With regard to the expansion of the system, Vissers would like to see the system being expanded to the rest of the Drechtsteden-regio. They have a partnership with a number of municipalities that all fall under the DMG-concession and it would therefore be possible to expand the NextBike-network to these municipalities. Up till now this has not happened, and this is these municipalities have the complete autonomy over their territory when it comes to shared bicycles. Vissers expects that the other municipalities do currently not experience the same regional advantages that expansion of the Nextbike-system could possibly have.

In general, Vissers is satisfied by the way the NextBike-system is currently organized and thinks that the fact that it is organized via the concession takes some load of the shoulders of the municipality and lessens their work load. One of the things that Vissers is skeptical about however is the fact that the concept of Mobility-as-a-Service is the responsibility of Qbuzz. Vissers however thinks that Qbuzz will not completely be impartial in their development of the MaaS-platform and guide consumers most likely with their own busses and trains. To eliminate this appearance of partiality Vissers would have rather seen that a more impartial party would have overseen, for example the Verkeersonderneming.

Perspective of the concessionary authority

The province of Zuid-Holland is the authority that is responsible for the DMG-concession. This means that they are the one that are the initiators of the 'ketenconcessie' in the DMG-area. The province incentivized tenderers to let their imagination run wild and try and offer the best door-to-door travel. The province tried to do this by granting a relative high value to the tenderer's plans for providing the entire chain of mobility.

The reason for the province to ask their tenderers such a thing, was the fact that they saw that the public transport, especially in rural areas, did not function optimally. This meant that bus lines would most likely have to be 'stretched' and the first- and last mile would increase in distance. That is why the province incentivized tenderers to make sure that also

this first- and last mile would be covered and keep public transport an attractive mode choice, even in rural areas. Another reason why the province wanted these other modalities realized by way of a concession is because it did not see them come by initiative of the market parties themselves. Van der Vliet thinks that the lack of students, who in his eyes are more like to experiment, makes that bike sharing providers are not that interested in setting up a network in Dordrecht and the DMG-area. Van der Vliet sees an important user base along this demographic and without them he thinks it will be harder to make the business case profitable.

Eventually the province determined that Qbuzz had the best offer for the entire mobility chain. However, the switch from the former operator, Arriva, to the new operator, Qbuzz, did not really go as desired. Sebastiaan van der Vliet of the province Zuid-Holland, thinks that these problems were partially caused because of the large changes that had to be made, mostly focused on the stretching of bus lines. These problems made that the focus of both Qbuzz and province was on solving the basic problems and making sure that the backbone of the system, the busses, drove correctly. Van der Vliet thinks that because of the chaos in the first months of the concession, the NextBike-system and its expansion moved to the backburner.

Although the transition has not gone as smooth as was desired, Van der Vliet is very positive about the way all the stakeholders worked together in creating the 'ketenconcessie'. The municipalities were very constructive and according to Van der Vliet this is one of the main reasons why it turned out to be possible to accomplish such large changes.

4.1.5. Conclusion

The overall experiences with the new 'ketenconcessie' seem to be quite positive from all sides, even though the transition of public transport operators could have gone better. The bikes of NextBike were also not that impacted by the messy transition from Arriva to Qbuzz as good arrangements had been made by both operators and between Qbuzz and NextBike. The expansion of the NextBike-network however seems to be an interesting point as there seem to be differences in the expectations of the province and the plans of Qbuzz. Where the province seems to have the impression that the shared bikes will be rolled out across the entire DMG-area, Qbuzz gives the impression that they are more than happy to keep the NextBike stations only to Dordrecht and possibly expand to some of the other 'Drechtsteden'. The province has however incentivized Qbuzz by including possible extensions to the contract when Qbuzz invests heavily continuing to develop the entire mobility chain. If Qbuzz do this, they can get seven extra years added on to their concession period, on top of the eight years that the original concession takes.

4.2 City of The Hague

Role	Organization	Contact
Public transport authority	MRDH	Simon Ceulemans
Public transport operator	HTM	Cindy Vrolijk
Bike sharing system operator	HTMBike and GoAbout	Cindy Vrolijk & Jacco Lammers
Municipality	Municipality of The Hague	Ronald Michels

4.2.2 Businessperspective

Perspective of bike sharing operator

The municipality of The Hague has set up a pilot with five providers, which aims to create an empirical basis for their policy on bike sharing. Two of these involved providers are: GoAbout & HTMBike.

GoAbout is a privately-owned company that besides its own bikes, also has its own MaaS-platform. The company is active in several cities across the Netherlands. One of the founders of the company, Jacco Lammers, said that they were quite surprised when the municipality of The Hague brought out a press release in which they were named as one of the participating providers in the pilot of the city. According to Lammers, GoAbout was still in consideration when the municipality included their name in the press release. On top of this, the press release did not mention one of the eventual participants, the HTMbike. Lammers had fundamental objections to the inclusion of the HTMbike within the pilot, as the HTMbike is a commercial endeavor of the public transport provider of The Hague, the HTM. As the municipality of The Hague is major stakeholder in the HTM, GoAbout felt that they had to compete against a 'state-owned company'. That is one of the reasons that the fleet of GoAbout in The Hague is still just 10 bikes, when they are allowed to place more than that. Another reason for the fact that the expansion in the Hague is lagging behind is the fact that the company wants to focus on the shared bikes on the last mile. This focus works the best when you have reserved places for your bikes on train stations that are close to the entrance to the station. Lammers states that they need these 'good' places, otherwise it will cost them too much money. These reasons combined made them decide to keep a wait and see attitude to the bike sharing market in the Hague.

The other highlighted participant of the bike sharing pilot of the Hague is HTMbike. As mentioned above, HTMbike is a commercial offspring of the public transport operator HTM, which shares are almost completely owned by the municipality of the Hague. The HTM wanted to offer extra service to its travelers, by offering services that will cover their last mile. After a thorough market research, the HTM saw a possible interesting opportunity in bike sharing as a last mile solution on their tram- and bus stops. That was a reason for them to talk to the municipality of the Hague about setting up such a system. However, the

municipality had not set up a policy on bike sharing in the city and had therefore banned all bike sharing companies from the city. The result of the talks between HTM and the municipality was eventually that the city wanted to set up a pilot to empirically gather input for the licensing system they wanted to implement in the beginning of 2020.

This outcome was however not exactly how the HTM would have liked to, as they would rather see them be the sole provider of bike sharing in the city.

Vrolijk did note that the bikes of HTMbike are often the subject of theft and vandalism, relatively more than bikes of other companies. Vrolijk attributes this higher count of vandalism to the fact that the HTMbike-stations are located more in the 'bad parts' of town. Where other systems are mainly not active in these parts of the city.

From the perspective of the providers of the bike sharing systems it seems that the outcome that the city of the Hague has employed is not as they would have liked to. The participating companies have to oblige however, because if they do not want to cooperate with the municipality, they will not get access to one of the biggest markets in the Netherlands.

Perspective of the public transport operator

The public transport operator in the Hague has a special position, as it is not only the company responsible for the public transport, but its daughter company is also active as a shared bicycle provider in the Hague. The philosophy of the HTM is that they want to offer the whole chain trip to the consumer, across the Hague. The previous two years the HTM has done market research to see what the consumer would like to have and how the HTM could offer this. The initial idea of the HTM was that they would place bike sharing station in the HTM-identity on their tram- and bus stops. In their talks with the municipality this turned out to be too difficult to realize and that is why they opted for the current form. As they are currently a part of the pilot of the Hague, they are not in the position to change a lot on their system, but they are looking for an expansion to neighboring municipalities.

The HTM sees the realization of bike sharing not really as a something that is desirable. The current development of shared bikes is a good example that in the Hague the bike sharing market can develop independently from the public transport and does not need to be controlled in such a way. The role they see for municipalities is that they need to set frameworks and limitations to make sure that the public space is not influenced or harmed in a significant way. For example, municipalities should place limitations on the number of providers that are active in a city or what should be done when the bikes become a nuisance. When the frameworks are determined, companies can decide themselves if they would like to operate in this municipality. This means that they see the public authorities more as a facilitating authority and should not mix too much in the business side of things.

4.2.3 Perspective of Public authorities

Perspective of the municipality

As noted previously, the municipality of the Hague has set up a bike sharing pilot in the city that went live for the public in the spring of 2019. Ronald Michels, consultant of the mobility-department of the Hague, states that the pilot has the aim to collect empirical experiences with bike sharing systems. These experiences will help the municipality in developing their policy on bike sharing and their licensing system. The licensing system is currently scheduled to be in effect in the beginning of 2020. This licensing system means that only companies that have acquired a license from the municipality are allowed to offer their bikes to the public in the Hague.

Before the pilot was in place, the municipality said they never had the need to ban bike sharing services from the city. Michels says that the providers that wanted to offer their bikes in the Hague were usually very cooperative. He says that providers see that it is in their best interest to cooperate well with the governments. Experiences in Amsterdam have shown that when companies do not do this the municipality can close the city entirely for all bike sharing providers, which of course is not what the providers would like to see. As Michels states: "it is in the best interest of the providers that the public opinion of them keeps positive". When organizing the bike sharing pilot the municipality purposely chose five operators who all have different approaches to shared mobility. GoAbout and Mobike are both bike sharing operators but Mobike is more generally oriented where GoAbout is more aimed at commuters. The HTM-bike is aimed at the travelers of the public transport. The Cargoobike and the Felyx are a different kind as they are different vehicles than a classic bike. Cargoobike offers cargo bikes and Felyx is a startup that offers electric scooters for the residents of the Hague.

Perspective of concessionary authority

The Metropole region Rotterdam-the Hague (MRDH) is the authority that is responsible for the public transport in the metropolitan area of Rotterdam and the Hague. But in contrary to other concessionary authorities they did not have any involvement in the organization of the bike sharing systems in the Hague. But the MRDH sees it as something positive that the current bike sharing systems are being realized without their support.

Simon Ceulemans, policy officer at the MRDH, currently sees themselves as having a facilitating and connecting role in the field of bike sharing. The organization is often involved in conducting research or being part of project groups of projects involving bike sharing. However, the MRDH has two implementation organizations, Bereikbaar Haaglanden for the The Hague-region and De Verkeersonderneming for the Rotterdam-region. According to Ceulemans, almost the whole topic of bike sharing is passed on to these implementation organizations.

However, Ceulemans also states that the MRDH is currently questioning whether they should take another role in the process. It is however difficult for the MRDH as they are not the managing authority of any land, as this is all done by the municipalities in their area. This fact makes it for them harder to take a role different of that of a connector and a facilitator.

To the question whether the MRDH is also thinking about something like a ‘ketenconcessie’, Ceulemans stated that they are currently in talks with the HTM about setting up additional transport services, so they can offer a trip from door-to-door. He also states that he thinks that when it is socially desirable for certain bike sharing systems or locations to be realized by the market does not act on this desire, that public authorities should offer money or give subsidies to a provider to organize such a thing. Ceulemans is however not completely sure what the best way to do such a thing is, as both in the concession or by another way are valid options in his view. But at the moment the MRDH is yet to include chain modalities within their concessions.

4.2.4 Consumerperspective

According to Cindy Vrolijk of HTM, the current usage figures of the HTMbike are according to the prognosis that the operator made beforehand. In this prognosis HTM naturally has taken the start-up period into account and the fact that travelers need to get to know the new system. As the mother company of HTMbike is the public transport operator of the Hague, it is not surprising that the company focusses its advertisement on the travelers in public transport and only have drop zones at tram- and bus stops. If the system also leads to higher numbers of travelers on certain stops is yet to be researched, mainly because the system is not live that long.

An important way to make the bike sharing systems more attractive to the public is to make them interoperable, for example by having them all in one application. For the municipality of the Hague this was a very important criteria when admitting operators to the pilot. Companies had to be working and cooperating to the open bike standard or an equivalent initiative.

4.3 City of Rotterdam

Role	Organization	Contact
Public transport authority	MRDH	Simon Ceulemans
Public transport operator	RET	-
Bike sharing system operator	Donkey Republic	-
Municipality	Municipality of Rotterdam	Bart Christiaens

4.3.2. Business perspective

Perspective of the bike sharing operator

Currently there are a couple of bike sharing operators active and these operators have a combined 2.000 bikes in the city. Besides the operators that have regular bikes, GoBike provides Rotterdam with e-bikes and Felyx provides the consumer of Rotterdam with e-mopeds.

Currently all these providers work in relatively good cooperation with the municipality of Rotterdam. Most providers have regular meetings with the municipality and keep them up to date on any changes or expansion they plan to make. These operators do not have to contact the municipality for these sorts of things, but they know that a good cooperation between all stakeholders involved is important for them. According to Bart Christiaens of the municipality of Rotterdam, bike sharing operators want to cooperate well with the municipality, because they all know that it is in their own best interest that the image of shared bikes is positive. Providers in Rotterdam know this best as the previous struggles with oBike, brought the public opinion of shared bikes in the city to a low point. But after oBike went out of business and all oBikes were removed from the city and e-moped provider Felyx arrived, Christiaens noticed the public opinion become more positive. This is also the reason why most providers are positive towards the upcoming license model that Rotterdam will get in 2020. This system needs to make sure that only good quality providers are active and keep the image of bike sharing among residents of the city positive, which will have a positive impact on the business of the bike sharing providers.

For some providers business is currently good enough that they are expanding their current systems. According to Christiaens the providers do this after careful deliberation and more often than not, after deliberation with the municipality. This is contrary to early operators which sometimes just dumped the bikes in the city, without a good plan about which locations they would serve.

Perspective of the public transport operator

The RET is the municipal public transport operator of the municipality of Rotterdam. Besides the operation of busses, they also operate tram and metro lines and a ferry service.

According to Bart Christiaens, the RET has a slightly apprehensive attitude towards their collaboration with bike sharing operators. They see themselves more as the company that provides the city of public transport and are not very actively searching for affiliation with bike sharing operators. According to Christiaens, they see a lot of bike sharing activity across the city and they have conversations with providers, but this has not resulted in a collaboration of some sorts. The only example of any collaboration is when one of the metro lines was under construction in 2018, travelers could use Mobikes to continue their journey by bike, but this was only during the two weeks that the metro line was under construction.

4.3.3 Perspective of public authorities

Perspective of the municipality

Rotterdam was one of the first cities in the Netherlands with a bike sharing system and the municipality has always used the free market model when it comes to shared mobility providers. But after recent experiences with oBike, among others, the local legislature wanted to get a better grip on the providers when they bring nuisance to the public space of the city and its residents. That is why, starting in 2020, the city will enforce a license system for shared mobility providers. This means that providers of shared mobility in any form imaginable, has to receive a license from the municipality to be allowed to offer their services in the public space of Rotterdam. The entry requirements however are relatively low, as the municipality does not want to hinder providers in such a way that they would no longer like to offer their services in the city. Currently not every detail of the licensing system is fully worked out, but according to Bart Christiaens of the municipality of Rotterdam, one of the things the municipality wants to limit is the number of vehicles that are allowed in the city. The municipality does this by capping the number of vehicles and using a 'first-come-first-serve system'. If the maximum number of vehicles of a certain mode is reached, no more vehicles of this mode are accepted by the municipality. When providers breach this, or any other, rule the municipality has the right to retract the provider's license, which means the company in question can no longer do their business in the city.

The municipality is still very keen on the potential societal benefits that bike sharing can have on Rotterdam. The city is especially focused on the possible effects of bike sharing on the public space and how it might save space, especially when it comes to parking spots for bikes. The combination of public transport and (shared) bike is also something that the municipality is actively seeking to strengthen. That is why the municipality is hoping the the RET is going to look for more cooperation with shared mobility providers in the city.

When it comes to a 'ketenconcessie', Bart Christiaens thinks that a distinction needs to be made between urban and rural areas. Christiaens thinks that in urban areas tenderers should be challenged to give their vision on shared mobility. Tenderers should get a good grasp on the current situation in the city and base their ideas on that, but concessionary authorities should not demand a certain number of bikes at each bus stop, according Christiaens. Christiaens is of the opinion that the entire trip chain should not be a quantitative measure, but a qualitative one that concessionary authorities need to judge tender offers on.

Perspective of concessionary authorities

As in The Hague, the MDRH is also the concessionary authority for Rotterdam. The approaches of the MRDH towards both the cities is more or less the same. The MRDH is quite hands-off when it comes to shared mobility and forwards most questions or requests with regard to the topic towards their implementation organizations, which is de Verkeersonderneming in the case of Rotterdam. The Verkeersonderneming however had a hand in the bike sharing market in Rotterdam. In 2014 they set out a tender, which was

eventually won by the shared e-bike provider Gobike. Apart from this endeavor there are no real involvement of the MRDH in the shared mobility market.

Like in the case of the Hague, the MRDH is exploring possibilities to change their role when it comes to bike sharing.

4.4 City of Utrecht

Role	Organization	Contact
Public transport authority	Provincie Utrecht	Jeroen Golstein, Gijs Knegtel & Herbert Tiemens
Public transport operator	Qbuzz	Maurits Vink
Bike sharing system operator	GoAbout & Donkey Republic	Jacco Lammers
Municipality	Municipality of Utrecht	Freek Deuss

4.4.2 Businessperspective

Perspective of the bike sharing operator

As is the case in the Hague, GoAbout is also an active company in Utrecht. The situation of them in Utrecht has changes over the last year however. The start of GoAbout in Utrecht was as a way to increase the accessibility of Utrecht Science Park, the campus of the university and hospital. They eventually did not want to be the one to provide the bike, but they saw themselves no other choice as they found no other companies that would wanted to share bikes in a way that they saw fit. As the municipality of Utrecht had banned shared bikes from their city, all bikes and stations were on property of the university, the hospital or other municipalities. Besides on the Utrecht Science Park, GoAbout was also asked to provide shared bicycles by the companies located on business park 'De Wetering', on the west side of Utrecht. The management of the public space on De Wetering was informally transferred to the companies that are located on the park. The GoAbout-system on De Wetering was tolerated by the municipality as they thought it to be too much trouble for them to remove the bikes. Especially the system on De Wetering is seen by GoAbout themselves as a success and they seem to like to want to continue it.

The announcement of the municipality that they were going to write out a tender for one provider to organize a bike sharing system for the entire city came out of blue sky to Jacco Lammers of GoAbout. GoAbout were thinking about expanding their network across the city, but they were of the understanding that the municipality would not want that, so they did not do anything. Lammers says that they apparently misread the ambitions of the municipality and that is them to blame for.

GoAbout submitted an offer to the tender the municipality wrote out, but eventually did not become the chosen provider, which was Donkey Republic. Also, because the municipality is legally not able to remove the bikes of GoAbout, both systems have to coexist next to each other. Currently there is no real collaboration between both providers and there is a regular level of competition between the two providers. Lammers says that they are giving Donkey Republic the time to either fail or succeed. Eventually GoAbout would like to reach a formal collaboration between the two, in which the bikes of Donkey Republic are also available for rental in the GoAbout-app. Although Lammers expects that Donkey Republic is currently not willing to enter in such a collaboration.

As the winner of the tender process of the municipality of Utrecht, Donkey Republic are currently the holder of the practical monopoly of bike sharing in Utrecht. As their operation only went live in April of 2019, not many results have been public, but according to Freek Deuss of the municipality, Donkey Republic are currently doing 1/3 trip per bike per day. For reference, in Copenhagen Donkey Republic records 5 trips per bike per day, which they think is reachable when their system in Utrecht will work really well.

Donkey Republic is doing their best to develop their market in a positive way. When local businesses are interested in having a station near their office or replacing their office bikes by Donkey-bikes, they have constructive talks to see if it is possible to realize such a thing. Another example is the fact that at first the only way possible to pay was by credit card. As in the Netherlands not everyone has a credit card, in contrary to other Western-European countries (Schwab, 2019), Donkey integrated iDeal-payments into their app, which made them more accessible for the Dutch market. This positive attitude to development can count on approval of the municipality, which is happy with the fact that Donkey Republic is doing this.

Perspective of Public transport operator

Qbuzz is the company that is responsible for the public transport in the city of Utrecht and the surrounding area. The company conducts its business under the brand name: U-OV. Qbuzz does currently not offer any shared bicycles in their concession area in Utrecht, in contrary to the DMG-concession, where the company does offer shared bikes to their customers. According to Maurits Vink, transport engineer at Qbuzz, the areas are quite different. Utrecht is a large city, with a lot of potential travellers and a frequent bus network, while in the DMG-area this is not the case. This is the reason for Qbuzz not to offer any last mile solutions to their consumers. However, Vink states that if the province wants to include last mile solutions in their next concession and they trigger the operators they will most likely also offer last mile solutions. This last statement seems to show the general stance of Qbuzz: they will offer the last mile solutions when incentivized but will most likely not offer them out of their own initiative.

Besides the Qbuzz-concession, the province of Utrecht is also home to another concession. Operator in this area is Syntus and in their current concession they offered six bike sharing carrousel in the town of Leusden. The province had not included it in the original tender document, but Syntus still saw an opportunity to compensate two stretched lines in Leusden by offering these six 'KeoBike-stations'. Although these stations are not in the city of Utrecht, it shows the different views the operators have with regard to their concession area.

4.4.3 Perspective of public authorities

Perspective of the municipality

In the city of Utrecht, the municipality has a large role in the current bike sharing system in the city. Until the beginning of 2019 the city had actually banned bike sharing providers from the city. The existing system of GoAbout on Utrecht Science Park was all organized on property of the university, hospital or other municipalities. In 2018 the city decided it saw potential for a bike sharing system in the city and decided to set up a tender to pick one provider for the entire city. The eventual winner of the tender was the Danish provider Donkey Republic and they got the practical monopoly to operate a bike sharing system in the city of Utrecht until the end of 2020. The actual monopoly however is not guaranteed as the municipality claim they do not have the legal tools to fend off any other providers from entering the market. According Freek Deuss, the project lead for the bike sharing system of Donkey Republic for the municipality, other companies will however honor the 'monopoly' of Donkey Republic as it is important for providers to do their business in good harmony with the municipality, as a good cooperation with the municipality can make rolling out a system a lot easier.

According Deuss, the main goal of the pilot of the municipality is to see if and how shared bikes can be of use for the city and its inhabitants. To get a conclusive answer on these and other questions the municipality has partners within the Smart Cycling Futures-consortium that will evaluate and research the pilot and its effects. The university of Utrecht has a good amount of research capacity dedicated to doing this and Deuss states that he likes the enthusiasm and dedication of the researchers. The results of these evaluations and researches will help form the future policy and perspective of the municipality on bike sharing.

The municipality is currently very satisfied with the collaboration with Donkey Republic up till now. According to Deuss, Donkey Republic reacts quickly on reported nuisance by their bikes. Although the nuisance is not often, when the municipality receives a report of nuisance, Donkey Republic has the station in question removed by the next day. Deuss is also satisfied with the proactive stance of Donkey Republic in developing their network, application and collaborations with interested partners. This proactive attitude however does not come with a fast speed of realization of these ideas.

The one main issue Deuss has with the current pilot is the fact that new developments are not realized in the desired pace. But the reason for this seems to be shared as the internal coordination of the municipality is also not fast with these sorts of things, but also some of the development of Donkey Republic seem not to come as fast as Deuss would like.

With regard to the bikes of GoAbout, Deuss does not exactly know what the municipality can do with them. As mentioned previously, the municipality does not have the legal tools to remove bikes or remove GoAbout from the city, which the municipality also does not really want to do as the GoAbout-bikes are not really a nuisance to the public according to Deuss. Deuss also says that the contract and GoAbout and the university is almost up, which means that the future of the system at Utrecht Science Park is somewhat in jeopardy. It seems that the municipality will tolerate the GoAbout system for now and will not take action against them.

Overall, the municipality is quite satisfied with the way the bike sharing pilot with Donkey Republic is going up till now, but they are still awaiting the results of the several researches that will be done during the rest of the pilot phase. Also due to the fact that the pilot will run until December of 2020, the municipality does not have a clear view yet of the next steps with regard to bike sharing in the city.

Perspective of the concessionary authority

The public transport in the whole of the province of Utrecht is the responsibility of the province of Utrecht, this includes the concession of the city of Utrecht. The province did not have a large role in the creation of the bike sharing pilot of the municipality Utrecht, but it was one of the initiators of the GoAbout-system on Utrecht Science Park.

Currently, the province is looking into how they will organize their next public transport concessions. At the moment the province has two of them, with one of them being somewhat fragmented, the question whether to merge the two concessions arises. The concept of the 'ketenconcessie' is also something the province seems to be looking at, with regard to their next round of concessions, but according to Jeroen Golstein of the province Utrecht, they do currently not have any concrete plans. The lack of concrete plans is in part due to the new coalition in the provincial government. After the summer of 2019, the province will actively start looking forward towards their new rounds of concessions and start formulating the base for these new concessions that will start in 2023.

The province is more involved in the exploitation of the KeoBike in the 'Provincie Utrecht'-concession with the stations in Leusden, Mijdrecht and Ysselstein. This is because this system is exploited by Syntus and they offered these stations in their tender document for the public transport concession. Syntus offered these KeoBike-stations despite the fact that the province did not explicitly ask for them in their initial request for quotation. As some of

these stations did not have the expected/desired user numbers, the province, together with Syntus have tried to look for locations that would be better suited to the KeoBike-system. This concession of Syntus makes clear that the province has experience with bike sharing systems run by public transport operators, although these systems were initially not included in the concession.

4.4.4 Consumer perspective

From the perspective of the consumer, the Keobike-system and the Donkey Republic-system seem to differ quite a lot.

The Keobike-system does not seem to suit the demands of the customers as well as they should. Some locations of docking stations have not been thought through well enough which has resulted in low usage. After pressure from the province, their concessionary authority, Keobike looked to relocate some locations which seems to have resulted in higher usage.

The operations of Donkey Republic seem to be quite customer-oriented. When residents of Utrecht complain about docking stations that are placed incorrectly in their opinion, they will directly relocate these stations. Further, when Donkey realized that customers had trouble paying by credit card, simply because the ownership of credit cards in the Netherlands is lower than the EU-average, they added an option to pay by iDeal or PayPal. This shows the difference for consumers, on the one hand there is a provider that will listen to their concerns and will act upon these concerns, where on the other hand there is a provider that will only act after implicit nudging of their concessionary authority.

Chapter 5: Analysis

In this chapter the gathered data from all cases will be combined and the different views and opinions of the different type of stakeholders will be examined.

5.1 Municipalities

Between the municipalities that were included in this research are some large differences noticeable. Dordrecht is, for example, a lot smaller with its 118.000 residents, than the Hague, Utrecht and Rotterdam which are all at least twice as large as Dordrecht. What unites all the municipalities is their combined will of keeping nuisance out of their public spaces and keeping their cities livable for their residents and visitors. Keeping the city livable is both having a clean and navigable public space and keeping the city accessible for everyone. In some cases both things contradict each other. In the example of the municipality of Rotterdam for example, where the local residents were inconvenienced by the large amounts of shared bikes in the public space of the city. In such cases the municipality is placed in a dilemma between the question which aspect of a livable city is more important: the mobility of/in the city and the clean and free public space of a city. Some cities, like Amsterdam for example, thought that the public space was more important, when banning shared bikes from the city in 2017 (RTL-Nieuws, 2017). But Rotterdam clearly values the mobility aspect of shared bikes to such an extent that they do not want to ban them out of the city.

For some cities it is hard to find the balance between the advantages and disadvantages of the shared bikes. Besides that, they often do not possess the legal power to, for example, ban the bikes from their city. Freek Deuss (Personal communication, 2019), from the municipality of Utrecht, says that their current system means that their operator chosen by tender has a practical monopoly on bike sharing in the city. If any operator would want to set up a system in Utrecht, they legally can do so. According Bart Christiaens (Personal communication, 2019), of the municipality of Rotterdam, the same situation occurred when Amsterdam had banned bike sharing operators from the city. Christiaens states that if one of the operators would have gone to trial, the ban of the municipality of Amsterdam would most likely not have held up. Both of these examples show that the position of the municipalities is quite strange and that it seems that a strong cooperation with the operators is necessary to combat any nuisance from the shared bikes in their public space. The city of Dordrecht is currently having a strong cooperation like this, with its operator (NextBike). This cooperation is also legally necessary for the operator as the provision of shared bikes is banned by the local APV (Algemene Plaatselijke Verordening)³. This means that for every additional docking station Nextbike wants to create, they need the

³ The APV is a police regulation. In an APV the municipality can set rules to keep a city clean, safe and livable. When the rules of the APV are not obliged, it is seen as a punishable offense (Cultureel Woordenboek.nl, 2019). <https://bit.ly/2kLPPnm>.

municipality to change the APV. By organizing it this way, the municipality of Dordrecht has tried to limit the nuisance of the bikes.

The cooperation between both the municipality and the shared bikes providers is mostly positive. The only negative experiences one of the researched municipalities had was Rotterdam and their experiences with oBike. Besides the messy exit of the defunct Chinese bike sharing operator, the bike sharing operators see that a well-maintained relationship with is also beneficial for themselves. This attitude by the providers has allowed municipalities to use their 'soft power' to try and limit the nuisance of the shared bikes to a minimum. A good example of the use of soft power by municipalities is the fact that the municipality of Rotterdam has asked any new companies that want to provide shared mobility services in the city to come and talk with the municipality first. The municipality cannot force the companies to do so, but up till now every company that is contemplating expansion into the Rotterdam-market has had one or more talks with the municipality to discuss their possible expansion plans into the city. The fact that these companies do this, even when they do not have to, shows that both municipality and shared bike provider want this positive, constructive relationship between the two.

To the question whether the bike sharing services should be included in the public transport concession, the answers of the municipalities differed somewhat. Maybe most predictably, the municipality of Dordrecht was currently very content about the way their current bike sharing system is organized (in the public transport concession). Peter Vissers of the municipality thinks that it would be less likely a bike sharing system would be in the city when it was not organized through the public transport concession. He states that the population of the city might not be as 'progressive' as for example that of a city like Rotterdam. Sebastiaan van der Vliet (province Zuid-Holland) thinks this is due to the lack of a higher education institution in the city, which means that there are less young, high-educated people in the city, who in his eyes would be more likely to use or set up bike sharing initiatives.

Cities where the bike sharing services were already active are more reserved in their willingness to include the shared bike in the public transport concession. The argument that Peter Vissers has for the municipality of Dordrecht is in their case not needed, so for them there needs to be another use for integrating both things. Bart Christiaens of the municipality of Rotterdam thinks that integration of shared mobility services into the public transport concession is not that useful for Rotterdam itself. Especially not the version of integration where the public transport concession prescribes the presence of a predetermined number of shared bikes at a specific stop. Especially in the crowded inner city of Rotterdam there is in some cases simply no space and according to Christiaens the municipality does not have the legal power to create the needed space for these services. Instead, Christiaens suggests that tenderers look for ways to connect with the active shared mobility providers in the city and see how they can improve each other. This creates a more qualitative approach to integration, instead of a quantitative approach. By giving the

tenderers for the public transport concession an incentive to cooperate with the shared mobility providers and come to a better integrated and better working transport system in the city. The municipality of The Hague has a pretty similar attitude towards the matter as Rotterdam has. They see both systems as separate entities and encourage integration of both systems, but do not see the one organizing the other as something beneficial.

This shows that there is a difference between municipalities and their approach. Where smaller municipalities with no existing shared bike system want a qualitative approach towards bike sharing in the public transport concession, larger municipalities where the shared bike has already arrived prefer a qualitative approach, where the integration of both systems does really add something to the transport system in the city.

5.2 Concessionary authorities

The concessionary authorities are eventually the ones determining how the public transport concession looks. They always have the final say in choosing the provider who wins the tender and set up the rules and conditions for the tenderers to hold themselves to. But when it comes to the question whether shared bikes need to be integrated in the public transport concession, all concessionary authorities seem to have a lot of questions.

The concessionary authorities are in a difficult position with regard to this question, because the public transport system is on another level than bike sharing systems. Where public transport is organized by them, the bike sharing systems are mostly organized on municipal level (either with or without help from a concessionary authority). This means that the integration of both systems is hard to realize without cooperating municipalities and civil servants of these municipalities. Sebastiaan van der Vliet of the province Zuid-Holland has great experience with this. When setting up the DMG-concession, the province had a lot of help in this process of pro-active and cooperative civil servants from municipalities all across the concession-area. On the other hand, he notices that when civil servants in an area are not cooperative, it is very hard to accomplish change, which eventually means that change will not be accomplished. The dependence of municipalities in the area is not the case when talking about the cooperation of civil servants, but municipalities are also the ones that have control over the public space of their own municipality. But this public space is where the bike sharing services have to operate, which means that the concessionary authorities can often not act on their own, but have to cooperate with the municipality in question. This can make it hard for them, especially when the municipalities are not cooperative.

Van der Vliet also notices that the 'ketenconcessie'-approach is currently working for the DMG-area but says that differences need to be considered and what works for the DMG-area will not necessarily work for another area. The three concession-areas of the province Zuid-Holland will therefore all be looked at separately and the fact that the DMG-area currently has a 'ketenconcessie', does not mean that the other two areas (Zuid-Holland Noord and Hoeksche Waard/Goeree-Overflakkee) will therefore be a 'ketenconcessie'. But

the experiences with the 'ketenconcessie' will of course be considered in the forming of the other concessions.

The other concessionary authorities that currently do not have any experience with organizing and coordinating a 'ketenconcessie' are very much doubting their role and are looking at ways to fill in their next concessions. The MRDH especially is putting into question their own approach to the upcoming shared bike services in their area. Currently they put all incoming questions towards their implementation organizations, but they are thinking of taking more control over this process. They are thinking about a shift from a market-initiative focused approach, towards an approach that is more focused on initiative from the public sector. This possible shift of attitude seems to be mainly fueled by the smaller municipalities and other areas that are currently not being served by the shared mobility providers. The MRDH wants to make sure that these areas are going to be served as well, but they are of the opinion that this will not be the case in a market-led market.

The answer whether shared bikes should be included in the public transport concession from the perspective of the concessionary authorities is not that clear. Authorities that currently have experience are influenced by this experience. Where the province of Zuid-Holland has had positive experiences with the DMG-concession and is therefore relatively positive towards the integration of both services, the province of Utrecht has had mixed experiences with shared bikes operated by the public transport operator and are therefore a little hesitant towards this integration. The one interviewed concessionary authority with no current experience with shared bikes in the public transport concession, the MRDH, seems to be doubting to tackle this topic. But this doubt seems to be the best summary of the current attitude of the concessionary authorities when it comes to the question at hand.

5.3 Public transport operators

A clear difference in the approach that the public transport operators have when it comes to the integration of shared bikes in the public transport concession is that on the one hand there is the attitude of using the shared bikes as a way to get their busses as full as possible. On the other hand, there is the attitude that sees the shared bike as a way of making money on its own. While both are progressive in the sense that they are looking further than just providing busses is the first attitude still focused on busses, while the other attitude is more focused at providing mobility for the traveler and this mobility is not necessarily one of the traditional forms of (public) transport. Both attitudes are fueled by the context that the operators operate the public transport in. While in (large) urban environments it seems financially feasible to operate a bike sharing system by yourself this is not the same in less urban environments. The attitude that is aimed at using shared bikes to realize full busses is fueled out of a context of bus lines which are 'stretched' and the increasing first and last mile that comes with this. To keep the public transport a viable travel option they need to offer options to bridge the first or last mile and the shared bike is one option they have to

do so. If they do not realize options to bridge the first/last mile they will most likely lose travelers as it will make the bus a less attractive option.

Within this last attitude there are still a variety of options for public transport operators to choose. They can still opt to set up their own bike sharing system. This is the route that for example Keobike or HTM have taken. Another option the operators have is to collaborate with bike sharing providers and let them provide the shared bikes to cover the first and last mile. This shows the two roles the operator can take in this process. They can take the role 'mobility provider' and themselves provide all the mobility services to the customer. The other possible role is that of 'director of the travel chain'. When choosing this role, the public transport operator only focusses on providing the traditional forms of public transportation themselves and all the additional modalities are operated by subcontractors of the public transport operator. This approach is often taken because the operators are of the opinion that they are the best at providing the traditional forms of public transport and that other providers are better at organizing those additional services. The public transport operator then takes the role of a director and makes sure that all services connect to each other in an efficient way. The aim of the additional services, like shared bikes, is then not to make money from these services themselves, but for people to use these services and then use the traditional forms of public transport. In this scenario the operator takes the gamble that the benefits of these additional services outweigh their costs.

5.4 Bike sharing provider

Something that has to be addressed when it comes to bike sharing providers is that their motives for provision of shared bikes is different than that of municipalities for example. For the providers it is their way of making money, which means that their proceeds need to exceed their costs. This fact is the most influential factor in the way this type of actor looks at the integration of bike sharing systems in the public transport concession.

The one thing that bike sharing providers have in common is the fact that they need the profits from their bikes to keep their business alive. When a provider gets a 'monopoly' in an area, for example the current situation in the municipality of Utrecht, this is easier as they do not have to compete with other competitors. But for companies that are not chosen to be the monopolist for a certain area, this feels like unfair competition. The same is the case for when a bike sharing system would be included in the public transport concession. This gives a certain provider a monopoly and with that an advantage towards their competitors. As the public transport concessions are for a large part subsidized by the government, shared bikes included in the concession will therefore most likely also be subsidized from this money. To other, competing, providers this feels like unfair competition. These 'subsidized' bikes are often also given the best locations at for example train stations, because they work closely together with the train operator. Travelers will see these bikes

more when they leave the station and are therefore more likely to choose these bikes over their competitors.

A sentiment that can be felt when talking to bike sharing providers is that they think that governmental intervention is often not necessary. As Jacco Lammers of GoAbout put it, initiatives that are economically feasible should not be subsidized, only the ones that might have a social value and are not deemed as economically feasible can be subsidized if a governmental authority deems it worth the money to do so. So, bike sharing providers are not completely against subsidizing with government money. For example, the case of the GoAbout-bikes at the business park De Wetering. The companies located on this business park give GoAbout a small subsidy to provide the bikes on the business park, because they would otherwise (not yet) be economically feasible.

As named previously, the bike sharing providers are trying to maintain a good relationship with the public authorities. They see it as necessary for them to maintain this good relationship and have a positive image for the authorities. This good relationship sometimes means that the providers have to make decisions that are not ideal for their company. For example, HTMBike originally wanted to roll out a station based system across The Hague. But because of the bureaucracy this would bring with it, they eventually chose to opt for a system with drop zones, which are located near the public transport stops.

The fact that the providers want to keep good relationships with the authorities can also have negative results for the performances of the businesses. For example, GoAbout was already active in the municipality of Utrecht (only at the Utrecht Science Park) and was thinking about expanding their system over a larger part of the city. However, they had the inclination that the municipality was not a fan of shared bikes because of the nuisance they would bring with them. So, GoAbout held of their expansion plans. This meant that when the municipality came with a quotation request for a bike sharing system for the whole city GoAbout was really surprised because they were still under the assumption that the city did not want such a thing. Jacco Lammers of GoAbout, states that he would have liked the municipality to come to them with their plans and see what both parties could have offered each other. This example shows that the providers still need to be proactive in their business activities and that a close (and well-informed) relationship with the public authority involved is important.

In conclusion, as the bike sharing providers are not that fond of governmental involvement, integration into the public transport concession does not seem like the most obvious or preferential choice. But this point of view can maybe also be categorized as jealousy towards 'the lucky few' who have managed to get their bikes integrated into the public transport concession.

Chapter 6: Conclusions

6.1 Conclusion and policy recommendations

This research has been conducted to answer a research question that is as follows: *To what extent is it desirable for bike sharing systems aimed at the last mile trip from bus stops to be included in the public transport concession?* Because of the qualitative nature of this question, the data to answer this question has been collected by conducting interviews with stakeholders that are of importance when it comes to public transport concessions and bike sharing systems. To create a sufficient variety in the conducted interviews four different cases have been chosen. In each case the way the bike sharing system is organized is different from the organizational structure of the other cases.

When looking at whether it is desirable to integrate a bike sharing system into the public transport concession it is worth looking at the views from the different kinds of stakeholders. When looking at it generally it seems that the public sector stakeholders (municipalities and concessionary authorities) were more positive about integration than the private sector stakeholders (public transport operators and bike sharing providers). A big influential factor towards the opinion of a stakeholder towards the 'ketenconcessie' is whether they already have experience with this form of concession. The stakeholders that currently have experience with the 'ketenconcessie' are predominantly more positive about the way of organizing the mobility. When the stakeholder, even the public stakeholders, do not have any experience with the 'ketenconcessie' themselves they are more apprehensive towards the concept, but are eager to learn from the current 'ketenconcessies'. This means that there are possibilities for 'ketenconcessies' to become more widespread when the experiences with the them continue to be positive.

Something that might need to be addressed is the current divide between the public and the private stakeholders. As the concessionary authorities are the ones that are responsible for the general contents of the public transport concessions, they are the ones that eventually determine whether they would want the shared bike or other last mile modalities in the concession. If the concessionary authorities do not have an adequate market consultation the supply and demand might not align. The drafting of the 'Programma van Eisen' needs therefore to be done very deliberately, to ensure that both supply and demand come together.

The most important takeaway from the interviews with all the stakeholders was the fact that a custom approach to each concession process is key. Every area or city is different and the context in all situations is different, which makes generalization difficult. A rule of thumb that can be used however is that in densely populated areas integration of the public transport concession and the bike sharing system needs to be addressed qualitative and in less densely populated areas a quantitative approach is possible. This is the case because in these densely populated areas there is economically feasible market for the bike sharing

systems. In this situation there is possibly no need for extra shared bikes, but the connection between public transport and the bikes might not be optimal. Using a qualitative approach and connecting the public transport operator with the bike sharing providers and creating a better transport chain might be a better solution in this case than looking for a new provider that is required to place a certain number of bikes at a bus stop.

The quantitative for less densely populated areas might be a better way because in these areas the market is probably less economically attractive for providers to place their bikes, because there are less people to use them. This means that placing a certain number of bikes at a bus stop is probably a better idea, because by doing this a new way to cover the last mile is created.

The main conclusion to answer the research question is that the concession process needs a certain amount of customization and that every concession area needs to be examined closely when thinking about the 'ketenconcessie' or the integration of shared bikes in the concession.

6.2 Reflection and recommendations for further research

When conducting scientific research, it is important to reflect on the research process and to give recommendations about possible improvements during the process and for further research.

This research was not without its complications. The originally chosen quantitative approach of determining the performance of bike sharing systems in public transport concessions eventually turned out not to be feasible, which meant a shift from a quantitative approach towards a qualitative approach.

Besides this unforeseen switch in research strategy, there were some other complications during the research. In some of the cases it turned out to be very difficult to get to speak with all the stakeholders as identified beforehand. Especially the bike sharing providers turned out to be hard to get in contact with. This outcome was beforehand identified as a risk and through the interviews with the other stakeholders in the case of the missing interviews it was still possible to get good insights into their approach and actions towards bike sharing and the public transport concession. Of course this is not the ideal solution but it did not lead to any substantial gaps in the gathered data.

A perspective that might be underrepresented in this research is that of the consumer. This perspective is purposely not taken into account that much because the consideration is that the consumer/traveler is probably not aware about the organizational structure of bike sharing system. Combined with the failure of the quantitative approach it was decided that for this research the 'consumer perspective' would not be taken into account. For future research it might be useful to look at the consumer perspective, although the fact that the organizational structure is very obscure to most of the consumers needs to be taken into account.

Another recommendation that might be useful for future research is that similar research might be done in a couple of years when the stakeholders have more experiences with the ketenconcessies and stakeholders involved in regular concessions have heard more of these experiences as well. The new insights and experiences with this form of concessioning might change the perspectives of the stakeholders and the outcomes of research might be completely different. That is why it is advised to replicate this research in a couple of years, or with other selected cases.

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