



From an institutional perspective: The untapped potential of B2C-car sharing

A research about institutional obstacles to business-to-consumer car sharing initiatives and how to overcome them

Master thesis

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Specialization in Urban and Regional Mobility,
Nijmegen School of Management

Radboud University

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June 2024

Colophon

The untapped potential of B2C-car sharing

A research about institutional obstacles to business-to-consumer car sharing initiatives and how to overcome them

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Version:	Final
Date:	26 June 2024
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Second reader:	C. Vitale
Keywords:	B2C-car sharing, institutional perspective, barriers, regulation, policy,
Wordcount:	25856 words

Preface

Dear reader,

In front of you is the thesis "*The untapped potential of B2C-car sharing*". Car sharing is a promising strategy to combat the livability challenges that are related to high parking pressure in inner cities. High parking pressure and the livability challenges that come with it, are often considered a strong nuisance by local residents. Little parking capacity in combination with relatively high levels of car ownership cause high parking pressure. A relief from this nuisance by car sharing services then would be theoretically something that has broad support among residents. Still, when you look in streets, close to city centers, several of them are full of parked private cars. Seeing streets like those, while car sharing has so much potential, makes me wondering what causes car sharing not be applied more broadly.

I wrote this thesis for my studies at Radboud University, where I was studying for the Master "Spatial Planning" with "Urban & Regional Mobility" as its specialization. This period of graduating preceded by a different period of thesis writing. The previous subject didn't suit me. Choosing a new subject has helped me carrying out the research with much more satisfaction. Still, the period had its challenges and I doubted if I was in the right direction. In the end it worked out for me because not only I expected some of the answers but also I considered some answers as enlightening which did me realize that the matter had more facets than I initially thought.

I want to thank my supervisor, Sander Lenferink, for accurate help and the pleasant conversations that I shared with him. He was easy to approach and available to answer my questions. I genuinely value that support. I would also like to thank the interviewees for their knowledge and for the provision of usable data.

I hope you will enjoy reading my thesis

Pjotr van der Laag

Nijmegen, June 2024

Summary

Large municipalities in the Netherlands (>150.000 inhabitants) face issues regarding car mobility challenges regarding high parking pressure that decreases livability standards in much of the neighborhoods where parking capacity in both the streets and at private spaces is relatively low in relation with the amount of vehicles per square kilometer. The expected population growth makes that large municipalities must make choices in challenges regarding the spatial planning of their neighborhoods. Car sharing is a promising tool to reduce the space that is required for parking cars as one shared vehicle can replace several private vehicles. Shared mobility can be an opportunity for private motorist to drive cheaper and to find a parking space more easily than with a private car. Though, car sharing is not applied widely as suitable alternative for car ownership and its potential is untapped, despite the ambitions some municipalities have. Although much research has been done about the success factors of car sharing, research that examines the structural functioning of institutions as a driving force behind policy and management processes at municipalities and car sharing providers has not been done yet. Therefore this research has been done from an institutional perspective where the variable are sought by analyzing both stakeholder's norms, roles and responsibilities. This study aims to provide further scientific knowledge on this matter with the main question:

What institutional obstacles underpin the untapped potential of B2C-car sharing in residential areas of large Dutch cities and how can these be overcome?

A conceptual model was created by combining the literature of Nansubuga & Kowalkowski (2021) and Jorritsma et al. (2021) as starting point from which other literature was sought. Additional scholars showed that various factors including active governmental steering, regulation in parking policies, market competition between car sharing and ownership are involved in the process of the organization of B2C-car sharing and the challenge to scale it up. This inductive research has grounded theory as its methodology and semi structured interviews as the method to collect data. The respondents are involved in municipal policy making regarding shared mobility and intermediaries at car sharing providers that have strong contacts with municipalities. The results showed that in the area of public institutional obstacles municipalities are not able to steer upon car sharing initiatives effectively, given the fact that active steering is absent and that regulation cannot be enforced properly. Car sharing providers that don't want to be hold by fixed agreements are related to this because they don't have the guarantee of the use of their product. Private institutional obstacles involve car sharing providers not being able to compete with car ownership because overall low profit margins takes away room for them to improve price and service, concluding that the market itself is not able to take care for any scale up. External influences are needed to make a shift towards upscaling possible, breaking through a so chicken-egg paradox. Overarching obstacles involved the absence of a mediator that takes up the role of matchmaking in order to organize the growth of car sharing. Overcoming the obstacles is done by the systematic financial support to car sharing initiatives where car sharing providers are offered user guarantee with every initiative to reach a stepped growth over the course of certain time period whereby matchmaking is needed to administratively guide this. This can be either done by the municipality itself or a third semi-public sectoral party. Accompanied with this, a legal framework must be active aside from this where car ownership is carefully restricted where car sharing initiatives are rolled out and facilities for other modes of transport are ensured to be sufficient. Overall, in the longer term, car sharing as transport mode, should be more considered as a public good on similar conditions of that of public transportation.

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1 Introduction

1.1 Background

The large municipalities of the Netherlands are facing similar issues regarding car mobility challenges in their inner city centers. Due to the high household density in combination with a low private parking capacity, inner city car mobility leads to a high parking pressure (Nijland, Manting, Daalhuizen, & O, 2017). Under here, figure 1 displays an example what high parking pressure in city neighborhoods can look like. Large parts of public space are spent on storing private vehicles. High parking pressure, combined with a relatively high share of public space, spent on parking capacity, comes with livability quests like heat stress and poor accessibility of public spaces for pedestrians, cyclists, disabilities emergency services and people with physical disabilities (Zaaijer, Nabielek, Snellen, & van de Coevering, 2008). The expected urban population growth in combination with a decline in average household size, will create further pressure on public space if the average car ownership per household does not decrease (Stoeldraijer, te Riele, van Duin, & van der Reijden, 2021).



Figure 1: public street parking in the Hague (Google Maps)

Individuals in every household have the willingness to participate in spatially separated activities in specific time prisms (Geurs & Wee, 2004). Meaning that a demand for getting from one place to another is directly deriving from this phenomenon. Considering the fact that the modal split of large cities is more diverse than lower density areas, there is a wide choice between modes of transport that makes how to get from one place to another in areas with a high building density (see figure 2). The diverse modal split of high density areas indicates that active- and public modes of transportation are a good substitute to private modes of motorized transportation on a large part of the trips that are undertaken. Still, people have a preference for private motorized transportation, even in places where sustainable modes of transportation like, walking, cycling and public transportation or a combination of them are a serious alternative.

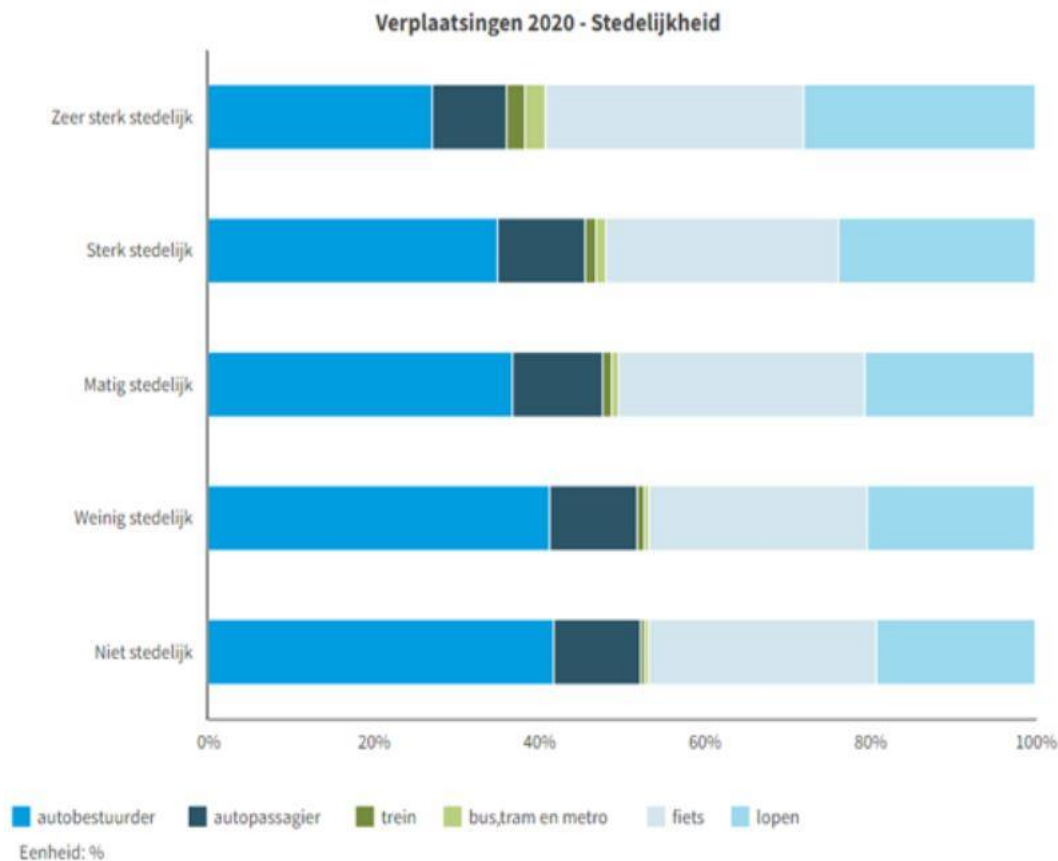


Figure 2: modal split of different areas based on building density. (CROW, 2023)

Recently, car sharing has become a promising strategy to combat the livability challenges that are related to high parking pressure in inner cities. The ministry of infrastructure and water management published a research in which car sharing has positive developments that benefit the livability of neighborhoods and cities (Ministry of Infrastructure and Watermanagement, 2022)

- Less public space is needed to accommodate parked vehicles. In the Dutch case, research of the ministry of infrastructure and water management shows that one shared car replaces four to eight private cars meaning that a reduction of required public parking space can range from 75- till 87% in case of a complete adoption of shared cars at the expense of the depreciation of private vehicles.
- As far as car sharing leads to less car use, it reduces congestion and improves accessibility as long as the users are identified as former car owners.
- Decline in emissions, a reduction of a certain amount of kilometers driven per year resulting from a decrease in car ownership is equivalent to a decline in CO2 emissions per year.
- The reduction of possible transport poverty. Car sharing offers the possibility for low income households to partake in activities. Think of certain occasionally paid visits to amenities or relatives that would have been too expensive to visit by self-owning a car or deemed impossible by other modes of transportation.

In the Netherlands, car sharing exists, but it is not widely applied in terms of complete neighborhoods fulfilling their potential of movement by shared cars instead of private motorized modes of transportation (Zijlstra, Bakker, & Witte, 2022) & (Schiller, Scheidl, & Pottebaum, 2017). Many cities have the ambition to stimulate growth further but they have not managed to let car sharing come to

a breakthrough (Jorritsma, Witte, Alonso-González, & Hamersma, 2021). Petzer et al (2022) argue that 6,4% of the population in the Netherlands has used B2C-car sharing, thus far.

In the present day, the increasing adoption of information and communications technology (ICT) offers a great opportunity to deploy the architecture on which car sharing can be founded (Di Bartolo, Bosetti, De Stasio, & Malgieri, 2016). The potential for car sharing is considered higher in high density areas where the sufficient amount of households nearby promote the use of car sharing (Ministry of Infrastructure and Watermanagement, 2022).

Like displayed in figure 3, car sharing is possible to be organized by different business cases (Cohen & Kietzmann, 2014):

- **Car Rental:** a company that rents automobiles for short periods of time to the public, generally ranging from a day or more to a few weeks, based on closed contracts where terms like mileage and rent period have been fixed.
- **Fractional ownership:** allows users to co-own a vehicle and share its costs and use. Most of the time this is a bottom-up initiative where a car sharing is done by selected members that form a group.
- **Peer-to-Peer Car Sharing (P2P):** the shared vehicles themselves are typically privately owned by one person with the sharing system operated by a third-party via a digital platform.
- **Business-to-Consumer Car Sharing (B2C):** The shared vehicles are owned by commercial organizations with the sharing system operated via a digital platform.

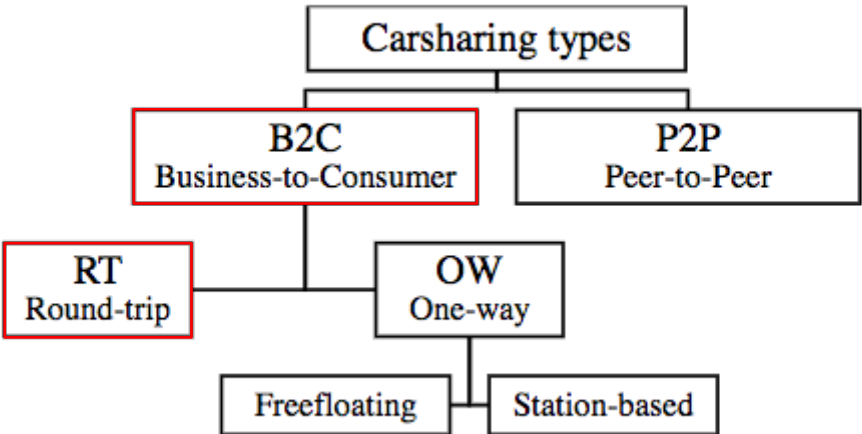


Figure 3: carsharing types model, the red lined types are applied in this research, based on the work of Burghard & Scherrer (2022) (Author’s work, 2023).

Besides the business cases there are also differences in how the car trips can be offered. This differs between one ways and roundtrips and within the one-way trips it is possible to have a fixed parking space for the vehicle (station based) and the possibility to store the car within a certain area, called free floating (Burghard & Scherrer, 2022).

Being aware of the different business models for car sharing, *Business To Consumer Car Sharing* (B2C) is the business case where this research is focused on (see figure 3). This choice is made because B2C-car sharing is a promising business case that seems to have the advantage in being suitable to organize car sharing on a large scale. Several scholars highlight the advantages that are solely excluded to B2C-car sharing. First off, B2C-car sharing ensures that the idle time of a vehicle is kept to a minimum, and that the economic costs and benefits of car sharing are distributed appropriately in comparison to

other business cases (Cohen & Kietzmann, 2014). Secondly, Cohen & Kietzman (2014) also address that B2C-car sharing involves a more solid interaction between the municipality and the party that provides the shared vehicles. This means that a municipality has a tighter grip on the development of shared mobility and is therefore able to serve public interests better because it has more grip on policy direction too. The municipality has only one contact that is involved with the organization of the vehicle offering, where the P2P-business model requires different contacts. Thirdly, car providers can offer their service better in quantitative and qualitative ways. Meaning that providers are able to react well on the interaction between supply and demand, in particular when it is compared to P2P car sharing, once the market for car sharing has extended (Kelly & Reeves, 2021). Eventually upscaling should lead towards decreasing costs for users of shared cars. This is also called the “economy of scale.” – “*cost advantages that businesses obtain due to their scale of operation*” (O’ Sullivan & Sheffrin, 2003). A condition for this is that the product in question is adopted massively so that it will become a more affordable alternative.

The roundtrip option within this business case has been chosen because in this research the focus lays on car sharing in favor of car ownership. Car use by car ownership is also characterized by round trips and is seen from a residential perspective. In other words: people drive their car starting at their residence and eventually ending the trip in their owned car at their residence as well. The research focus is not only put on round trips in general but also on the round trips which starting point is situated at a residential address. The concept of “residential car sharing” is therefore used to interpret these kind of trips.

1.2 Problem statement

The potential- and possibilities for car sharing have never been as promising as they are today. Car sharing is not widely applied in terms of complete neighborhoods fulfilling their potential of movement by shared cars instead of private motorized modes of transportation, even though, shared cars are potentially capable of providing mobility to people as good as private owned cars.

In practice, residential car sharing is not always a suitable alternative for car ownership. This can be based on driver’s arguments and personal considerations regarding car ownership and the current level of service of shared vehicles, that make car sharing not being able to compete with car ownership. Part of that level of service is formed by how extensive the car sharing market has already become. In other words: with low supply comes low demand because the opportunity for shared mobility is simply not there. Furthermore, in order to make car sharing fulfill its potential, municipal policy can contribute to the growth of shared mobility.

From this point of view, the competition between shared mobility and private mobility and municipal policy making are the key issues that deserve special attention. Obstacles that occur within these spheres of influence - therefore called institutional obstacles, - are considered to be the contributing factors that cause the current situation of the untapped potential of B2C-car sharing. Therefore the problem statement is expressed as the following:

- *B2C-car sharing is not always able to offer a viable alternative to car-ownership.*
- *Municipal policy and regulations have not yet led to the full exploitation of the potential of car sharing mobility.*

1.3 Research aim

Determining what obstacles exist for the B2C-car sharing market to allow shared cars to become a viable alternative for car ownership

&

Determining what Dutch large municipalities can do to stimulate the growth of car sharing.

1.4 Main question

~

What institutional obstacles underpin the untapped potential of B2C-car sharing in residential areas of large Dutch cities and how can these be overcome?

~

1.5 Sub questions

- 1) *What public institutional obstacles caused municipal policy and regulations not being sufficiently able to stimulate growth of car sharing?*
- 2) *What private institutional obstacles cause car sharing providers not being fully able to compete with car ownership?*
- 3) *What overarching institutional obstacles do further prevent the development of a solid growth of car sharing in the modal split?*
- 4) *How can these institutional obstacles be overcome?*

1.6 Scientific relevance

The scientific relevance covers how and why the findings of this research contribute to the insights that have not been scientifically researched yet and gives an introduction of the explanation what research method fits this research.

Research about implementing or expanding B2C-car sharing has mostly been an approach of different starting points. The work of Nansubuga & Kowalkowski (2021) can be taken as a guideline. This literature review presents the analysis of 279 papers on car sharing and identifies key areas for future research into car sharing. Like Jorritsma et al. (2021), they have mentioned that a lot of research has been done showing that collaboration between public and private stakeholders is important for the growth of car sharing. Customer- and vehicle performance and market factors also come into play. According to them, an important area that research on car sharing should focus on is how car sharing is incorporated as part of the mobility system of a city or area.

Particularly important is the relationship that car sharing in the modal split has with other transport modes because when focusing on car sharing, as a municipality, it must be prevented that the growth of residential car sharing is at the expense of sustainable forms of mobility. This research takes that into consideration because it aims on formulating an advice for governmental bodies about what they can do to stimulate B2C-car sharing.

This research is done from an institutional perspective. An institutional perspective assigns an important role to the structural functioning of institutions as a driving force behind policy and management processes. With institutions one can think of norms, roles, responsibilities, ways to approach or tackle problems and power relations (Leroy & Wiering, 2007). This perspective displays the understanding of societal and governmental structures forming the guidelines how - in the case of this research -car sharing is organized (Scott, 2004). By examining these structures possible institutional barriers can become clear, meaning that this perspective can be used as a holistic tool to find out how to enlarge the mode of car sharing within the modal split of inner cities instead of focusing on one particular stakeholder within the process.

Institutional complexities in various domains have already been extensively studied. For instance Alexander (2002) studied the roles of public actors and the public interest in spatial planning and Needham (2006) studied how private actors partake in the spatial planning process. Research into car sharing from the institutional perspective that exposes the relationship between actors and domain-specific obstacles has not yet been conducted as such. This makes the phenomena that are studied new and not being viewed through this theoretical lens yet. The focus of the contribution of this research to the knowledge base will therefore not be on finding the truth, but rather on conceptualizing what takes place in the development and organization of B2c-car sharing in Dutch major cities. The associated research methodology will be Grounded Theory, which is further explained in paragraph 3.1.3.

1.7 Societal relevance

In recent years, urban mobility is still based on private car ownership and this is hard to alter (Banister, 2007). Considering that car mobility is the most polluting mode of transportation of the modal split of the daily urban system, this is a mode of transport that is wanted to be reduced by policy makers and a large part of society.

Policy makers have put effort into stimulating the use of other modes of transportation but when using other modes of transportation is not possible for citizens and using cars is inevitable, making car sharing a solid alternative for private car use will be a good opportunity to reduce car ownership. When car sharing is adopted on a large scale, public space that is spent to store private cars, can become available to spend to other things that improve the livability of the city like public green and amenities. This research gathers the knowledge for municipalities how to act in their policies and legislation to take care for a solid development of shared car mobility and is therefore a useful addition in their policies for making the mobility system of their cities more sustainable.

2 Theoretical framework

The theoretical framework has been set up as foundation where this research is further based on. This foundation contains the concepts that will later frame both the obstacles that make why the potential for B2C-car sharing is untapped and the aim in which the approach for overcoming these obstacles is tried to be found. Like noticed in paragraph 1.6, this research is conducted from an institutional perspective, therefore the domains where both municipalities and car sharing providers are in, are outlined. These domains display what variables are sought to explain the inability of effective governance and regulation by municipalities and the inability of effective competition between car ownership and car sharing from the perspective of car sharing providers.

2.1 Private domain: competition between car ownership & car sharing

The private domain is the domain where products and services are freely produced and consumed. Competition largely determines how products are distributed and how private actors can put their services in the market. The systematic way in which car sharing providers compete with car ownership is elaborated in this paragraph and this chapter lays out the factors that influence the effectiveness of car provider's competition with car ownership.

2.1.1 Private domain

The private domain can be seen as the sector in which actors exist that serve self-interest (Lutkevich & Wigmore, 2022). Abstractly, this means that the foundation of their actions lays with their striving to exist. For now and in the future. Concretely, this means that their contribution to society consists out of providing services and products which consumers want to make use of. Market actors provide services as long as people demand it and pay for it and their right of existence stands with being able to compete with competitors that provide similar services and products (Hayes, 2023). Within the scope of this research car sharing providers, have to compete with car ownership by profitably increasing their share in the modal split. In other words: the service of car sharing must compete with car ownership based on price and service assets.

2.1.2 Price competition car sharing vs car ownership

In the Netherlands there exist a couple of professional providers that offer car sharing services. Mywheels and Greenwheels are the providers with clearly the largest vehicle fleet. They are the only providers who are active nationally (Wilman, Deelauto huren: dit moet je weten over het aanbod en de kosten bij 4 grote platforms in Nederland, 2022). Zooming in on Mywheels & Greenwheels, the way of payment goes with an hourly rate and a rate for each kilometer driven. Furthermore, different payments for using the car a whole day or a week are relatively cheaper but are more expensive than car ownership and different subscriptions can be taken out to lower the hourly- and kilometrage costs. Costs of car sharing are quite variable. Meaning that the costs per kilometer are largely formed by the driven kilometers and elapsed time between collecting and returning the vehicle (Wilman, Deelauto's lijken duur, maar is dat wel zo?, 2022) (see figure 4 at the next page).

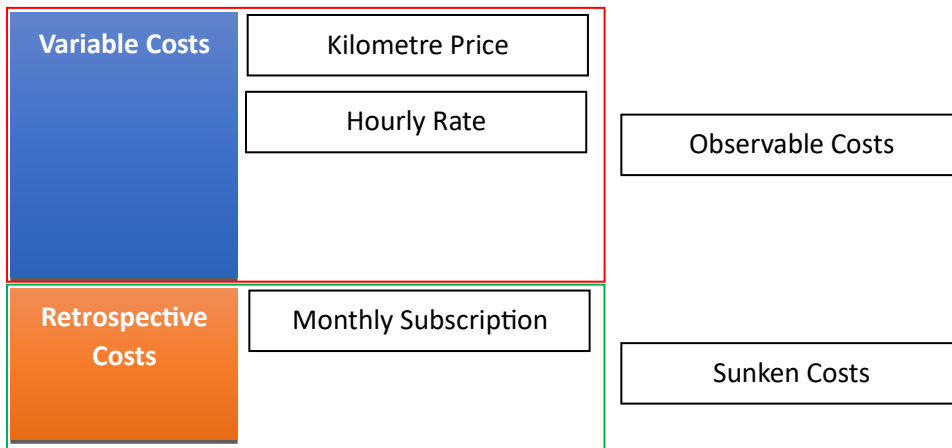


Figure 4: the costs of car sharing (Authors work, 2023).

Knowing that the subscription on car sharing is paid on an hourly- and a kilometrage rate, and the share of variable costs is relatively high, car sharing is mainly financially attractive in comparison to car ownership if the amount of yearly driven kilometers is small and rides merely take a couple of hours between leaving and returning (see figure 5). In return, consumers of shared cars are unburdened from several duties that belong with car ownership like short and long termed- maintenance, fuels, taxes, depreciation, vehicle acquisition and finding a parking spot upon returning. Wilman (2022) researched the costs of using the service for car sharing and he concluded that car sharing is cheaper at the moment that the driven kilometrage is lower and the ride time (the time between leaving and returning) is short. This means that especially people that do not drive much and don't drive often are getting a better total price for car mobility by car sharing than by car ownership. Nevertheless the tipping point of cost difference can be situated on different year kilometrages depending on the car and if the trips consist out of a high kilometrage or out of a short or long period of use. In conclusion: short flexible rides with lower distances are cheaper to do by car sharing than by car owning (Wilman, Deelauto's lijken duur, maar is dat wel zo?, 2022). Dependent on the segment of the car, the tipping point can lay on different year kilometrages.

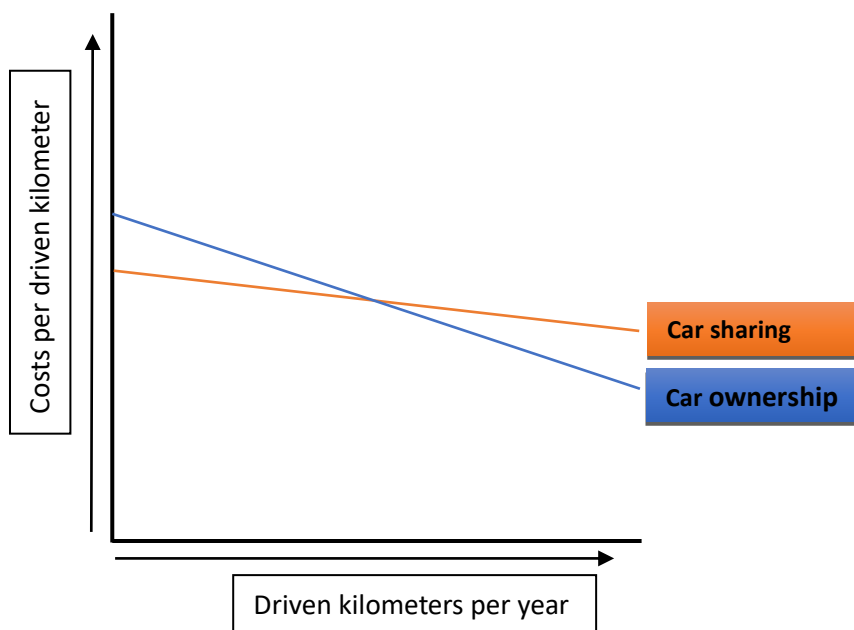


Figure 5: the financial tipping point of car sharing and car ownership based on the yearly amount of driven kilometers (not to scale) (Author's work, 2023)

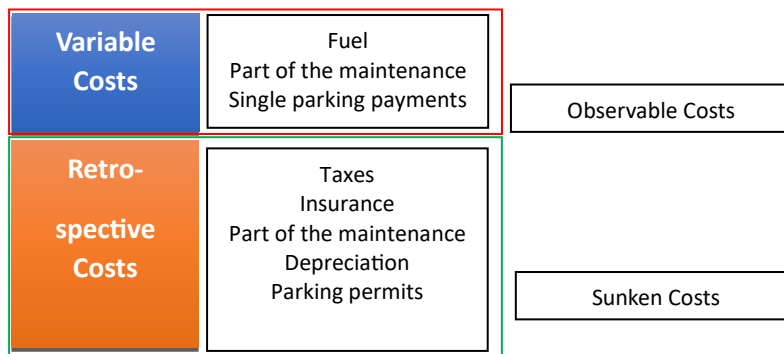


Figure 6: the costs of car ownership (Author's Work, 2023).

Car ownership is paid for differently, in comparison to car sharing. The costs of car ownership are consisting of more so called sunk costs (figure 6). Car ownership concludes variable costs as well like fuel costs, but sunk costs are representing a greater share than variable costs. Sunk costs are considered the costs that have already been incurred and cannot be recovered (Mankiw, 2009). Because the high share of sunken costs in car ownership, driving much is relatively cheaper per kilometer and people are less aware of the real costs of a car (Gardner & Abraham, 2006).

2.1.3 Non-financial motives for car ownership over car sharing

It is important to understand the underlying motives of car ownership over car sharing. By understanding what people value about car ownership, it is possible for car sharing providers to anchor these values into their product or service. For an explanation of motives, the work of Gardner & Abraham (2006) and Soza-Parra (2022) is looked at.

The first motive that people take into consideration in either car sharing or owning is that of **vehicle assets**. Earlier on it was mentioned that car sharing providers do not provide potential customers the same vehicle fleet that customers can acquire in the free car market. In other words, a less diverse product supply. People merely make such considerations based on the vehicle specifications like comfort, safety, accessibility, passenger- & luggage space and performance based ride characteristics and how he or she is emotionally attached to a certain type of car (Soza-Parra, 2022). The second motive is **freedom and autonomy**, mentioned by both scholars. Freedom is quite a broad definition but if the definition of "freedom" is more zoomed in on within the perspective of car mobility than freedom is considered as the drivers opportunity to always have a vehicle available, close by. Autonomy is a part of that consideration as well but a more important role that plays along here is that people can have the preference to not share a car with strangers or not share at all. The third motive is **identity** and this motive is also a little more complex to designate. Identity is seen as individuals who define themselves by expressing who they are to the outside world. In the case of car mobility, this can be expressed in the type of car that is owned (Gardner & Abraham, 2006). This also relates to the last motive of that of **status** to not only identify oneself with car owning but with owning a car to be positively socially valued. The motive of status is not expected to play a major role in car owning (Soza-Parra, 2022).

2.1.4 Market mechanism

Market mechanism is a process to optimize the distribution of goods and services by the use of money exchanged by buyers and sellers (Friedman, 1969). This process is complex, but to keep it simple, market mechanism initially is seen like follows: The prices that people pay reflect the relative values of all the various products that they buy and the services they utilize. Meaning that, in a free market economy where private actors compete, people are eager to pay more if the value of the product is higher than that of the product of the competitor or they choose a certain product for the same price

if the alternative choice is worse. Adopting the information up here, this means that in order to car sharing being competitive with car ownership, its price and quality must be well-matched, independent of the number of kilometers driven by the vehicle per year. Price is relatively easy to understand, but an important aspect which adds a factor in price difference is not only how the prices really are but also how the prices are felt. Gardner and Abraham (2006) address that financial costs play an important role in the consideration of car ownership and driving. What is remarkable, however, is that they state that people underestimate the costs of driving. This is caused by costs being cognitively represented according to the timescale in which they are encountered. Car ownership has more so to call “sunk costs”, invisible costs that are made over a larger time frame that makes the costs seem to appear less influential. Car sharing therefore does not have the same “sunk costs” because these costs are for the car providers and in order to cover these costs, the costs are more explicit and encountered on a daily or per-journey basis. (Gardner & Abraham, 2006). In conclusion in the scope of this research the market mechanism is formed by competition of price (more about that in 2.1.2) and the performance of the service of car sharing set against the values that people got regarding car ownership based on driver’s motives in 2.1.3. For an oversight see the table under here.

Indicator	Summarised Characteristics
Price	<i>Sum of visible costs that are made based on the kilometrage and in case of shared cars the duration of the rental period and costs that have already been incurred and cannot be recovered.</i>
Price perception	<i>The ratio between sunken costs and variable costs what makes how the product is paid for. A similar ratio between shared and owned cars can display the differences in costs better.</i>
Product/vehicle specifications	<i>The characteristics of vehicles are comparable to the ones that consumers demand in comparison of their own car.</i>
Freedom & Autonomy	<i>Self-control about departure and returning times, periods of use and guaranteed accessibility and the possibility to only share the car with people you know.</i>

Table 1: performance of car sharing. Based on the work of Gardner & Abraham (2006) and Stradling, Meadows, & Beatty, (2001). (Author’s work, 2023)

2.2 Public domain: governance, regulation and policy

The public domain is the domain where governmental services reside, where public goods are provided and public interests are served (Oakland, 1987). Public actors are capable of providing these goods and serve public interests by steering and capturing the full complexity of rule-making in societies (Steurer, 2013). Actors in the public domain, thus have the duty to provide public goods and public services but also to govern and regulate in order to manage these goods and services. Governing or governance and regulation comes forward into policies and legislation. If it comes to their role of the service of B2C- car sharing, they have to deliver the framework wherein the car sharing providers can legally and physically operate and where consumers can use the service of car providers. Municipalities have the ambition to expand the use of car sharing within cities to improve livability and facing different public urban concerns like mentioned in paragraph 1.1.

2.2.1 Policy making: actively steering upon car sharing

The criterion of “good spatial planning” plays an important role in the spatial domain of municipalities’ organizations wherein urban mobility policies are included. This criterion is intended, among other things, to guarantee an acceptable living environment. (Ministry of Infrastructure and Watermanagement, 2023). Interpretation of this criterion leads to the municipalities’ obligation to manage urban mobility patterns, this, in order to keep cities accessible and to provide people’s mobility. Managing urban mobility patterns is established in municipal spatial- and mobility policies.

Policy is defined as *“the pursuit of achieving certain goals with certain means and certain time choices.”* (Bressers & Hoogerwerf, 1991). Additionally, Voican (2008) defines policy as *“guideline of governmental courses of action in order to improve facets of a certain societal subject towards a certain outcome.”*. One can interpret a good spatial planning in mobility perspective as providing in peoples mobility while an acceptable living environment is guaranteed.

Municipalities managing the development of car sharing can be distinguished in two approaches (Petzer,, Vaskelainen,, Campman, & Frenken, 2022). (1.) municipalities can actively steer upon residential shared car mobility by phasing out car ownership and replace car ownership by car sharing. In practice, this is done by cooperation with interested civilian parties at neighborhood level to actively replace owned cars by shared cars. A good example is the neighborhood of *“Middelland”* in *“Rotterdam-West”* where car sharing is organized by a cooperation between these parties (see figure 7). These initiatives lead to a gradual reduction in car ownership but are also characterized by a different type of car sharing, namely peer to peer car sharing (P2P) where the shared car in question is only available for a select group of people in the street that participated from the beginning (Gemeente Rotterdam, 2023). However, this approach can be used with B2C-car sharing too. This has not been done on a wide scale yet.



Figure 7: neighborhood initiative for car sharing. This was a bottom up initiative where the municipality of Rotterdam acted as director and facilitator. The car sharing system here involved peer2peer car sharing, what makes this initiative an general example rather than an example that displays a best practice for B2C-car sharing (Gemeente Rotterdam, 2023).

In order to actively steer upon a policy theme, effectively, Kingdon (1984) and van Meter & van Horn (1975) formulated conditions that need to be met. These can be applicable for car sharing as well. First, societal and political support is crucial to set the agenda. Second, goals must be transparent and provide a concrete direction. Third, the phase of programming and implementation owes its success to the available governmental staff and resources. and fourth, the possibilities & willingness of those involved to actually participate to implement the policy. In practice this means societal and political support to actively stimulating car sharing and reducing car ownership, a clear goal how many shared cars must be placed in a certain area and enough capable governmental staff to direct this development in combination of the willingness of neighborhoods' inhabitants to renounce car self-ownership. (2) The other opportunity is that municipalities integrate car sharing into a regulation framework in the planning approval procedure, also called the WABO-procedure. This procedure is the regulatory foundation of the changes in the built environment.

2.2.2 Regulation upon residential car sharing in the WABO procedure.

Like mentioned in previous subparagraph, municipalities, as public actors, can steer towards development of growth of car sharing by regulation. Steurer (2013) firstly outlines regulation into rules, set by governmental institutions that have “legislative-bindingness” The question now is what role regulation has in steering upon the development of residential car sharing. Like mentioned in the previous paragraph, car sharing can be integrated into a regulation framework in the spatial planning approval procedure within area development projects in the built environment, called the WABO procedure in the Netherlands.

Area development involves the change of the built environment and can be characterized as an addition of dwellings and amenities towards the built environment and a change of function’s facets like the measurements of the buildings (van Essen, 2007). In mobility perspective, changing the function in general or changing the function’s facets, means that depending on the parking norms, there may be an increase in parking requirements in the new situation compared to the old situation (Bos, Savooyen, Martens, & Graumans, 2014). Due to the scarcity of space in cities, policy measures are in place to prevent parking pressure from increasing to a certain value. Solutions to this include creating parking spaces on private property or reserving parking capacity in existing parking garages like the municipality of the Hague included in its parking policy (Gemeente Den Haag, 2011) Adding public parking capacity could be an opportunity as well, but it is mostly not applied, because it does not solve livability issues. In the WABO procedure car sharing can be an option to meet parking needs. As already mentioned in paragraph 1.1, shared cars can replace between 4 and 8 parking spaces of private cars and it is attractive for a project developer to opt for shared car parking capacity instead of parking capacity for private cars because the developer does have to care for less parking places in case shared cars are applied in a development plan (Petzer,, Vaskelainen,, Campman, & Frenken, 2022). For car sharing providers it is attractive to work along in this process as long as the shared vehicles, that are placed, have a sufficient user potential. Within area development, the adaptation of the built environment can therefore form a transition engine for replacing private cars with shared cars. In summary, the process goes as follows: a developer wants to develop an area through new construction or renovation of existing functions. The municipality checks against the parking norms in the building permit procedure to determine whether the parking requirement of the new function is higher in comparison to the old function. If this is the case, the municipality can ask the developer to make an effort to prevent further increases in parking pressure in public spaces. Car sharing can therefore be a mean to meet parking needs and a solution for the developer to allow development to proceed (Petzer,, Vaskelainen,, Campman, & Frenken, 2022).

2.2.3 Enforcement of regulation in the WABO procedures.

As mentioned earlier, enforcement of policy and regulation has a major influence on the effectiveness of it (Kingdon, 1984). In the process of the transition from private car use to car sharing, it can be argued that a municipality must consider how the new situation is maintained to prevent car ownership from increasing again over time at the expense of car sharing. The type of enforcement measures, depends on whether shared cars are offered in public- or private space.

Starting with parking shared cars in private spaces, property owners take care for the management of parking capacity being used by shared cars only. This in accordance with the conditions in the building permit. Subsequently, a public actor must have the means to monitor and enforce this if the property owner fails to ensure that the number of shared cars is in accordance with the number agreed in the permit. Enforcement on parking shared cars in public spaces is slightly different. When shared cars for residents are parked in public spaces, municipalities have the option to control the process themselves to maintain shared cars in public spaces. This means that parking permits for shared cars will be

enforced directly and that parking permits for private cars will not be granted to residents of addresses where it has been agreed in the WABO permit that the parking requirement will be solved with shared cars (CROW-KpVV, 2016).

2.3 Conceptual framework

The focus on the research objective is to determine what institutional obstacles underpin the untapped potential of B2C-car sharing in residential areas of large Dutch cities. The conceptual framework further elaborates the expected factors that influence if the potential of the growth of car sharing is met. The assumption is that, based on the existing literature, this is what the potential institutional obstacles in relation to B2C consumer car sharing looks like.

Viewed from the reader the model works from left to right and starts with two aspects in the black boxes of both the private and public domain from where the variables originate. In case of the public domain these are two different ways of how municipal governments can steer upon the growth of car sharing. The first is steering by separate policy (Petzer,, Vaskelainen,, Campman, & Frenken, 2022). The second one is based on existing regulation, whereby regulation's definition of Steurer (2013) is based on defining what this means for the regulatory framework of car sharing.. In case of the private domain the aspects emphasize the competition between car ownership and car sharing based on the market mechanism that is formed by price, price perception, and vehicle specifications (Hayes, 2023) (Gardner & Abraham, 2006) (Stradling, Meadows, & Beatty, 2001)

The orange boxes denote the variables that affect each domain-specific aspect. In case of *separate & active governmental steering* it comes with societal and political support to actively stimulate car sharing and reducing car ownership, a clear goal how many shared cars must be placed in a certain area and enough capable governmental staff to direct this development in combination of the willingness of neighborhood's inhabitants to renounce car self-ownership (Kingdon, 1984) (van Meter & van Horn, 1975). In case of "*Car sharing regulation in parking policies*," the opportunity of car sharing is in municipal laws to provide guidance how shared cars must be offered in case of adjustments of the built environment (van Essen, 2007). This stands with municipal's opportunity to enforce this regulation and the opportunity to make an agreement with car sharing providers to offer these cars in practice for a fixed time. The aspect of price competition goes with simply the difference in price between car sharing and owning (Hayes, 2023) and the perception of the price which means the ratio between sunken costs and variable costs (Gardner & Abraham, 2006) The aspect of product competition is about the question to what extend shared cars can fulfil the consumers' needs for what they see as what car mobility must meet. This, based on the motives they have to choose for car mobility in general and car ownership specifically (Gardner & Abraham, 2006) (Stradling, Meadows, & Beatty, 2001). For additional information see table 1 in paragraph 2.1.4.

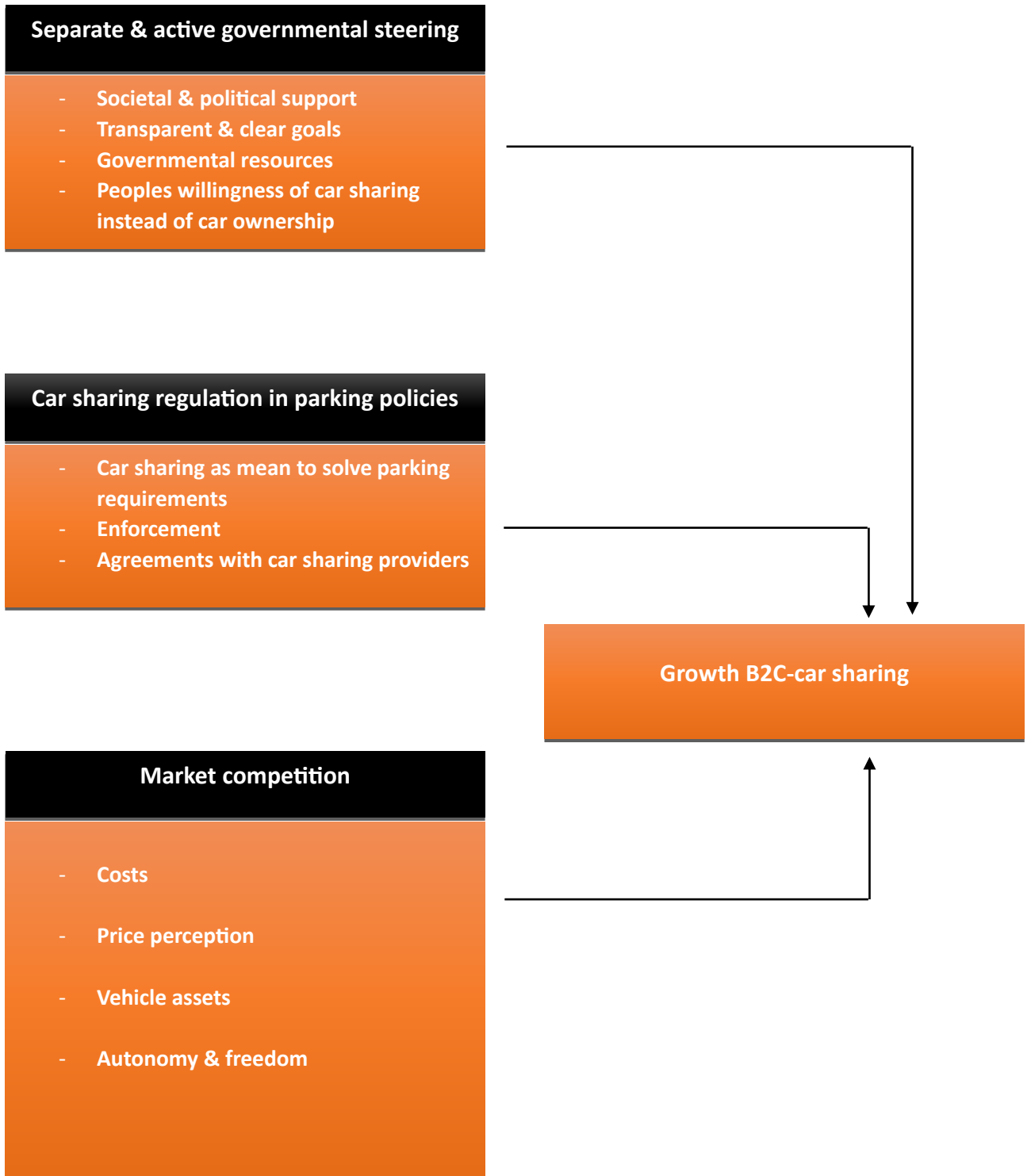


Figure 8: conceptual framework (Author's Work, 2023)

3 Methods

This chapter provides the information about how the secondary data will be acquired. The setup kicks off with the research paradigm where the different research philosophies are dived into, followed up by the explanation of the kind of reasoning. This is followed up by how the data collection has been shaped and how the analysis of the data is carried out. Last paragraph will be dedicated to the final ethical considerations and the considerations regarding validity and reliability.

3.1 Research paradigm

The research paradigm is seen as the set of choices that are made by the researcher how the research subject is approached. This is done by first asking oneself how knowledge is developed. This can be expressed by different philosophical considerations. These considerations will eventually frame how the process of thought is carried out, which means what type of knowledge is acquired. In order to develop knowledge and determine which process of thought is belonging to this approach, a research strategy is outlined in which the desired knowledge is planned to be acquired and how this is done.

3.1.1 Research philosophy & reasoning

The research philosophy is based on a set of considerations how the world is viewed from the perspective of the researcher. This theoretical perspective guides the researcher and is based on ontological and epistemological considerations. Visseren-Hamakers (2022) addresses that: ontology defines what type of reality exists in the human world which knowledge can be acquired from. Epistemology defines how knowledge is created. In this research social constructivism or interpretivism forms the philosophical ground. This perspective explains that the researcher needs to be aware of the consideration that in this research, neither reality can be understood using appropriate methods, nor that reality exists as multiple mental constructions that address the existence of multiple realities based on the subject's personal biases (Cohen, Manion, & Morrison, 2007). This leads to knowledge that is created based on the existence of an objective reality but the interviewee's construction of reality is built by both the objective reality and the interviewee's biases. Because of these ontological and epistemological considerations, natural scientific methods do not play a role as method for developing knowledge within the scope of this research. The knowledge that is acquired is based on relativistic approaches of the existence of reality and a constructionistic approach on how knowledge is created. Concluding this statement, the argument can be expressed that data can only be collected by perceiving phenomena through "perspectives" that are shaped by the researcher's and respondents past experiences (Blaikie, 2000)

In this research an inductive approach of reasoning is applied. This is because the aim of the research's strategy is to contribute to theoretical development (Verschuren & Doorewaard, 2015). This is done because theories from institutional perspectives in relation to the growth of car sharing have not been investigated often yet. However research- or outlining of other phenomena from an institutional perspective has been done. Theories that are related to these studies are used in the theoretical framework and form a preliminary statement which indicate what is expected to be found in this research. In other words: the content that is formulated in the theoretical framework consist of the foundation where the causal relation between the phenomena and conclusion of this research will be based on

3.1.2 Research strategy

To determine the research strategy, two different interim statements are taken into consideration. The first being the outlined research philosophy above here which states that that natural scientific

methods don't play a role in the development of knowledge within the scope of this research. Secondly the aim of this research is to explore what obstacles arise for the B2c-car sharing market to allow shared cars to compete effectively with private cars and to determine what Dutch large municipalities can change in car sharing mobility policy and parking regulations to promote car sharing, at the same time when car ownership is discouraged. Due to the interpretive philosophy, the aim to "explore" and the new insights that are attempted to be made, a qualitative methodology has been chosen. Qualitative research gathers descriptive data in order to gain an in depth understanding of phenomena (Creswell & Guetterman, 2018).

3.1.3 Research methodology → grounded theory

Conducting inductive qualitative research can be done by different methods. For this research the method of "grounded theory" will be used. The method of Grounded Theory is first described by B. G Glaser and A. L Strauss (1967). The approach amounts to the iterative process consisting of the steps that are outlined under here.

Step 1 of the grounded theory consist out of formulating a conceptual theory. In this research this is the theoretical framework summarized and depicted into the conceptual framework. In step 2 the sample is drawn. In this research the sample, that is built, is based on the second part of the research aim, namely, that this research is aimed at the largest cities in the Netherlands. The definition of "large city" is loosely coinciding with the 10 largest cities in the Netherlands, more about that in paragraph 3.2. Step 3 is about finding theoretical saturation, which means that no new information is emerging from new secondary sources in comparison to the sources that have been used already. Step 4 involves coding and analysis of the data, which will be further elaborated in paragraph 3.3. Step 5 is the second last step where, based on the data analysis, it can be tested where the conceptual theory holds up and where it needs to be refined. Finally, the new theory is assessed by searching for literature that can either validate or disempower it. (Glaser & Strauss, 1967). For an oversight of this process see figure 8 under here.

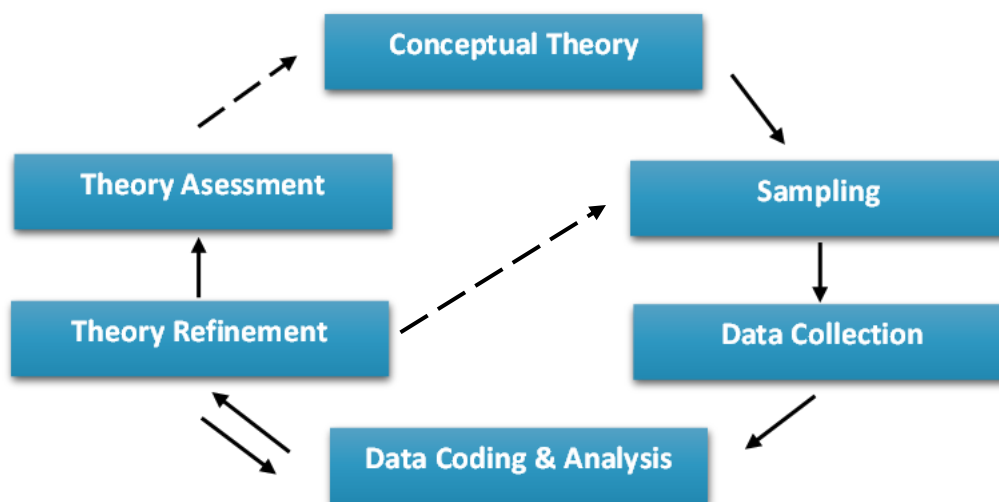


Figure 9: process of grounded theory, based on the work of Glaser & Strauss (1967), (Author's work 2023)

3.2 Data collection

Data collection in grounded theory is done by sampling. Sampling is choosing a subset of respondents from within a population to estimate characteristics of the whole population. Important is that the sample represents the population. Within the scope of this research the research aim and main question contain the aspect of the large Dutch cities. Following this fact, logically the largest Dutch cities are approached to gather data from. This is not only because of the fact that solely large cities are studied but also because these cities are expected to have car sharing policy that is more developed than smaller cities. Conclusions about it can then be drawn more precisely. Therefore the sample selection amounts to the cities of the Netherlands with more than 100.000 inhabitants and preferably more than 150.000. Eventually some other slightly smaller cities are going to be asked to acquire more diverse information. Further sample sources are large car sharing providers, and a scholar that has done research on this theme as well. Bringing the total amount of interviews that are going to be conducted at 13. Interviewees from municipalities have knowledge about how policy and regulation is constructed and why, while interviewees from car sharing providers bring up important considerations about the provider's business operations. The scholar is submitted a set of questions that contains the questions of the interviews that are given by both the municipalities and car sharing providers. A more detailed outline about the interviewees' expertise and the organization to which they are affiliated is classified information in the context of the desired anonymization of some of the respondents and is therefore only available to the writer's tutor in appendix F.

In this research, semi-structured interviews will be the mean to collect data. Semi-structured interviews are interviews that combine a pre-determined set of open questions with the opportunity for the interviewer to explore particular themes or responses further. The advantage of semi-structured interviews is that the questions that must be asked are well thought about by the interviewer and that the structure in the answering can be processed into answering the main questions easier. However, respondents is given the opportunity to provide new insight that must build on the theory that is expected to come out of this research (Charmaz & Belgrave, 2007).

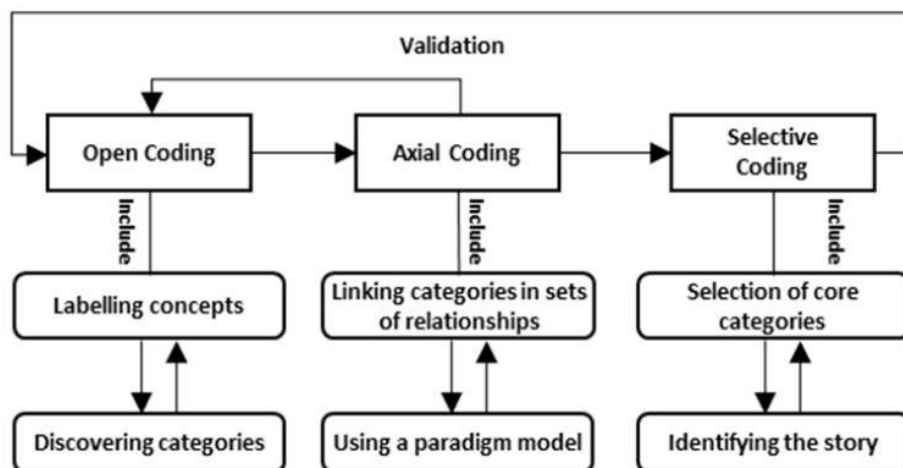


Figure 10: coding framework (Alhassan, et al., 2023)

3.3 Data analysis

The process of data analysis contains a couple of steps, like displayed in the figure at the previous page. Beginning, with the recording of interviews followed up by transcribing, the coding process and the concluding analysis-step of building the code scheme, that can be found in appendix G. Interviews are recorded and transcribed with the consent of interviewees. Transcribing is done with Atlas.ti just like the coding process. The coding process is a strategy that must be dived into before the interview transcriptions are read. A code scheme offers the framework to canalize the information that is used for the answering of the sub questions. A code scheme consists of different things and to build a code scheme the following steps are gone through. First step will be open coding. Open coding means labelling fragments of the interview transcriptions. The main aim of labelling is to give each text fragment a main theme, so that it becomes easier to find different codes. The second step is axial coding. Axial coding involves comparing the assigned codes of each text fragment in order to find similar aspects. The similar aspects can be placed under an overarching code. The specified codes are formulated into connections in step three called “selective coding”. The analysis of data in grounded theory is called “constant comparative analysis” which means that categories or themes are refined by new data and are not predetermined like in deductive research (Glaser & Strauss, 1967).

3.4 Validity & reliability

Validity and reliability are indicators that imply the quality of the research results. Validity is expressed in the way the findings of the research can be generalized to a broader context. Validity depends on the question if the study sample represents the population enough (Joppe, 2000). If that is the case, the research findings are applicable in other contexts and situations. Improving validity in qualitative research is possible by taking the following things into consideration. First off, the interviewer must put effort into the responses being genuine and not being influenced by “what is wanted to be heard.” This is done by constructing the interview questions as non-suggestive as possible, see also appendices B till E. Secondly, validity can be improved by the interviewer expressing own’s interpretation of the answers to the interviewee, in order to check if the given answers are proved to be mono-interpretable. (Lani, Moran, Glase, & DSouza, 2023). Lastly validity of the research is achieved by data saturation which means the degree to which new data repeats what was expressed in previous data. (Saunders, et al., 2017).

Reliability as indicator is seen as in what matter a reproduced research provides the same results (Joppe, 2000). In essence, valid research means that the result that has to be acquired is obtained rightfully by measuring correctly, however in the acquisition process of data, it is also important that other circumstances must not lead to different outcomes while the obtained results are still valid. To improve reliability, it is important that interviewees are representative members of the segments that are going to be examined. In case of the municipalities it is important to interview respondents that are closely involved into shared mobility policies and in case of the car sharing providers, the respondents must function as an intermediary between municipality and the car sharing business operations. Last note about reliability that has to be made, is that the results need to be generally applicable on the large cities in the Netherlands. The definition of a large city has never been officially captured worldwide on a specific amount of inhabitants but the International Statistical Institute defined it as a city of 100.000 inhabitants or more (Körösi, 1887). In this research at least half of all the Dutch cities with more than 150.00 inhabitants, the municipal representatives are questioned. At this way the results can be generalized and are applicable to other cities.

4 Results

This chapter discusses the results from the interviews and covers the answering of the sub questions regarding the obstacles that affect car sharing initiatives, how they can be overcome and what different processes can be distinguished within the approach of overcoming the obstacles. The results are divided into domain specific obstacles (4.2 - 4.3) and domain overlapping obstacles (4.4), followed by the conditions of overcoming them in that same order (4.5 – 4.7). After that an oversight of all obstacles and corresponding conditions will be displayed in one table (4.7.1). Before the results of both the obstacles and how to overcome them are discussed, the first paragraph of this chapter involves a closer look on the situation of both separate and incorporated policy on stimulating car sharing in each municipality that was questioned. This, to put the results in the other paragraphs into perspective.

4.1 Current situation municipal policies

Figure 11: oversight of municipal steering and regulation regarding car sharing initiatives. (Author's work 2024)

Municipal respondent	Separate active steering upon car sharing initiatives	Regulation upon residential car sharing in the WABO procedure
1	Initiative among local residents in car sharing groups, but it cannot be properly incorporated into the current parking policy.	Car sharing initiatives as part of estate developments in public spaces but not yet in private spaces
2	No active steering upon car sharing initiatives	Car sharing initiatives as part of estate developments in public spaces for paid parking, but no view of shared cars in private parking spaces
3	Initiative by the municipality, but cars are difficult to realize by providers due to small groups or low support among residents.	Car sharing initiatives as part of estate developments in public spaces for paid parking, but not always restrictions on car ownership.
4	Initiatives based on pilots, no active steering	Car sharing initiatives as part of estate developments in public spaces for paid parking, but not always restrictions on car ownership.
5	Ambition to actively encourage shared car use while imply traffic calming measures in some streets. No active steering	Car sharing initiatives as part of estate developments but without the guarantee of offering shared vehicles
6	No active steering upon car sharing initiatives	Application of shared mobility in real estate developments has no strings attached. Initiatives lies with developers
7	Ambitions for active steering upon car sharing initiatives but no actions yet.	Car sharing initiatives as part of estate developments but without the guarantee of offering shared vehicles
8	No active steering upon car sharing initiatives because priority lies at improving regulatory framework of the WABO procedure.	Non-binding option for the application of partial mobility in estate developments. Initiative at the municipality as organizing party
9	No active steering upon car sharing initiatives	Non-binding option for the application of partial mobility in estate developments. Initiative at the municipality as organizing party
10	Car sharing as an integral part of a tool in projects to improve the neighborhood's livability. There are restrictions on car	Non-binding option for the application of partial mobility in construction plans. Initiative among developers. The municipality

	ownership, but not absolutely through more expensive parking permits. Initiative by local residents.	supports “remote parking” as a restrictive measure on car ownership.
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4.2 Public institutional obstacles

Public institutional obstacles are defined as obstacles that cause municipal bodies not being fully able to deliver the framework wherein car sharing providers can legally and physically operate and where consumers can use the service of car providers. In other words, where municipalities or car sharing providers have the ambition to expand car sharing as part of the modal split at the expense of car ownership, they do not succeed to do so, because of unsatisfactory public policy and regulation.

4.2.1 Absence of active governmental steering

Like mentioned in the proposal, one aspect of public administrative commitment to stimulate the growth of car sharing is actively engaging people into car sharing by phasing out car ownership and replace this by shared vehicles. This is done by mutual consultation with citizens and car sharing providers. Out of inquiry with different municipalities, it turned out that this approach is not applied on high scale, like shown in the quotes under here. Some minor initiatives have been initiated. In that case, a small closed group of people started with sharing a vehicle but this is considered a different business case, namely P2P-car sharing, and eventually several of these initiatives were dismissed later (Respondent_1, 2023) or were not able to come off the ground (Respondent_6, 2024). At different other municipalities (Respondent_3, 2024) (Respondent_10, 2024) (Respondent_11, 2024) there is no systematic approach that has been laid down in specific policies like quoted under here

Respondent 11: *“Well, shared mobility policy, I can talk briefly about this, because we don’t have it. In the mobility vision we broadly described some aspirations regarding shared mobility. Based on these aspirations we carry these out integrally in a couple of specific projects, but we don’t apply it separately”* ¹

On the contrary, the existence of a systematic approach was not positively confirmed in other municipalities either. There are different causes that can be linked to the absence of a municipal systematic undertaking to phase out car ownership and actively engage people to start car sharing in existing urban situations. These are either a lack of urgency among different actors and/ or a combination of a shortage of municipal resources that are needed to administratively organize these initiatives. The cause for the absence of a systematic approach can be placed into two types of answers. 1. The urgency, albeit it politically, administratively or societally is not experienced. 2. The municipal resources are not sufficient to meet this challenge on a large scale (Respondent_1, 2023) (Respondent_2, 2024) (Respondent_10, 2024). Lastly some municipalities deliberately choose to not execute this type of policy for ideological or pragmatical reasons. Both can be traced back to either urgency and municipal resources. For instance one municipality has mentioned that they put their resources on car sharing as part of area developments because this is a major task that asks much of the municipal organization (Respondent_10, 2024) . Other municipalities have mentioned insufficient political support (Respondent_5, 2024) (Respondent_8, 2024) (Respondent_11, 2024).

¹ Quote in original language: *“Nou deelmobiliteitsbeleid, daar kan ik vrij kort over zijn, want dat hebben we niet of weinig. In de mobiliteitsvisie hebben we wel de hoofdlijnen beschreven van de mobiliteitswensen om dat te stimuleren. We doen een aantal concrete projecten op het gebied van deelmobiliteit, dus we werken wel aan deelmobiliteit maar niet een soort van apart deel of iets dergelijks, is er niet.”*

Respondent 10: *“We don’t have a jar of money, and we don’t have 100 people working at the department for shared mobility.”*²

Respondent 5: *“Well, that is still difficult in our municipality at the moment, with regard to private parking. Our council still considers car parking to be very important and a lot of money is involved. An attempt is being made regarding the parking requirement, but it is difficult to get it through the council, writing real policy is still difficult.”*³

Respondent 8: *“Of course you have a political context, right? We have no left-wing council, no left-wing college. So it is quickly explained as bullying cars, these things.”*⁴

4.2.2 Shared cars as part of WABO-procedure & enforcement

Like mentioned in the theoretical framework, another way to public-administratively stimulate the growth of car sharing is to integrate it into a regulation framework in the spatial planning approval procedure within area development projects in the built environment, called the WABO procedure in the Netherlands. Most municipalities have made this option available in their parking policy or are willing to do this on relatively short notice. In order to effectuate this regulation, a couple of aspects have turned out to be influencing its effectiveness, where municipalities are struggling with. One thing is that car sharing is applied in the WABO procedure, but that the conditions about the application are to some level contradicting the conditions of the current parking policy, what frustrates feasibility. For solving this matter, a whole new standard of parking policy is then needed to be established.

Respondent 1: *“People took the initiative to start car sharing and wanted to do so in groups. We cannot yet properly frame this with the current parking policy.”*⁵

In other cases, municipalities have not managed to take care for side administrative measures that must be taken as part of the integration of car sharing into the regulation framework. One of these measures is a parking permit ceiling or the inability to have a car in the first place. Another one is to keep track on the locations where car sharing initiatives have been launched in practice. Keeping track of these initiatives do not always happen (Respondent_2, 2024), what makes that municipalities don’t have a way to evaluate if car sharing has become a solid opportunity to provide into the mobility demands for the households that have been part of the building permit.

Respondent 2: *“That is really difficult - and even for a municipality - to have an overview of which developments should use shared cars, that is also lacking.”*⁶

What has come to notice is that the most crucial public institutional obstacle in the process of WABO-procedural car sharing initiatives, is enforcement. Enforcement of car sharing initiatives cannot be- or is simply not always carried out properly. This starts with car sharing enforcement on private terrain. Here, municipalities are not able to check if the initiative of car sharing is really delivered and if the developer that is owner of the parking facility is keeping it that way (Respondent_1, 2023)

² Quote in original language: *Tenzij we zeggen hier is een pot met geld, maar die pot met geld hebben wij natuurlijk niet en we hebben helaas niet 100 mensen werken op deelmobiliteit”*

³ Quote in original language: *“Nou, dat is op dit moment nog lastig in Rotterdam, ten aanzien van privaat parkeren. Ons college vind auto parkeren nog heel belangrijk en er gaat ook veel geld in om. In die parkeereis wordt het wel geprobeerd, alleen is dat moeilijk om door de raad te krijgen, echt beleid schrijven is nu nog lastig.”*

⁴ Quote in original language: *“Je hebt natuurlijk een politieke context hè? Wij hebben geen linkse raad, geen links college. Dus het wordt al snel uitgelegd als auto’s pesten, deze zaken.”*

⁵ Quote in original language: *“Burgers namen initiatief om te gaan autodelen en wilden dat in groepsverband doen, we kunnen dat met het huidige parkeerbeleid nog niet goed inkaderen.”*

⁶ Quote in original language: *“Dat is echt wel lastig en ook überhaupt om als gemeente daar het overzicht van te hebben van welke ontwikkelingen allemaal deelauto’s in zouden moeten zetten, dat ontbreekt ook.”*

(Respondent_2, 2024) (Respondent_6, 2024) (Respondent_10, 2024) (Respondent_11, 2024). This is because the parking facility is not on public terrain and this terrain is not physically and legally available for municipal surveillance.

Respondent 2: *“Well, that is really still a point of attention. Because if that is on private property, then we really have less insight into it.”*⁷

Besides the both physical- and legal unavailability of private parking facilities, enforcement of car sharing in the WABO procedure comes with another challenge. Anticipating on the private institutional challenges, car sharing providers are reluctant to be bound to contracts that describe an offer-guarantee of shared vehicles (Respondent_6, 2024) (Respondent_7, 2024) (Respondent_10, 2024) (Respondent_13, 2024), which causes a municipality’s inability to effectuate mobility policy regarding car sharing.

Respondent 6: *“Yes, we wanted to place shared cars here, but there is no provider who wants to do that for 10 years.”*⁸

Application of car sharing initiatives being a new concept creates a barrier as well. Wrapping car sharing into a regulatory framework is pioneering work. For public institutions, it is hard to define parking norms that suit the practical situation (Respondent_1, 2023) (Respondent_6, 2024). Pioneer obstacles can lead to a “wait-and-see-attitude” in municipal organizations, what makes that it becomes harder to successfully implement car sharing initiatives (Respondent_8, 2024).

Respondent 1: *“And then the unclear question is whether the parking standard and car replacement ratio is sufficient, too little or too much.”*⁹

Respondent 8: *“Well, we’ll just have to wait and see how things are going in other areas. I sometimes worry, will this really work?”*¹⁰

In contrast to parking capacity for car ownership, the parking norms for shared cars requires greater accuracy, because it influences the success rate for car sharing initiatives. Shared vehicles that are not used past a certain threshold value, cannot be profitably offered by car sharing providers. This makes that too high estimated parking norms for shared vehicles results in car sharing initiatives not being able to get off the ground. On the other side, too low estimated parking norms might result into an optimal usage of shared vehicles from the perspective of car sharing providers, but higher utilization of shared cars comes to lowered availability from the perspective for users. This can possibly undermine the support for car sharing as people consider availability of vehicles as important (Respondent_6, 2024) (Respondent_7, 2024). This contradiction will be described further in paragraph 4.2.3.

Last notion to make that goes for enforcement is that it requires a different juridical approach. Enforcing the application of shared cars as part of a building permit where the WABO procedure has been completed for, goes via an anterior agreement between car sharing providers and the civil service department. A permit does not give the opportunity to unilaterally enforce car sharing initiatives.

⁷ Quote in original language: *“Nou ja, dat is echt nog wel een aandachtspunt. Want als dat op privaat terrein is, dan hebben we daar gewoon echt wel minder zicht op.”*

⁸ Quote in original language: *“Ja wij wilden hier deelauto’s neerzetten, maar er is geen aanbieder die dat voor 10 jaar wilt doen.”*

⁹ Quote in original language: *“En dan is het onduidelijke en de vraag of die parkeernorm en autovervangingsratio nu voldoende, te weinig of te veel is*

¹⁰Quote in original language: *“Nou we wachten dan toch nog maar even af en kijken ook even hoe het in andere gebieden gaat. Ik maak me wel eens zorgen, gaat dit nou echt werken?”*

Within the public domain's perspective this fact means that unilateral steering opportunities are limited (Respondent_9, 2024).

Lastly, it also became apparent that there are legal challenges that are currently related to the complexity of organizing car sharing initiatives. These juridical complications make that municipalities are not sufficiently able to respond effectively to obstacles that arise when shared mobility policy is tried to be effectuated in practice. The first situation is when car sharing providers notice disappointing use of shared vehicles and have the demand to place them in public space outside instead. This cannot be simply done because competitive providers will object against this and see this as unfair competition (Respondent_10, 2024). Secondly, there is not much clear about what has to happen when a car sharing provider goes bankrupt (Respondent_6, 2024). Thirdly, agreements with car sharing providers are hard to alter (Respondent_6, 2024) and when the inability to alter is to the disadvantage of the municipality, it can be a serious financial burden for the municipality. Lastly there is some difficulty with withdrawing parking permits. Especially when there is no comparable parking alternative or consent of the side of the permit holder, it is not possible to withdraw (Respondent_9, 2024).

Respondent 10 : *It is of course possible that after 1 or 2 years it turns out that the shared cars are not used enough, so we want to move one or two of them to the public space. If we do that, we will actually come into conflict with parties that are already in the public space.*¹¹

Respondent 6: *“And a provider might go bankrupt after 4 years. Who will then ensure that there is a new provider?”*¹²

Respondent 6: *“We see that this does not work for residents because you agree that there will be an x number of shared cars for 10 years. That number has been calculated based on the number of fewer parking spaces that have been created. Maybe that's way too little or way too much. Then you have no way to adjust that.”*¹³

4.2.3 Facilitation of car ownership & insufficient attention for other modes of transportation.

In the theoretical framework the concepts of direct governmental steering and the integration of car sharing in the regulatory framework of the WABO-procedure were the main points of interests that were to play a role in the stimulation of car sharing growth from a public institutional perspective. However, another variable came to the surface. Spatial facilitation of car ownership interferes negatively with car sharing initiatives (Respondent_3, 2024).

Respondent 3: *“Shared cars have been placed, but they are not used, this can be caused by the abundance of parking space, so that everyone is able to park his or her own car.”*¹⁴

This question is multifaceted, this can be the case when owned cars can be parked with relative ease close to the residential unit and/or parking owned cars in public space is relatively affordable in relation to what parking in public space is worth. An example is the comparison between the price of a parking

¹¹ Quote in original language: *“Het kan natuurlijk dat na 1 of 2 jaar blijkt, dat de deelauto's te weinig gebruikt worden, we willen er een of twee verplaatsen naar de openbare ruimte. Als we dat gaan doen, komen we eigenlijk een beetje in de clinch met partijen die al in de openbare ruimte staan.”*

¹² Quote in original language: *“En misschien gaat een aanbieder wel failliet na 4 jaar. Wie zorgt er dan voor dat er een nieuwe aanbieder komt te staan?”*

¹³ Quote in original language: *“We zien dat dat in de richting van bewoners niet werkt omdat je afspreekt dat er een x aantal deelauto's komt te staan voor 10 jaar lang. Dat aantal is berekend op basis van het aantal, parkeerplaatsen dat er minder gerealiseerd is. Misschien is dat veel te weinig of veel te veel. Dan heb je geen middel om dat nog aan te passen.”*

¹⁴ Quote in original language: *“Er zijn deelauto's neergezet, maar ze worden niet gebruikt. Dat kan komen, omdat er genoeg parkeerplek is, zodat iedereen zijn auto neer kan zetten.”*

permit and the price to rent a parking place at private property at the same location within a given city. A parking permit is often much cheaper than renting a parking spot inside a parking garage nearby or in parking facilities that belong to the building where the residential unit is situated. What is worth to notice is that not only the facilitation of parking owned vehicles makes car sharing less promising, but a general municipal vision, where car mobility is seen as an essential part of the modal split at places where alternative modes of transportation are available is seen as factor that makes car sharing less promising (Respondent_5, 2024). Although the negative interference of car ownership facility is important to consider, simply decreasing the facilitation of parking capacity for owned cars can have a negative effect for the adoption of car sharing initiatives as well. Unintentionally it can lead to a decreasing support for car sharing initiatives when the alternative situation is not well thought of (Respondent_6, 2024). Insufficient attention to other modes of transportation has a negative impact on the development of car sharing initiatives, because, due to the incidental nature of car sharing rides, people have to rely on a varied choice of means of transport to meet their complete mobility needs. With alternative modes of transportation being not suitable to undertake the trip, people have a much stronger preference to own a car. (Respondent_1, 2023).

Respondent 6: *“Lower parking norms while people are not able to get a parking permit, this will lead to complaints, misunderstandings and ambiguities.”* 15

Respondent 1: *We do realize that you have to use the "carrot" and the "stick". The parking policy or the permit ceiling is then the stick and offering sufficient alternatives is the carrot. So not only shared mobility, but also good cycling facilities, public transport and attractive public spaces where you can walk easily and safely.”*¹⁶

4.3 Private institutional obstacles

Private institutional factors are seen as factors that cause car sharing providers not being fully able to compete with car ownership and to profitably increase their share in the modal split. In other words, where car sharing could potentially play a bigger role as mode of transportation in certain city-neighborhoods, it does not, because of the absence of sufficient demand for shared cars and/or the inability of car sharing providers to provide a car sharing service that meets the demand.

4.3.1 Unprofitability of car sharing

Improving urban livability by encouraging car sharing is a goal that municipalities can embrace in their mobility policies. To express this goal in the context of the market mechanism, this means that the service of car sharing must compete with car ownership and potential users must switch from their choice of private car rides to trips with shared cars. Before discussing the issue of the growth of the car sharing market, the obstacles associated with the current size of the market are discussed first. To overcome these obstacles, car sharing providers must either increase the quality of their provided car sharing service or decrease the perceived price, or both. Taking this in consideration, car sharing providers were asked what factors are laying at the base of the inability to undertake the steps leading to either one of them. The general trend that followed is the low profitability that offering shared vehicles entails and the little space they have to put the service in the market for a lower price (Respondent_4, 2024) (Respondent_7, 2024).

¹⁵ Quote in original language: *“Lagere parkeernormen, terwijl mensen geen vergunning kunnen krijgen, dat leidt echt wel tot klachten, onbegrip en onduidelijkheden.”*

¹⁶ Quote in original language: *“Wij beseffen dat je de ‘wortel’ en de ‘stok’ moet gebruiken. Het parkeerbeleid of het vergunningenplafond is dan de stok en het bieden van voldoende alternatieven de wortel. Dus niet alleen deelmobiliteit, maar ook goede fietsvoorzieningen, openbaar vervoer en aantrekkelijke openbare ruimtes waar je gemakkelijk en veilig kunt wandelen.”*

Respondent 7: *“We are making a loss and we cannot do anything in terms of pricing.”* 17

Expansion of this space requires service upscaling (Respondent_8, 2024) and increased use of the service. For upscaling and increased use to be possible, the use of shared cars by consumers must also become more recurring in nature. In the current situation, the use of shared cars is largely incidental (Respondent_4, 2024) (Respondent_7, 2024) (Respondent_8, 2024) (Respondent_10, 2024).

Respondent 10: *“A shared car is not an alternative for drivers who uses his or her car to get to work on a daily basis.”* 18

Incidental trips are classified as rides that are not part of the daily and or a short based recurring travel pattern of people. Examples are the commuter trips, grocery shopping or transporting people to recurring related activities. Like mentioned in the theoretical framework, B2C-car sharing is cheaper than car ownership when the year kilometrage is relatively low (see figure 5 at page 15). From a market-mechanistic point of view, this price structure is a response to this incidental characteristic demand for shared cars (Respondent_4, 2024) (Respondent_7, 2024).

Respondent 7: *“We consider car sharing to be a solution for people who drive a certain amount of kilometers per year.”* 19

The incidental nature of the use of shared cars is therefore a consequence of the price structure and the availability of shared vehicles. High year kilometrages by shared cars are more expensive than owning a car and both availability and accessibility are seen as an important condition for meeting daily car mobility needs (Respondent_6, 2024) (Respondent_7, 2024) (Respondent_9, 2024).

A private car can currently offer this availability better than a shared vehicle. Car sharing is not only more expensive but in cases when prices are comparable, people perceive car sharing as more expensive as well (Respondent_3, 2024) (Respondent_4, 2024).

Respondent 5: *“People own a car for themselves because they have the feeling that owning a car is cheaper than make use of the service of B2C-car sharing.”* 20

Shared car mobility only occupies a small place in the mobility market and shared cars are not able to serve people the opportunity of daily commutes. In the current situation, one vehicle at the major car sharing providers serves between 10 and 100 people, which are too many when some of them want to use the car on a daily basis for a considerable amount of kilometers, while keeping a descent degree of availability (Respondent_7, 2024). B2C-car sharing as a mode of transportation can maintain itself, although it cannot be called a large money maker (Respondent_4, 2024) (Respondent_7, 2024). In large cities, the significant population concentration provides enough potential customers for the shared vehicle to provide the occasional trips of near residents. Situated at a market equilibrium, supply and demand are currently in balance.

¹⁷ Quote in original language: *“Als je in de stukken kijkt maken we verlies en kunnen we niks op het punt van prijsstelling.”*

¹⁸ Quote in original language: *“Een deelauto is geen alternatief voor iemand die dagelijks zijn auto nodig heeft voor werk*

¹⁹ Quote in original language: *“Wij vinden dat autodelen er is voor de mensen die.. ja een bepaald aantal kilometers maken per jaar inderdaad.”*

²⁰ Quote in original language: *“Mensen hebben een eigen auto omdat ze het gevoel hebben dat die goedkoper is dan een deelauto van een provider.”*

4.3.2 Inability of organized market growth & overcoming initial phase

So much for the framework of obstacles that explains what profile B2C-car sharing plays in the current market. The next aspect is the growth of the market. The process of growth of business activities that are related to B2C-car sharing can come into being in two ways. Regardless of the factors that are driving it, a market expands by 1.) an increased demand, to which supply responds, or 2.) an increasing or improved supply that contributes to improvement of service quality, thereby increasing demand as mentioned in paragraph 2.1.4. The exact process of expanding a market is subject to many factors and supply and demand will always have a recurring interaction on each other. In the case of a mobility market, the focus of a growing share of the modal split lies in the supply and level of service of the relevant transport mode as well. A simple example: more people use public transport when public transport performs better (Rollinson & Coombes, 2023), just as more people use the car when traffic congestion decreases due to upgrading road capacity (Clifton & Moura, 2017) just as more people walk and cycle with improved cycling facilities and road safety (Song, Preston, & Ogilvie, 2016). Taking these phenomena into account, it can be argued that the growth of car sharing mobility is tailored on the same. Inquiries among interview respondents seem to be in line with this line of thought (Respondent_9, 2024) (Respondent_10, 2024) (Respondent_11, 2024) (Respondent_13, 2024).

Respondent 10: *“Supply also creates demand. Look, if you never see a shared car anywhere, why on earth would you switch to the use of shared mobility?”* 21

However, the current car sharing market currently operates according to the opposite paradigm. This means that supply follows demand. The first example related to this is the consideration where and how many shared vehicles are put somewhere. Logically, car sharing providers only offer shared vehicles where they are profitable at that time, under current demand, or where this could become the case when area developments provide insight or an estimation into how many new shared vehicle users will there potentially be (Respondent_4, 2024) (Respondent_5, 2024) (Respondent_7, 2024) (Respondent_8, 2024) (Respondent_9, 2024) (Respondent_10, 2024) (Respondent_11, 2024).

Respondent 4: *“Of course, we will never leave car that is unprofitable.”* 22

Not only the consideration of where and how many shared cars are placed in certain places is subject to this, but also the structure of the price for using car sharing services. Perception research commissioned by one of the car sharing companies that was interviewed, has shown that the current price structure of costs per kilometer, per time unit and monthly subscription price are the closest to the optimum for car sharing providers in the current market (Respondent_4, 2024). This means that a different price structure would apparently lead to a reduction in customers or a lower profit margin per kilometer driven.

Respondent 4: *“We gave the order to do a price-perception research, specifically to ask questions about these kinds of things and also to see what people's willingness is, and it showed that the model we are currently using, is the most favorable.”*23

This price structure follows from the current mobility demand for shared transport, which, as mentioned earlier, is of an incidental nature. In this case, it implies that upscaling of shared mobility in

²¹ Quote in original language: *“Aanbod creëert ook vraag. Kijk als je nooit ergens een deelauto ziet staan, ja waarom zou je in godsnaam overgaan op het gebruik van deelmobiliteit?”*

²² Quote in original language: *“We laten natuurlijk nooit een auto staan die verlies draait.”*

²³ Quote in original language: *We hebben prijs-perceptie onderzoek laten doen, juist specifiek om dit soort dingen uit te vragen en ook te gaan kijken van wat is dan de bereidheid van mensen is en daar is uit gebleken dat het model dat we nu hanteren het meest gunstig is.”*

Figure 12: schematic view of the process of the tension between user efficiency and vehicle availability (Author's work 2023)

Increasing the number of vehicles is therefore a logical step to solve this issue, but here too the following applies: does an increase in the number of shared cars stand equal to meeting the demand or is it ahead of that? As mentioned in 4.3.2, the paradigm that car sharing providers follow is “supply is following demand.” In a growing market or increase in use, this means that an area is crossed that can be seen as the moment at which a shared car in itself is cost-effective for a car sharing provider, but that availability for users decrease and forms a barrier within this field of tension. After all, why would you add shared cars if the current ones are well used in the area? The consequence of adding a shared car may be a small increase in the number of reserved rides, but the question is whether this increase in the number of ride reservations sufficiently covers the additional costs of an extra vehicle. It is an investment for the car sharing provider on a small scale and from which no guaranteed complete cost coverage can initially be generated.

4.3.4 Owned vehicle attachment & target groups

In paragraph 2.1.3 several motives for car ownership have been discussed. These motives ranged from vehicle's specifications, like comfort, safety, accessibility, passenger & luggage space and performance based ride characteristics to more internal value based motives like autonomy, identity and status. The motives above here, also recur in the interviews several times. They come back in the interviews as values that cause obstacles within the consideration of switching from car ownership to car sharing. Although more detailed and precise explanations for not considering car sharing instead of ownership have not been investigated, these can be seen as an essential part of people's skeptical view of car sharing in addition to considerations about costs. Within this research it can be said that there is a so-called attachment to one's own car. Shared vehicles are not fully able to properly answer several needs that owned vehicles do answer. Example 1: a family that needs that car on a very regular basis while having a specific mobility pattern that is very difficult to be served with shared cars (Respondent_13, 2024). Example 2: the older couple who are not eager to cooperate with innovative ways of meeting their mobility needs with shared mobility and who are familiar with their own car. Example 3: the person who uses his car intensively every day.

Respondent 13: *“When someone or a family consists of a father and a mother and they both need a car, for example because they are informal caregivers, or the son has a van with building materials. Then you cannot expect them to give up their car.”*²⁷

Besides this vehicle attachment, there is another aspect that needs to be taken into account, which is the income of potential users. Low income households cannot use shared cars to provide themselves in their mobility demand on a regular basis. High income households will consider car sharing only for idealistic reasons. (Respondent_13, 2024).

Respondent 13: *“Income can be a barrier to use shared cars. If a citizen's income is too low, shared cars are not used. High income households simply rather buy a car.”*²⁸

²⁷ Quote in original language: *“Op het moment dat er iemand of een gezin bestaat uit een vader en een moeder en die hebben allebei een auto nodig, want ze zijn bijvoorbeeld mantelzorger, of de zoon heeft een busje met bouwmaterialen. Dan kun je niet verlangen dat die afstand doen van hun auto.”*

²⁸ Quote in original language: *“Inkomen kan een drempel zijn om deelauto's te gebruiken. Als jij een te laag inkomen hebt voor vervoer, kan je geen deelauto gebruiken. Als je een hoog inkomen hebt, koop je een auto.”*

Lastly, some other motives are there as well. These range from the aversion to electric driving that especially goes for car sharing providers that serve electric vehicles and lack of knowledge about the advantages of shared vehicles (Respondent_3, 2024).

4.4 Overarching institutional obstacles

Overarching institutional obstacles are defined as obstacles that contribute to the public institution's inability to steer and capture the full complexity of car sharing mobility rule-making and to obstacles that cause car sharing providers not being fully able to compete with car ownership and to profitably increase their share in the modal split. Overarching obstacles can be seen as a common denominator in which the effects of public and private institutional obstacles maintain each other across the two domains. These obstacles can originate from the organizational failure of the institutions concerned, but can also be external obstacles that both actors have to deal with. The obstacles are grouped by looking at the common denominator to where these obstacles can be traced.

4.4.1 Car Sharing Incentive

Where other transport options have matured over the past century and occupy a certain place in the modal split, car sharing is a mode of transportation that has not been offered for long yet. For example, large car sharing providers "Green- and Mywheels" have only been operational for one or two decades and in the theoretical framework it was mentioned that communication technology has only recently made it possible to offer this mode of transport systematically. It can be stated that every mode of transportation has a reason for growth. Interview data shows that car sharing as a mode of transport needs a certain cause for it to be operational on higher scale. It can also be called the "the necessity car sharing" where it should be noted that car sharing as such is emerging as an option out of necessity. This mainly applies to the majority of potential car sharing users and not the early adapters, but this group is important because the customer base from this group is decisive for car sharing becoming adopted on a large scale. The earliest car sharing users are generally the people who switch to car sharing out of idealistic considerations (Respondent_9, 2024).

Respondent 9: *"A couple of idealists, those are citizens that already strongly ask for shared vehicles."*²⁹

The so-called early and late majority have a more specific reason for car sharing that is rather based on personal benefit (Respondent_7, 2024).

Respondent 7: *"With the early majority it becomes a broader group, so the motivation to do it, shifts. You are more likely to use it if it is a good alternative to an owned car. More from self-interest and less from the environmental aspect."*³⁰

If there is no need for car sharing, it will not get off the ground (Respondent_8, 2024) (Respondent_10, 2024). Geographical factors can be added under this phenomenon. High urban density areas make car sharing more suited in providing the mobility needs of people within a certain area (Respondent_3, 2024) (Respondent_11, 2024).

²⁹ Quote in original language: *"Je hebt hier en daar een paar idealisten, dat zijn de mensen die nu al smeken om deelauto's."*

³⁰ Quote in original language: *"Bij de early-majority wordt het een bredere groep, daarmee verschuift de motivatie om het te doen. Je gaat het dan eerder gebruiken als het een goed alternatief is voor de auto. Meer uit eigenbelang en minder vanuit het milieuaspect."*

Respondent 3: *“Car sharing companies find it less commercially interesting to offer cars in areas with lower population density.”*³¹

This is in line with the statement that facilitating car ownership and not paying sufficient attention to policy for alternative forms of transport such as public transport and safe direct connections for cyclists and pedestrians have a negative impact on the development of car-sharing initiatives.

(Respondent_1, 2023) (Respondent_3, 2024) (Respondent_7, 2024) (Respondent_8, 2024)
(Respondent_10, 2024).

4.4.2 Absence of a mediator

As mentioned earlier, there is a tension between user efficiency and vehicle availability that hinders the launch of car sharing initiatives. In interviews, several respondents have indicated that governmental direction is lacking, contributing to the inability of the growth of car sharing as part of the modal split, they indicated that the inability of organized market growth, is partly caused by the absence of a mediator that performs the necessary organizational tasks (Respondent_7, 2024) (Respondent_12, 2024). These tasks revolve around determining in advance whether sufficient people within a street or neighborhood are willing to use a shared car for not owing a car in return (Respondent_7, 2024).

Respondent 7: *“If the car runs poorly, we have to take it away, unless the municipality goes into the neighborhood or sends a letter to try to guarantee that an x number of customers will actually drive it.”*³²

Carrying out this task creates an administrative workload. The responsibility for carrying out these kinds of studies is currently neither under the responsibility of municipalities or commercial actors. Municipalities do not seem to do it on a large scale and for actors in the private domain goes the same (Respondent_7, 2024). Car sharing providers cannot include this on a large scale in their portfolio of activities, because they would then price themselves out of the market, and admit that it does not fit in their business model under the current circumstances (Respondent_7, 2024). Carrying out these operations incur costs, that in one way or another must be recovered from consumers that utilize car sharing services (Respondent_7, 2024). Systematically exploring new user potential, is called “matchmaking” by one of the respondents. A matchmaker is therefore charged with the role of investigating whether there are enough people on the street or neighborhood level who stand positive towards to car sharing and leading, or directing and implementing the process so that these people can have access to a shared car. Knowing the results of these investigations, a matchmaker, can then guarantee a certain amount of driven kilometers for shared vehicles.

4.4.3 Unsuccessful policy effectuation

Looking at how the actors, municipalities and car sharing providers, can be characterized, there is a certain contradiction in their interests (Respondent_11, 2024) (Respondent_13, 2024) that creates an obstacle. As indicated in the theory, municipalities have a social interest to serve against market players who develop their activities to provide for their own existence. An important phenomenon that follows from this is the partial inapplicability of municipal regulations to effectuate a guaranteed offer of shared

³¹ Quote in original language: *“Autodeelbedrijven vinden het commercieel minder interessant om in gebieden met lagere bevolkingsdichtheid auto’s aan te bieden.”*

³² Quote in original language: *“Als de auto slecht draait, dan moeten we hem weghalen, tenzij de gemeente de wijk ingaat of rondschrijft om te proberen te garanderen dat dat een x aantal klanten dan ook echt daarmee gaat rijden.”*

cars by car sharing providers. The following situation is described as an example to explain this phenomenon.

Respondent 13: *"We have also made agreements and that is the difficult part. On the one hand you want to hold them to it, but it is of no use to us if after about 6 months there are cars there that are not being used, then I would rather they put cars in other places in the municipality where they are being used. become. We also have no use for providers that go bankrupt. It is a field of tension for us."*³³

In urban area development where new estates are developed, meeting needs for parking capacity is often resolved on private property and mostly indoors. Given the situation of keeping cars out of public spaces as much as possible or the physical shortage of space, this is a logical choice in municipal policy and regulation. However, private parking spaces are managed by owners or property managers of the entire building and are mostly not freely accessible to everyone. For reasons of user efficiency, car sharing companies do not want to offer vehicles in parking spaces that are not freely accessible. They have indicated that parking shared cars in covered facilities is not one of their preferences as well, because reduced visibility and accessibility of the shared vehicle in question could lead to missed clientele.

Respondent 5: *"It is not favorable for the visibility of shared vehicles, to park indoors. We simply don't get any cars there, and there isn't a single provider that is open to that."*³⁴

Interviewer: *"In the case of public space, a shared vehicle can be used, because anyone is able to access the vehicle?"*

Respondent 4: *"Yes, that is actually even a requirement from our side."*³⁵

However, in order to be able to implement shared cars as a solution to the parking demand, as part of the permit, it is important that public authorities are able to enforce that shared cars are actually offered in practice. The permit itself does not offer this enforcement option, but the juridical base is laid on prior agreements between municipalities and shared car providers (Respondent_9, 2024). This situation leads to car sharing providers being reluctant to enter into agreements about the offer guarantee of shared cars and ultimately this circle relationship leads to the inability to conclude a binding deal on offering shared cars or just a non-binding deal that can fail by lack of customer interest.

4.4.4 Communication

The interviews also revealed that there are gains to be made in the process of area development in the field of communication between different actors. This mainly concerns communication between developers or real estate managers with future residents of the relevant homes that have been completed in new construction projects. It occurs that new residents do not know that they can use a shared vehicle at their new home, which can ultimately lead to untapped use of shared cars, while this potential could have been utilized. (Respondent_3, 2024) (Respondent_6, 2024).

³³ Quote in original language: *"We hebben ook afspraken gemaakt en dat is het lastige. Aan de ene kant wil je ze er aan houden, maar wij hebben er ook niks aan dat na een maand of 6 daar auto's staan die niet gebruikt worden, dan heb ik liever dat ze auto's neerzetten op andere plekken in de gemeente waar ze wel gebruikt worden. We hebben ook niks aan aanbieders die failliet gaan. Het is voor ons een spanningsveld."*

³⁴ Quote in original language: *"Het is niet gunstig van de zichtbaarheid van deelauto's om in pandig te parkeren. We krijgen daar gewoon geen auto's, er geen één aanbieder die daar voor open staat."*

³⁵ Quotes in original language: *"In het geval van de publieke ruimte kan eventueel wel een deelauto worden gebruikt, want dan kan iedereen natuurlijk bij die deelauto komen." "Ja dat is zelfs een eis van ons."*

Respondent 3: *“What I sometimes see is that I think there is little communication from real estate parties about the presence of shared cars and if people are going to live there, they should actually know in advance that “you can’t actually park your own car there, but there are shared cars.”*³⁶

On the other hand, a restriction on private car use can also lead to homes being unsaleable (Respondent_6, 2024). However, it was not clear which target group was involved at the time, so it cannot be excluded that a restriction on private car use when considering purchasing - or entering into a rental period - for a home will standardly lead to home seekers dropping out.

Respondent 6: *“Having your own ability for transportation is considered a value in the purchase of houses. Houses are becoming increasingly expensive, you are now in a higher price segment, but without a parking space for your own car, then, they are not sold.”*³⁷

Finally, there are also communication barriers in existing situations. An example of this is that people are skeptical about shared cars because they do not sufficiently understand the added value (same goes for political support) or they are not aware of the car replacement rate of shared cars (Respondent_9, 2024) (Respondent_11, 2024).

Respondent 9: *“Then many people say that parking spaces should not be sacrificed. As a municipality we say: if you have a shared car in the street, that actually provides a place. Only no one believes it.”*³⁸

Respondent 13: *“Creating a hub with shared mobility also means that 4 car parking spaces will be lost. Everyone then has the question: “where should I park my car?”*³⁹

4.4.5 Tension shared vehicle visibility and municipal car free environment ambitions

Finally, a possible obstacle that might occur in the future, came forward in one of the interviews. Although this issue is not confirmed to be occurring right now, it sure is something to take into account. This issue may arise in light of the issue that car sharing providers do not want to store their vehicles in indoor parking facilities. This poses a contradiction with the ambition of municipalities to execute traffic calming policies regarding storage of cars in public spaces, if not making some streets entirely car-free.

Respondent 6: *“The initial intention was to keep shared cars visible. It is also expected that the number of shared cars will continue to grow significantly. If you say, we will make our city center residential-friendly, and only allow essential car traffic, then you do not want to see hordes of shared cars in the streets.”*⁴⁰

³⁶ Quote in original language: *“Wat ik nog wel eens zie, is dat er volgens mij weinig communicatie is vanuit vastgoedpartijen over de aanwezigheid van deelauto’s en als mensen daar gaan wonen, moeten ze dus eigenlijk van tevoren weten van “eigenlijk kan je je eigen auto daar niet kwijt, maar er zijn wel deelauto’s.”*

³⁷ Quote in original language: *“Het hebben van eigen vervoer wordt als waarde beschouwd bij de aankoop. Huizen worden steeds duurder, je zit inmiddels in een hoger prijssegment maar dan zonder parkeerplek voor de eigen auto, dan worden ze niet verkocht.”*

³⁸ Quote in original language: *“Dan zeggen veel mensen dat er geen parkeerplaatsen opgeofferd moeten worden. Als gemeente zeggen we: als je een deelauto in de straat hebt, dan levert dat juist een plaats op. Alleen niemand gelooft het.”*

³⁹ Quote in original language: *“Bij het realiseren van een hub met deelmobiliteit, betekent dat er ook 4 autoparkeerplaatsen weggaan. Iedereen zit dan recht op met de vraag: “waar moet ik dan mijn auto neerzetten?”*

⁴⁰ Quote in original language: *“De eerste instantie was dat ook wel de bedoeling om deelauto’s wel zichtbaar te houden. Het is ook de verwachting dat het aantal deelauto’s nog flink gaat groeien. Als je zegt, we maken onze binnenstad verblijfsvriendelijk, en alleen het hoognodige autoverkeer nog toelaten, dan wil je niet dat er alsnog hordes deelauto’s in de straten staan.”*

4.5 Conditions and chances for overcoming public institutional obstacles

4.5.1 Active governance

Like mentioned in 4.2.1, there is a lack of municipal guidance in the process of the stimulation of shared mobility. As indicated in the theoretical framework in section 2.2.1, actively steering on shared car mobility is a promising means of reducing car ownership and encouraging shared car use while people's car mobility needs are still met. Municipalities do offer the option of having shared cars fill in the option of solving the parking issue in estate developments but these interventions are ad hoc and often have a high degree of non-binding nature. Several respondents have indicated that active steering upon car sharing by municipalities is necessary as an essential part of this process. Active steering on car sharing initiatives, is therefore the condition that is essential to make municipal bodies capable of managing car sharing as a mode of transport (Respondent_2, 2024) (Respondent_11, 2024) (Respondent_13, 2024).

Respondent 2: *"I do think that we as a municipality could be more proactive about this and go into the neighborhoods. Involve people more and help them cross the threshold to actually start car sharing."*⁴¹

Respondent 11: *"I notice that the market needs guidance."*⁴²

4.5.2 Expansion of municipal resources

Active steering on car sharing initiatives comes with obstacles besides the lack of active steering as being an obstacle itself. Active governance requires investments of public resources, given the fact that there is a shortage of them in several municipalities. These shortages are an inherent part of the explanation why municipalities are currently hardly steering actively on shared mobility as proposed in the theoretical framework. Not only more active steering itself is therefore a prerequisite, but the need for an expansion of resources must also be made available to implement this management (Respondent_1, 2023) (Respondent_2, 2024) (Respondent_7, 2024) (Respondent_10, 2024).

Ultimately, a municipal administrative organization is a reflection of the political situation in the municipality in question and political support is therefore indispensable to make the resources available that are necessary for active steering. Conversely, political support is a reflection of the local society and if citizens can be informed about the possibilities of car sharing, support can be created, which is not only important for getting car sharing initiatives off the ground at street level, easier, but also for increasing political support. The most important message that needs to be conveyed among civilians and politicians is the added value of car sharing and not emphasizing what car sharing has to solve.

Respondent 5: *"No, that is still very difficult at the moment, because the council would like to see a social added value in the use of shared cars at this time."*⁴³

Municipal resources aim to ensure that an administrative effort is made with regard to that what is needed to organize shared mobility. Activities that arise from this, are revolving around the mapping on what addresses shared cars are present. This is necessary to ensure that these car sharing initiatives are maintained in these places and restrict a rise of car ownership. In addition, municipal resources are needed for enforcement activities. With an increase in shared mobility within the modal split, there

⁴¹ Quote in original language: *"Ik vind wel dat we daar wat proactiever als gemeente op zouden mogen acteren en de wijken in. Mensen meer meenemen en een drempel over helpen om daadwerkelijk te gaan autodelen."*

⁴² Quote in original language: *"Ik constateer dat de markt behoefte heeft aan sturing."*

⁴³ Quote in original language: *"Nee, dat is nu nog heel lastig, omdat het college wel graag graag een maatschappelijke meerwaarde zou willen zien in de inzet van deelauto's op dit moment."*

will also be an increase in the demand for municipal resources to carry out these enforcement activities at more addresses than is currently the case and, finally, additional resources are needed to give municipalities the opportunity to play a more leading role to be taken in the process of organizing car sharing initiatives. More about this in paragraph 4.7.1.

4.5.3 Best practices and creation of a parking standard

A number of obstacles can be added under a so-called “pioneer barrier.” Examples mentioned in 4.2.2 are the unknown parking standards and the higher pressure on accuracy of these parking standards and a wait-and-see attitude of municipalities driven by uncertainty, which in turn causes that car sharing initiatives do not get off the ground. A lack of known best practices explains this phenomenon. Although the search area for best practices can initially be expanded, it is also important to comprehensively evaluate every car sharing initiative in the Netherlands. It is essential to check to what extent the parking standard prove to be realistic to the practical situation, while taking into account as much environmental data as possible. Examples are housing density, alternative forms of transport and the price range of the homes in question. Factors that CROW also includes in their studies in order to publish guidance on all kinds of traffic engineering measures. Shared car mobility, just like conventional parking, must become an important part of this to provide municipalities with tools with which new car sharing policy can be formulated and implemented. The most important thing for this is to evaluate municipalities themselves and to make evaluation results freely available, with a third authority collecting this data and publishing a guide based on this data. In this way, the number of best practices from which support can ultimately be obtained for projects increases faster and shared car mobility becomes a well-known tool more quickly, instead of having to be pioneered again and again.

Respondent 6: *“We are also in one of those national steering groups. Make sure that measures become nationally recognizable and that we learn from each other.”*⁴⁴

4.5.4 Careful restriction of car ownership

Paragraph 4.2.3 describes that facilitating the parking of private cars interferes negatively with car sharing initiatives. This is because when people are given the free choice between car owning or car sharing, they often choose to have their own car (Respondent_10, 2024). An exception to this is the small group that chooses to use shared vehicles for idealistic reasons. (Respondent_7, 2024). With this phenomenon in mind, an effective car sharing policy requires careful restrictions on car ownership. Restricting car ownership can be done in various ways and how this should be done carefully is as follows. First of all, paid parking is a condition (Respondent_2, 2024)

Respondent 2: *“Paid parking is a key-condition to make shared car mobility happen.”*⁴⁵

Without a parking permit system, car sharing cannot be enforced and a municipality cannot discourage car ownership. Furthermore, lowering parking norms is important in case of area development plans, especially in case of new developments. In existing public spaces, reducing parking capacity must be considered. Although discouragement of car ownership is an important condition for the establishment of car sharing initiatives, this must be done carefully. The most important guideline is that citizens must not get the feeling that they are disadvantaged in meeting their mobility needs due to this policy (Respondent_7, 2024) (Respondent_12, 2024) (Respondent_13, 2024).

⁴⁴ Quote in original language: *“Wij zitten ook in een van die landelijke stuurgroepen. Zorg dan ook dat het landelijk herkenbaar is, dat we van elkaar leren.”*

⁴⁵ Quote in original language: *“Betaald parkeren is een randvoorwaarde om deelautomobiliteit voor elkaar te krijgen.”*

Respondent 7: *“if municipalities start introducing it in places where shared mobility is not really necessary or where people have a low income... Then what are you actually doing?”*⁴⁶

This starts with a collective feeling of the need for measures against livability problems, where car sharing can act as a tool to tackle these problems. High parking pressure being the clearest example, like mentioned in paragraph 1.1. In this case car sharing must be seen as a tool to improve livability rather than an aim itself (Respondent_13, 2024). In other words, not only there is a need for a threshold for car ownership, but in a certain sense, a necessity for car sharing, as well (Respondent_6, 2024).

Respondent 6: *“to say that we cannot bring people together with commercial parties, that is not the case. It's just that the necessity for car sharing is not there.”*⁴⁷

An important condition for discouraging car ownership, which is also associated with stimulating car sharing initiatives, is that alternative modalities like public transportation and facilities for active modes of transportation must be sufficiently available. This is in line with the fact that car sharing services are mainly intended for incidental trips, a fact which will not change in the beginning phases of a possible growth of shared mobility in the modal split. People who engage into shared mobility, thus, need other modes of transportation as well to meet in their mobility needs. Carefully discouraging car ownership is therefore focused on the preservation of citizens' ability to move to a comparable extent. Insufficient availability of alternative modes of transport can cause people to adopt negative attitudes towards measures of discouragement of car ownership. A supporting strategy for this condition is to still allow private car parking, but to locate these parking spaces further away than the parking spaces for shared cars. People who absolutely need a car, still have the option to qualify for it (Respondent_13, 2024).

Respondent 13: *there is middle course that private cars will not be parked in areas anymore where space is scarce but at another place. We are also doing all kinds of pilots for that, it is called remote parking.”*⁴⁸

Finally, one last condition that should be mentioned within the context of carefully discouraging car ownership is to focus this effort on areas that are suitable for this policy. This is also in line with the theoretical framework that car sharing is currently already being applied more often in these places. In line with the efforts of public law stakeholders, it is therefore important to focus car sharing policy to stimulate shared mobility mainly on inner city areas and surrounding residential areas, where the opportunity for car mobility is already less attractive due to high spatial pressure, and higher levels of traffic congestion (Respondent_3, 2024) (Respondent_9, 2024) (Respondent_11, 2024) (Respondent_13, 2024).

4.6 Conditions and chances for overcoming private institutional obstacles

4.6.1 Financial investments into shared mobility as mode of transportation

Like mentioned in paragraph 4.3.1, B2C-car sharing is hard to make a profitable business out of it in current circumstances. Shared mobility is only a small part in the modal split. Especially people who only incidentally need to travel by car turn to shared cars. Currently, shared cars are not an alternative to car ownership due to a combination of service and price. Improving price and service is equivalent to scaling up the supply of shared cars at a price comparable and competitive to car ownership. Scaling

⁴⁶ Quote in original language: *“als gemeenten het gaan invoeren op plekken waar deelmobiliteit toch niet echt nodig is of waar mensen een laag inkomen hebben. Wat ben je dan eigenlijk aan het doen?”*

⁴⁷ Quote in original language: *“om op basis daarvan te zeggen dat we met commerciële partijen geen mensen bij elkaar kunnen brengen, daar is geen sprake van. Het is gewoon dat die behoefte voor autodelen er niet is.”*

⁴⁸ Quote in original language: *“er is wel een tussenweg mogelijk dat de auto niet meer in de gebieden staat waar de ruimte schaars is, maar op een andere plek. Daar doen we ook allerlei pilots voor, parkeren op afstand heet dat.”*

up car sharing in the modal split is currently not possible to be done by the market itself like quoted at page 33. Several respondents indicated that this requires financial support. The respondent's views differ about what form of financial support can be thought of. These range from plain subsidizing, making car sharing more attractive fiscally, and covering costs of car sharing initiatives within area development plans.

Subsidizing car sharing can be seen as overarching concept where different approaches can fall under. For this research the terminology of subsidizing is therefore seen as a systematical financial support of car sharing. What was noticeable in this discourse was the comparison with public transportation. It is equated with the possible financial support of shared mobility. Public transportation is partly subsidized by central and provincial governmental organizations (Respondent_13, 2024). Subsidizing car sharing to a certain extent is one of the examples of systematically supporting this transport mode.

Respondent 13: *What role do you now take as a government, because we provide public transport with a concession and we pump millions into each other. We say that public transport should cost money. That has social importance, bringing people from A to B, but that question has never been asked about shared mobility. I can also wonder why this is from market parties, because we have a social objective, which may cost money.*⁴⁹

Another possible way of financially supporting car sharing is to reduce BPM, road tax, reducing the price for a parking permit or reducing the costs that are part of the procedure for registering shared vehicles (Respondent_7, 2024).

Respondent 7: *“There is a lot you can do with taxes, such as road tax and all kind of these charges.”*⁵⁰

The third method of financial support can take place on a smaller scale. This involves delivering guarantee to some extent for car sharing providers' cars that are not yet cost-effective in the beginning phase after the date of installation on the streets. The so-called initial phase. Several respondents have indicated that municipalities have a role to play in making a financial contribution to this. This guarantee can be part of a real estate development plan but also an independent car sharing initiative in the existing built environment.

Respondent 9: *“But we did say that we believe that a developer should contribute to this. In the sense that the costs for shared transport of residents are lower for a while as an incentive.”*⁵¹

Developers can also be asked to make this contribution given the fact that shared cars in developments often involve a reduction in the parking standard and therefore a reduction in construction costs. Important to notice is that this construction has some barriers of its own that are mainly revolving around the inability to decide how the agreement regarding guarantee deliveries are formed. Possible solutions for that matter are further explained in 4.7.2.

⁴⁹ Quote in original language: *“Welke rol neem je nu als overheid, want openbaar vervoer doen we met een concessie en daar pompen we elkaar miljoenen in. We zeggen dat openbaar vervoer geld mag kosten. Dat heeft maatschappelijk belang, mensen van A naar B brengen, maar die vraag is nooit gesteld bij deelmobiliteit. Ik kan me ook afvragen waarom dat van marktpartijen is, want we hebben een maatschappelijke doelstelling, dat mag geld kosten.”*

⁵⁰ Quote in original language: *“Je hebt heel veel wat je kan doen met belastingen dus wegenbelasting en dergelijke.”*

⁵¹ Quote in original language: *“Maar we hebben daar wel bij gezegd van dat wij wel vinden dan dat een ontwikkelaar daar aan mee moet betalen. In de zin van dat de kosten voor deelvervoer van de bewoners een tijd lang lager zijn als stimulans.”*

Respondent 11: *“Over the next 5 years, we will pay a car sharing provider an x amount and then we will leave an x number of cars there to bridge the start-up phase.”*⁵²

In conclusion investments can have the form of systematic financial support as foundation for the existence of a new mode of transport sector, or to cover up the initial phase of car sharing initiatives during real estate developments or in existing build environments.

4.6.2 Application of pricing strategy

As indicated earlier in the theoretical framework, the price perception of car sharing plays a role in a number of people's decision to refrain from car sharing. This mainly revolves around people who yearly drive the amount of kilometers which entails comparable costs for B2C-car sharing as car ownership. B2C-car sharing is experienced as expensive, while this is not always the case due to the high share of observable costs within the total cost picture. In the theoretical framework aligning the price perception of B2C-car sharing with car ownership was described to make people more aware under what circumstances car sharing is cheaper than car ownership. A method for this was to adjust the structure of the subscription for shared mobility by increasing the share of sunken costs and reducing the share of observable costs. However, perception research commissioned by one of the car sharing providers that was interviewed, has shown that the current price structure of costs per kilometer, per time unit and monthly subscription price are the closest to the optimum for car sharing providers in the current market as was quoted at page 33. Respondent 7 subsequently suggested that in the current situation, changing the structure of the subscription is less strategic than changing how car ownership is paid for. In the Netherlands this is called *“anders betalen voor mobiliteit”* translated: *“paying different for mobility.”* Paying differently for mobility can be used as an opportunity to strengthen the competitive position of car sharing relative to car ownership because the prices between shared mobility and car ownership can then be compared better. At the same time, this does not lead to a deterioration of the financial position of car sharing providers.

Respondent 7: *“There is a lot that you can do with how car mobility is taxed. An example is pay as you go. Then you can add the “shared car” category and give a lower rate.”*⁵³

4.6.3 Stepped growth

Like described in 4.2.3, there exists a tension between the accessibility of shared vehicles that plays an important role in the attractiveness of shared mobility and user efficiency that is needed for the vehicle's profitability for car sharing providers. Car sharing providers, logically have an economic incentive where they choose to put their vehicles and therefore follow the market's demand. In 4.3.2 it was shortly mentioned that the interrelationship between supply and demand in the mobility market is not fully the same as how shared mobility services operate in the free market. The demand for transport services has, to a certain extent, a positive correlation with the supply for these services. A condition that can be created that is in line with these considerations is stepped growth (Respondent_3, 2024) (Respondent_9, 2024) (Respondent_12, 2024).

Respondent 3: *“Yes, preferably, you want to aim for 20 residents, because then you can also set up several shared cars.”*⁵⁴

⁵² Quote in original language: *“De komende 5 jaar, betalen we een deelauto aanbieder, een x bedrag en dan laten we daar een x aantal auto's staan om de aanloopfase te overbruggen.”*

⁵³ Quote in original language: *“Je hebt veel wat je kan doen met hoe automobilititeit wordt belast. Een voorbeeld is betalen naar gebruik. Dan kun je de categorie “deelauto” daar aan toevoegen en een lager tarief geven.”*

⁵⁴ Quote in original language: *“Ja het liefst, wil je toch al wel richting de 20 bewoners, want dan kun je ook wel meerdere deelauto's neerzetten.”*

Respondent 9: *I think you actually have to have a certain mass to take a system step in one go. Here I am not thinking of gradual growth, but of installing several cars at a time, because people then see: the cars are there, it is available, it will grow automatically.*⁵⁵

An investment is made to make that the offer of shared cars at a local level gets ahead of the demand. With stepped growth, the supply of shared cars is ahead of the demand. Because of this anticipatory offer, demand is expected to grow along with it. In order to make stepped growth possible, it is important that the costs are covered externally during the phase between the first vehicles being placed at the location in question and the moment they will become cost-covering themselves. This is in line with the condition of covering the costs in the initial phase, stated in paragraph 4.6.1.

4.6.4 Target groups and citizen participation

Systematic financial support of car sharing initiatives and actively involving citizens that comes with it, requires a meticulous preliminary research about the support for these initiatives. Bottom-up approaches are therefore the used methods to give citizens a qualitative sense of involvement (Respondent_8, 2024). This, because before large-scale operations can be initiated, first it is important to know how many support can gathered at the base of initiatives.

Respondent 8: *“In that respect, we start from the bottom up, we don't work with a stick but with a carrot. We are going to facilitate it. We offer the opportunity, because I see initiatives in larger municipalities that we are moving in that direction, so we are preparing to move in that direction as well.”*⁵⁶

However, support is not a given and local authorities will have to consider where this support can best be found, under the guise of low-hanging fruit. As mentioned earlier, not everyone is open to car sharing initiatives. This is why different respondents advocate a target group approach in order to contact the citizens that have positive attitudes towards shared mobility in general and have a current trip profile that make them suitable to cooperate in particular. These target groups range from young drivers (Respondent_4, 2024) (Respondent_11, 2024) (Respondent_12, 2024), to motorists with low annual mileage (Respondent_12, 2024), single-person households (Respondent_8, 2024), persons or households who have a second or third car (Respondent_11, 2024) (Respondent_12, 2024).

In addition to this target group approach, there is another important condition to take into account. The organization of shared mobility must not have negative consequences for the financial situation of low-income target groups when people in this group switch from car ownership to car sharing. Finally, the target group approach' focus should be on low and middle incomes, while it is expected that high incomes will not participate in the initiatives (Respondent_13, 2024) unless the motive is based on idealistic foundations. To inform potential users as best as possible about the benefits of car sharing. The message comes across when its added value has been proven, both being under the responsibility from both municipalities and car sharing providers.

⁵⁵ Quote in original language: *“Ik denk dat je ook eigenlijk een bepaalde massa moet hebben om in één keer een systeem stap te zetten. Hier denk ik niet aan geleidelijke groei, maar om per keer meerdere auto's neer te zetten, omdat mensen dan zien van: de auto's zijn er, het is beschikbaar, het gaat dan vanzelf groeien.”*

⁵⁶ Quote in original language: *“Wat dat betreft beginnen wij bottom-up, we werken niet met een stok maar wel met een wortel. We gaan het faciliteren. We bieden de mogelijkheid, want ik zie bij initiatieven in grotere gemeentes dat we die kant op gaan, dus wij bereiden ons voor om ook die kant op te bewegen.”*

4.7 Conditions and chances for overcoming overarching institutional obstacles

4.7.1 Matchmaker imperative

Several barriers and conditions are connected to the following condition for overcoming the overarching institutional obstacles. Like mentioned earlier in several paragraphs, the absence of active governmental steering, the inability of organized market growth, the absence of a mediator are barriers that have one common denominative condition: the need for a stakeholder that takes the role of match maker. This, to take care for the challenge to organize a stepped growth of shared mobility, by systematically exploring new user potential for shared vehicles. A matchmaker is therefore charged with the role of orientating whether there are enough citizens who stand positive towards car sharing within a marked area and leading, or directing and implementing the process so that these people can participate in shared mobility within a fair walking range from their living address while opportunities and facilities for self-owned cars are phased out. As mentioned in 4.4.2, there is currently no provider who also engages in commercial match making on a large scale, as this is not profitable (Respondent_7, 2024). Due to the unprofitability of matchmaking it can be argued that this activity can be done by (semi-) public entities with municipalities being the obvious example.

Currently, citizen participation within the process of existing shared mobility initiatives takes place but this rather revolves around support-research, in which people still have the non-binding choice to both support the idea in combination with the parking facilities for owned cars still being present in the same area, like quoted at page 27 (Respondent_3, 2024) (Respondent_10, 2024) (Respondent_11, 2024). Match making is therefore a more comprehensive form of citizen participation in which citizens are not only involved in decisions in the public space, but where negotiations also take place in which various commitments or actions are expected from citizens that go with this. Most important action being the willingness to give up car ownership or acceptance of removing the possibility of parking private vehicles in the relevant area.

When the municipality carries out this role, this activity can exist alongside the existing mobility policy and its aim is the executive task that should enable the stepped growth of shared mobility within the modal split. As part of match making, a level of cost coverage guarantee can be agreed for car sharing providers, because a clientele is already being organized to a certain level. The advantage of a match-making oriented organization of shared mobility is that car sharing providers can be assured of cost coverage to certain extend, which they also stated as a condition for offering shared cars as part of area developments (Respondent_7, 2024).

Respondent 7: *If a matchmaker can indicate that a certain amount of kilometers are guaranteed, then we can put a car there.*⁵⁷

⁵⁷ Quote in original language: *“Als een matchmaker kan aangeven dat er zoveel kilometers worden gegarandeerd, dan kunnen we daar een auto neerzetten.”*

4.7.2 Stakeholder cooperation

Cooperation must set the stage where both actors mutually benefit from each other's efforts. Two obstacles that frustrate effective cooperation were mentioned in 4.4.4. Following each obstacle in the following sections, the corresponding condition(s) for overcoming them are mentioned.

The first obstacle was the difficult enforcement of the use of shared cars. Enforcement of policy rules is essential for their effectiveness, but unilateral enforcement will cause reduced support for the installation of shared cars by providers if the user potential is not expected to be fully utilized, like mentioned at page 37. Finally, enforcement in private parking spaces is not possible and providers indicated that they would prefer not to park their cars indoors because there is once again a fear of reduced utilization of customer potential due to visibility (Respondent_5, 2024). Match making can partly solve this because it can partly guarantees use. The most important conditions that can resolve these obstacles are making the parking facility physically and juridical accessible to the local government in consultation with the owners of the relevant building (Respondent_10, 2024) in combination with a car sharing agreement in which a flexible vehicle supply is agreed on a flexible end date (Respondent_6, 2024) (Respondent_12, 2024) (Respondent_13, 2024).

Respondent 10: *"The developer must then make the space available so that we can set up shared mobility there."*⁵⁸

Respondent 6: *"Then you have much more flexibility in the agreements you make, because you can say, we first make an appointment for 3 years and then we look again at which provider is suitable. Also in the number of well, - we first place so much and we agree on a flexible service around it, so that after a year you say - 2, we see the demand, so this is the fixed number of cars that we place."*⁵⁹

The core value of the agreements does not have to relate to the offering of a certain number of vehicles, but to sufficiently provide shared car mobility for residents. It is of course essential to evaluate the development in order to make adjustments, when it turns out that supply and demand seems not to fit in practice. On the one hand, this gives the municipality the opportunity to enforce car sharing initiatives and on the other hand, providers are offered a user guarantee to a certain extent. The final result is an acceptable risk distribution.

The second obstacle was inadequate communication between developers, the municipality and future residents in real estate projects where restrictions on car ownership are intended. Furthermore there is skepticism among citizens regarding car sharing initiatives in existing neighborhoods. Both have inadequate communication as a common denominator. Communication should therefore be optimized where possible between real estate agent, developer and municipality to inform buyers or renters about the existing restrictions on parking their own car nearby. In addition, there is the opportunity to remove skepticism among citizens who are involved in car sharing initiatives in existing neighborhoods by clearly communicating that the car replacement rate of shared cars ensures a reduction in car ownership and, in exchange for a reduced demand for parking space, new facilities in the neighborhood can be realized.

⁵⁸ Quote original language: *"Die ontwikkelaar moet dan de ruimte beschikbaar stellen, dat wij daar dan deelmobiliteit op kunnen zetten."*

⁵⁹ Quote in original language: *"Dan heb je dus veel meer flexibiliteit in de afspraken die je maakt, want je kunt zeggen, we maken eerst voor 3 jaar een afspraak en dan kijken we opnieuw naar welke aanbieder geschikt is. Ook in het aantal van nou we zetten eerst zoveel neer en we spreken daar een flexibele dienst omheen af, dat je na een jaar 2 zegt, we zien de vraag, dus dit is het vaste aantal auto's dat we er neer zetten."*

In this way, car sharing initiatives can serve as a leverage (Respondent_11, 2024) (Respondent_13, 2024) when problems relating to public space are politically exposed by residents or representatives.

Respondent 3: *"It turns out that it only comes across in a real 1-on-1 conversation with citizens, so to speak."*⁶⁰

Respondent 11: *"We then say to citizens: "That's fine if we all want to have a car, we're happy to facilitate that, but that means that the playground for your children will no longer be available."*⁶¹

Respondent 13: *"Don't you also want a better neighborhood that is nice for your children?" Then everyone gives in. Then we say that we do need the space for that, and what takes up space? Right, the car. Everyone agrees with us. Then you look at how can you remove those cars and organize the environment better?"*⁶²

4.8 Theory refinement

Before moving on to the final chapter, the results are reflected on in this chapter. Taking the conceptual theory as starting point, the question how these results contribute to the formation of a new theory is therefore answered, marking the theory refinement step of the grounded theory process.

Existing research about car sharing initiatives was conducted from different starting points to form the conceptual theory. The common denominator of important core conditions to get these initiatives off the ground concerned municipal management, car sharing as part of the parking solution in WABO procedures, cooperation between stakeholders to manage this parking solution and putting the service of car sharing as a competitive product next to car ownership in the modal split. These conditions were mentioned in the theoretical framework of Chapter 2. The obstacles that prevent meeting these conditions and the strategy to overcome them should be identified as such in this study. The obstacles and the strategy to overcome them ultimately create the new theory, as well as the result on the central question of this research. However, this research has also provided new insights that will be added as new parts in the construction of a new theory.

In that respect, the results from this research show similarities with the theoretical framework in the sense that: 1.) B2C-car sharing must be put more competitively in the market, but due to the low profitability of shared cars. It is still difficult in the current market, 2.) cooperation between stakeholders and careful restrictive measures with regard to car ownership is needed, 3.) direction from public administrative bodies is required and 4.) that the policy must be focused on densely populated urban neighborhoods.

However a number of extensions or further nuances through this research with which the new theory can be expanded have also emerged. In the private domain, this involves a change in paradigm from car sharing service supply following demand to an anticipating supply that causes demand for it to increase. Financial support is required to cover up the costs that must be made in advance for this. This also concerns the variable, "price perception". In the theoretical framework and the interviews it was assumed that by aligning the cost distribution of shared car use with the costs of car ownership, the costs could be made more comparable so that people can make a more well-thought choice between

⁶⁰ Quote in original language: *"Het blijkt dat het pas overkomt in echt een 1 op 1 gesprek met burgers zeg maar."*

⁶¹ Quote in original language: *"Wij zeggen tegen bewoners dan: "prima als we met z'n allen een auto willen hebben, dat willen wij best faciliteren, maar dat betekent dat het speeltuintje voor je kinderen komt te vervallen.""*

⁶² Quote in original language: *"U wilt toch ook een betere wijk die fijn is voor uw kinderen?" Dan geeft iedereen toe. Dan zeggen wij dat we daar wel de ruimte voor nodig hebben, en wat neemt ruimte in? Juist, de auto. Dat is iedereen met ons eens. Dan ga je kijken, hoe kan je die auto's weghalen en de omgeving beter inrichten?"*

car sharing and car ownership. It emerged that adjusting the price structure of the car sharing payment subscription required for this ultimately leads to possibly missing out on customer potential, making the effects appear negligible. It is therefore interesting to transform the distribution of costs for car ownership to a system of “pay as you go” instead of making the distribution between fixed and variable costs of car sharing comparable to car ownership.

In the public domain, the variable of the pioneer barrier regarding the level of knowledge of municipalities about the application of car sharing in area developments came to light. Evaluation and exchange of data plays an important role in learning from each other to set up new car sharing initiatives. Furthermore, an overly simplistic premise was made that the organization of car sharing initiatives can only be established and maintained through agreements and subsequent enforcement. However, a critical note that must be added to this is that enforcement is indispensable for the maintenance of car sharing initiatives, but that the conclusion of agreements must take place on flexible conditions in combination with a usage guarantee through match making and car ownership restriction and financial guarantee for car sharing providers. Otherwise agreements cannot not be disclosed. The final note that can be made for this section is that in the theoretical framework, car sharing was seen as a goal itself. In response to this, it was argued that goals should be formulated clearly, transparently and with a timetable according to the work of Kingdon (1984) and van Meter & van Horn (1975). However, this research showed that car sharing can better be seen as a means to achieve goals related to livability challenges rather than being a goal in itself.

The figure at the next page denotes the new theory as how it is formed after conducting these research based on the conceptual theory as how it is as formulated as such in chapter 2. There are still some remarks to be made about the buildup of this theory which will be further mentioned in chapter 6.

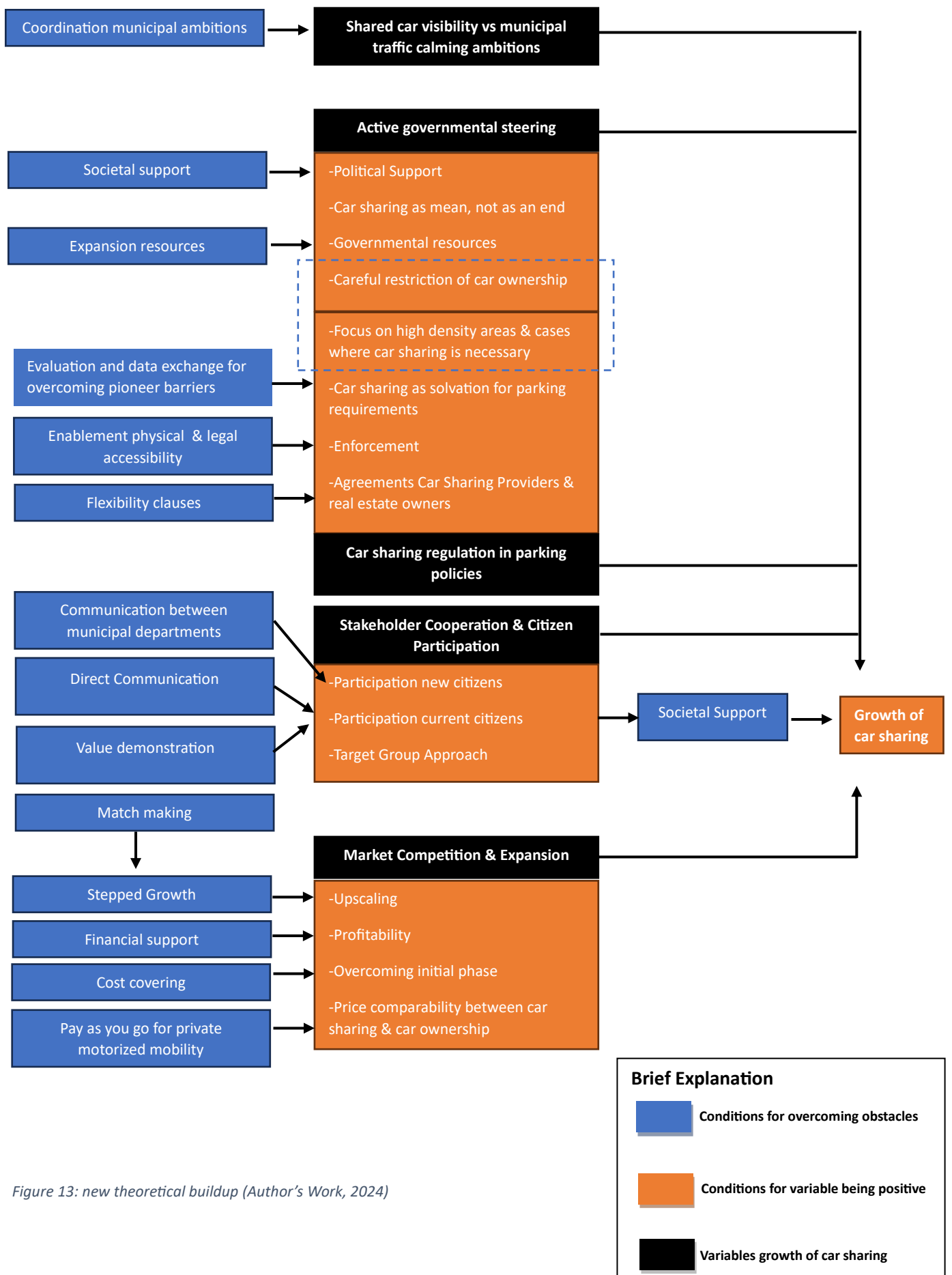


Figure 13: new theoretical buildup (Author's Work, 2024)

5 Conclusion

This chapter will look back on the answers to the sub-questions in chapter 4 and thus answer the main question. First of all, a recap of the sub-questions. **The answers to the sub-questions are as follows:**

1. The obstacles that cause municipal policy not being fully able to stimulate the growth of car sharing.
2. The obstacles that cause car sharing providers not being fully able to compete with car ownership.
3. The overarching obstacles that prevent the development of a solid growth of car sharing in the modal split.
4. What conditions need to be set to overcome these obstacles.

The answer to the main question is as follows:

The institutional obstacles underpin the untapped potential of B2C-car sharing in residential areas of large Dutch cities and how these can be overcome

Public institutional obstacles include 1.) the absence of active steering on car sharing initiatives, mostly caused by a shortage of municipal resources, 2.) limited ability to enforcing- and unilateral steering opportunities, 3.) pioneer barriers that result in a wait-and-see attitude or unfavorable implementation conditions for car sharing initiatives, 4.) the continued facilitation of car ownership and 5.) legal challenges relating to issues involved in offering car sharing, causing initiatives to come to an unexpected end or not to continue.

Private institutional obstacles concern 1.) the small margins of car sharing services for car sharing providers, 2.) unbridgeable start-up phases associated with the inability of market expansion, 3.) a tension between user efficiency and vehicle availability and 4.) groups who have negative attitudes towards car sharing due to private car dependency.

Overarching obstacles that can also be derived from the list of public and private institutional obstacles are 1) the absence of a mediator who must take on the role of match making and 2.) the complexity of concluding an agreement between car sharing providers, developers and municipalities about the supply of shared cars in car sharing initiatives. Since unilateral control of the supply of shared cars is not possible, anterior agreements are required between the parties involved, but the formation of these agreements is also a barrier because of car sharing providers not wanting to be bound to agreements with fixed terms.

Overarching obstacles that further emerged are 3.) limited applicability with regard to the location. Car sharing is currently, but also in the future only suitable in high density areas. 4.) limited support for car sharing initiatives due to skepticism among existing residents in the neighborhood, or insufficient information for future residents 5.) and a tension between the visibility of shared vehicles and municipal traffic-calming ambitions. Finally, there is another abstract obstacle, and that is 6.) the modality of car sharing itself. Unlike other modalities, which each have their own strengths depending on what kind of ride one wants to make, shared mobility does not arise from optimally satisfying a certain ride aspect, but out of necessity, when private car mobility is less - or not an option at all. If there is no external reason to consider shared car mobility at street or neighborhood level, a car sharing initiative will be much harder to get off the ground. High parking pressure can therefore be seen as important external reason for this necessity.

The challenge in the public domain include the inability of municipal organizations to steer upon car sharing initiatives. This is not only due to insufficient political or social support, but also because indoor

storage of shared cars may be physically or legally beyond the enforcement options of municipalities. Government guidance and regulation are seen as an important condition for getting a development of shared mobility off the ground, but simply imposing rules about the offering conditions of shared cars will only be counterproductive because shared car providers cannot go along with this unilateral effect of the law without guaranteeing the ability to profitably offer a car sharing service.

Municipalities taking control is therefore highly recommended, in response to the current ad hoc nature of car sharing initiatives. Taking control requires more municipal resources such as money, manpower and knowledge. These resources are not only needed to implement the policy, but also to manage it. An example is the mapping on what addresses shared cars are present in order to align restrictive measures regarding car ownership with it and to ensure that these car sharing initiatives are maintained. To overcome pioneering obstacles it is necessary to evaluate data about car sharing initiatives with and publish this open source so that a national standard of key figures regarding shared mobility can be established. This will provide tools for municipalities that are just at the start of their ambitions regarding shared mobility. Enforcement of car sharing initiatives requires prior agreements with car sharing providers in order to guarantee a car sharing supply. It is necessary that municipal enforcement organizations have physical and legal access to the places where shared cars are offered in order to effectuate these agreements. Finally, ancillary mobility policy is still needed. This entails a careful restriction on car ownership. "Restriction" should therefore not be seen as banning private car mobility, but discouraging private car ownership by means of paid parking, parking private vehicles elsewhere, reduced parking norms within area developments and reducing public parking capacity. An important condition that goes with this is that citizens should not be disadvantaged in their mobility provision. This means that while restrictive measures for private car use are undertaken, an improvement or quality guarantee of other transport modes must be counterbalanced, while low-income groups should not be left behind financially. Finally, care must be taken to ensure that restrictive car mobility policy does not negatively interfere with the interest of car sharing providers to be able to visibly offer their cars.

The challenge in the private domain is the improvement of B2C-car sharing's price and service. It is equivalent to scaling up the supply of shared cars at a competitive price comparable to car ownership. Scaling up car sharing in the modal split is currently not possible to be done by the market itself. The challenge in the private domain revolves around breaking a so called chicken-egg paradox. In other words, external influences are needed to make a shift towards upscaling possible. For a price reduction an increase in use is necessary and for an increase in use an improved service is necessary and for an improved service an increase in use is necessary to finance it. To resolve this paradox, various forms of financial support are needed. These vary from 1.) plain subsidizing, 2.) making car sharing more attractive fiscally, and 3.) covering costs of car sharing initiatives within area development plans. This support makes stepped growth possible, with the supply anticipating the demand. In addition, changing how people pay for motorized private mobility is a promising way to make the price between car sharing and car ownership more comparable. In the Netherlands the concept of "*anders betalen voor mobiliteit*" is already known but it is not implemented yet in practice. This pricing concept has a more similar ratio between sunken and observable costs in comparison to the pricing structure of shared mobility what makes that people become more aware of their transport choice. This can have a positive influence on the number of people who choose car sharing mobility.

Making stepped growth possible will have to be accompanied by matchmaking. This, in order to make a transition in synchrony with the careful restriction of car ownership in which car sharing providers can be offered a user guarantee, after which an offer of shared vehicles can then be made via an anterior agreement with flexible conditions. The most important pillars that should support this

approach is a careful restriction of car ownership with the measures mentioned earlier, while ensuring the quality of alternative modes of transport. This policy direction should use car sharing as a means to achieve a goal with regard to accessibility and neighborhood livability within areas with high residential densities. Demonstrating the added value of shared mobility is important in order to maintain and/or win support among participants. Car sharing can be used as a mean to better facilitate citizens' desires with regard to spatial redevelopment in their neighborhoods in order to increase support among existing residents instead of car sharing being a goal in itself. To prevent support from decreasing in situations where new residents come to live in the neighborhood in the context of new area developments, communication and coordination between the stakeholders involved in the area development is important to make sure that new residents are informed about the car sharing initiatives and that support among them is consolidated. In the broadest sense, the maximum potential of car sharing mobility will mainly lie within the groups of childless couples and singles, younger drivers and people who occasionally drive living in high density areas.

6 Discussion

In the discussion paragraph, the meaning, relevance of- and the relation between the founded results with the literature research. This will be discussed in paragraph 6.1 first. In 6.2 the shortcomings of this research in general and of the research method related towards the expected results is outlined. In 6.3, further research suggestions are made to extrapolate the knowledge gain from this research onwards based on findings that could not be disclosed. Lastly in 6.4, recommendations in practice are made where an advise is given about the things that should be taken into consideration, if stakeholders took the results of this research to heart and translated them into policy choices.

6.1 Theoretical implications

Like already notified in 1.6, this research has provided new insights about the combination of the relationship between actors that are involved in the organization of car sharing and the domain-specific obstacles that play a role in that process have not been conducted as such.

Nansubuga & Kowalkowski (2021) and Jorritsma et al. (2021) contemplated collaboration between the public and private stakeholders as key for successfully implementing car sharing initiatives. Nansubuga & Kowalkowski (2021) noted that within this frame, factors impeding the progress of car sharing and how these can be managed should be explored. The second scholar noting that the condition for the growth in the use of shared cars is that there is sufficient supply and that the low profitability of the vehicles for car sharing providers forms the barrier, which also emerged in this research as important result.

The point of view from which this research is done makes that these factors have emerged. The institutional perspective (as defined by Leroy & Wiering (2007) and Scott (2004)) through which car sharing as subject is researched made clear what obstacles can be conceptualized and how domain specific role of both municipalities and car sharing providers plays a role in these obstacles.

New insights that emerged were not only, governmental bodies should perceive car sharing as a mode of transport where they should guarantee in a similar way as how that is done with public transport, but that the necessary and currently absent active steering upon car sharing in densely populated neighborhoods in large cities must go hand in hand with the activity of matchmaking, in order to manage these impending factors to a point where the potential of car sharing is fully realized in the current form. This makes a clear difference from the first one-dimensional assumption of regulation, and how the car sharing service is under the influence of market mechanisms.

6.2 Limitations

Limitations are an impact of a constraint on the research design in the overall study. They are the flaws or weaknesses in the study, which may influence the outcome of the research. The following limitations came out and are discussed in this paragraph.

In paragraph 3.1.3 it was mentioned that grounded theory is an iterative process which favorably should be gone through more than one time. However, in this research, the process was only gone through one time only. Normally, after theoretical saturation has occurred, the theory must be refined. In this study, it took a relatively long time before theoretical saturation occurred and the number of car sharing providers who were willing to participate in the study was rather low. Theoretical saturation did not occur until relatively late in the study and therefore within the capacity of this study there was no room for multiple iterations of the process..

Ultimately, this research could not determine to what extent or in what way vehicle specifications play a role in the growth of car sharing. Although it was assumed in the theoretical framework that vehicle specifications of shared vehicles should be comparable to the vehicle specifications of cars that are still owned by participants, no conclusion can be drawn regarding this with the current data from the interviews in this study. premise. Ultimately, it is expected that quantitative research is a better method to enclose results about this variable. Vehicle specifications often concern numerical or classifiable expressions of data where a statement is made about a select group that represents a population. This requires direct questioning of this group, whereby the high number of respondents and quantitative data allow more precise statements to be made about this matter.

Since the market of car sharing providers is small, the number of different providers surveyed is limited, which may negatively impact the data generation from these respondents. As a result, the results from this study rely more on the perspective of municipalities and less on that of car sharing providers. Many car sharing providers have declined to participate in interviews. A more extensive survey of car sharing providers could provide assistance in improving the results of grounded theory.

6.3 Further research suggestion

As mentioned in 6.2, the current study's dataset, is not consisting of any data about the variable of "vehicle specifications" as influence on successful implementation of car sharing initiatives, Therefore a follow up study is needed to measure what vehicle specifications people find important the shared cars to have and to what extend they matter in people considering from switching from car ownership to car sharing.

Important consideration that has to be made is to proceed this research, with one or more extra iterations to provide stronger support for this theory or imply adjustments when it turns out new data sheds a different light on the matter. After multiple iterations are done, where, besides municipalities, preferably more car sharing providers are questioned the theory can be assessed by questioning scholars and possibly consulting extra literature.

An interesting opportunity that can be thought of is to repeat this research with a different business case, namely with P2P-car sharing where barriers and ways to overcome these are researched. There the problem statement would not be what makes car sharing providers not being able to compete with car ownership. Instead, it revolves around why existing car owners don't make their vehicles available for others or potential car sharers refrain from organizing similar initiatives and what municipal organizations can do about it.

6.4 Recommendations in practice

Like mentioned earlier, the current service of B2C-car sharing fully operates in the private sector without systematic steering from the public sector. The quality of the car sharing services and the costs are a result of competitive market dynamics, in which the profitability of car sharing initiatives is put under pressure. In 4.6.1 it has been mentioned that a concession-agreement can play a role as a tool for municipalities to manage the supply of shared vehicles and as a result, shared cars can be offered often better in less lucrative places or under more favorable conditions. In theory, concession agreements can increase the service of car sharing. In practice car sharing as a mode of transport is currently still a small market, too small for a concession based shared mobility service. However a role for concession agreements comes closer once shared car mobility has reached its fullest potential under current circumstances. Further research is required how this should be further implemented when car sharing is applied more on a scale that close to its potential without concession contracts.

An interesting chance for organizing shared mobility on a larger scale is the approach of how peak demands could be met as mentioned by Respondent 12. This is also the phase when car sharing mobility takes place on higher scale than it does now. Not only do peak demands need to be met, the general question of how vehicles can be used as efficiently as possible can also be answered with this approach. This concerns the dual use of both parking space and vehicles. In the case of vehicles, the possibility of overlapping business cases should be explored. In paragraph 1.1, figure 3 these business cases were introduced. Respondent 12 advocated for an overarching system of rental cars with cars that are used in daily shared services to improve the supply-resilience. Therefore providers could think of horizontally integrating their business activities, indicating an overlap of services within the same organization.

In the case of parking space, dual use of parking facilities will have to be considered. Various functions in public space have their so-called peak moments when the highest demand for the use of their space is occurring. For amenities this is often during the day and in the evening. And for dwellings this is in the evening and at night. How this strategy should be put into practice is a subject for further research.

Like the mentioning in the disclosure of paragraph 4.2.2, there are legal challenges that are currently related to the complexity of organizing car sharing initiatives. These challenges have been mentioned but there is no unambiguous strategy to overcome these challenges. Therefore further research is needed in order to deal with this in practice.

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Appendix A - Obstacles and conditions oversight

An overview of all obstacles and the conditions to overcome them are depicted in the table under here. A further explanation is therefore to be traced in chapter 4.

Public Institutional Obstacles	Conditions for overcoming them
Absence of governmental steering <ul style="list-style-type: none"> - Lack of urgency at municipal organizations - Lack of political support - Lack of municipal resources 	-Active governance -Demonstration of shared vehicle's added value -Expanding resources
Inability of enforcement parked shared vehicles	Enablement physical accessibility of private parking facilities
Pioneer barriers	Learning from best practices Creation of parking standard
Limited unilateral steering opportunities	Anterior agreements between providers, developers and municipalities
Facilitation of car ownership and/or insufficient attention for alternative modes of transportation	Careful restriction of car ownership <ul style="list-style-type: none"> - Investments in public transport and safe & fast infrastructure for active modes of transport.
Juridical tasks <ul style="list-style-type: none"> - 	Further research
Private Institutional Obstacles	Conditions for overcoming them
Unprofitability of car sharing	Systematical financial support
Car sharing requires a lot of participants	Match making & upscaling
Inability of market growth and overcoming the initial phase	Systematical financial support, Different fiscal price strategy for mobility Stepped growth
Tension between user efficiency and vehicle availability	Stepped growth Cost covering initial phase car sharing initiatives
Groups with negative attitude towards car sharing <ol style="list-style-type: none"> 1.) Large family that needs a car on a regular basis while having a specific mobility pattern 2.) Older couple who are not eager to cooperate with innovative ways of meeting their mobility needs 3.) People who drive a lot 4.) Low income as threshold for car sharing 5.) High income as threshold for car sharing 6.) Limited knowledge among potential users 	Target group approach & Match Making <ol style="list-style-type: none"> 1.) Childless couples and singles 2.) Younger drivers 3.) People who occasionally drive
	Prevention of the disadvantage of people meeting in their mobility needs
	Careful restriction of car ownership
	Demonstration of shared vehicle's added value
Overarching Institutional obstacles	Conditions for overcoming them
Necessity of car sharing <car sharing incentive>	Car sharing as a mean, not as an end
Geographical negative influence on profitability	Policy's focus on high density areas

Absence of a mediator	Match making
Inability of deal making anterior agreements between stakeholders	Flexibility clauses
Citizen- participation challenge Uninformed new inhabitants	Optimization communication municipal departments regarding housing & mobility, area developers, estate agents and new inhabitants <Estate Developers – New inhabitants>
Citizen-participation challenge: Skepticism among current inhabitants	Car sharing as stake Demonstration of shared vehicle's added value
Tension shared vehicle visibility and municipal traffic calming ambitions	Coordination municipal ambitions

Appendix B - Interview Guide Municipalities English

Q1: Car sharing can be encouraged by introducing a stand-alone policy that reduces car ownership in collaboration with local residents and promotes shared mobility. Is there a program for this in this municipality?

➤ Repeat and rephrase if, no clear answer to the question has been obtained.

Q 2: If so, are there any problems you encounter during implementation?

Q 3: If not, why, and what are the barriers?

Q 4: Car sharing can also be encouraged by integrating shared mobility policy into parking policy, whereby shared cars can contribute to meeting parking needs after real estate development. Does the municipality offer the option of having shared cars as part of the environmental permit?

➤ Repeat and rephrase if, no clear answer to the question has been obtained.

Q 5: If not, why is car sharing not yet part of the parking policy?

Q 6: If so, is it possible to apply car sharing initiatives in renovation situations?

Q 7: If not, what are the barriers?

Q 8: Is it possible to maintain this initiative after implementation?

Q 9: If not, what are the barriers?

Q 10: When organizing B2c-car sharing initiatives, collaboration with car sharing providers is required. Where in the collaboration with car sharing providers does the causality lie between the success and failure of car sharing initiatives?

Q 11: In both new area development situations and in existing living areas where car sharing initiatives are implemented, other stakeholders are involved. Where in the collaboration with them does the causality lie between success and failure of car sharing initiatives?

Q 12: Does collaboration need to be changed? and how?

Appendix C - Interview Guide Municipalities Dutch

V1: Autodelen kan worden gestimuleerd door er op zichzelf staand beleid op te voeren waarbij in samenwerking met wijkbewoners autobezit wordt verminderd, en deelmobiliteit wordt bevorderd, is daar bij deze gemeente een programma voor?

➤ *Herhaal en herformuleer indien, er geen duidelijk antwoord op de vraag is verkregen.*

V2: Zo ja, zijn er in de effectuering, problemen waar jullie tegenaan lopen?

V3: Zo nee, waarom niet en wat zijn de barrières?

V4 Autodelen kan ook worden gestimuleerd door deelmobiliteitsbeleid te integreren in parkeerbeleid waarbij deelauto's een bijdrage kunnen leveren om na vastgoedontwikkeling in de parkeerbehoefte te voorzien. Biedt de gemeente de mogelijkheid om deelauto's als onderdeel van de omgevingsvergunning te laten zijn?

➤ *Herhaal en herformuleer indien, er geen duidelijk antwoord op de vraag is verkregen.*

V5: Zo nee, waarom is autodelen nog geen onderdeel van het parkeerbeleid?

V6: Zo ja, lukt het om deel auto initiatieven bij verbouwsituaties toe te passen?

V7: Zo nee, welke barrières liggen daar aan ten grondslag?

V8: Lukt het om na implementatie van dit initiatief, dit initiatief in stand te houden?

V9 : Zo nee, welke barrières liggen daar aan ten grondslag

V10: Bij het organiseren van B2C-autodeelinitiatieven moet worden samengewerkt met deelauto providers. Waar in de samenwerking met deelauto providers ligt de causaliteit tussen het wel en niet goed van de grond komen van deelauto initiatieven?

V11: Hoe zit dat met andere stakeholders die daar ook bij zijn betrokken? In zowel nieuwbouwsituaties als bestaande situaties?

V12: Dient samenwerking te worden veranderd? en hoe?

Appendix D - Interview Guide Car sharing providers English

Q1: In the theory I have included that the price competition of shared cars with car ownership lies not only in the actual costs, but also in the extent to which the price can be compared with car ownership by equalizing the distribution between observable and sunken costs, the so-called cost perception. Is it a possibility to change the car sharing subscription, so that both the actual costs and the perception thereof correspond to those of car ownership?

➤ *Repeat and rephrase if, no clear answer to the question has been obtained.*

Q2: Offering a shared vehicle to a closed group is what appeals to many people in their process of considering car sharing. Do you provide the option to offer a shared vehicle to a closed group?

➤ *Ask for reasons why not.*

Q3: Have you heard that vehicle specifications may play a role in the abandonment of car sharing by current customers and potential newcomers? If so, which are these?

Q4: Do potential customers' concerns regarding personal data lead them to refrain from car sharing?

Q5: Can- and do you want to make it possible for people to use shared cars without a reservation?

➤ *Explain that use without reservation can contribute positively to the feeling of autonomy, which is considered valuable in automobility.*

Q6: Are you committed to making car sharing easier for vulnerable target groups such as the elderly and people with low literacy?

Q7: Is there currently a possibility to test shared cars for a short time at a greatly reduced rate or other benefits?

Q8: As a car sharing company, do you participate in the consultation regarding the location of new shared vehicles in the neighborhood or do you think that you are not involved enough?

Q9: Are you involved in the process that shared cars must be supplied with the WABO permits as part of solving the parking demand in new construction and renovation situations?

➤ *Ask for an explanation of how this process works and how it can be improved*

Q10: Hebben jullie aandeel bij de aanbieding van deelauto's op private parkeerterreinen?

➤ *Ask for an explanation of how this process works and how it can be improved*

Q11: Are there situations in which local authorities consult with you to roll out car sharing initiatives on a larger scale for a group of residents?

Q12: Do you have any additions to what has been discussed?

Appendix E - Interview guide car sharing providers Dutch

V1: In de theorie heb ik opgenomen dat de prijsconcurrentie van deelauto's met autobezit niet alleen op de werkelijke kosten ligt, maar ook in de mate waarin de prijs met autobezit te vergelijken valt, de zogenoemde kostenperceptie. Is het een mogelijkheid om het deelauto abonnement te veranderen, dat zowel de werkelijke kosten als de perceptie ervan overeenkomt met die van autobezit?

➤ *Herhaal en herformuleer indien, er geen duidelijk antwoord op de vraag is verkregen.*

V2: Het aanbieden van een deelauto aan een gesloten groep is wat menig mens aanspreekt in het proces van hun overweging om te gaan autodelen. Bieden jullie de mogelijkheid om een voertuig van jullie aan te bieden aan een gesloten groep?

➤ *Doorvragen redenen waarom niet*

V3: Hebben jullie vernomen dat de voertuigspecificaties een rol kunnen spelen bij het afzien van autodelen door huidige klanten en potentiële nieuwkomers? Zo ja, welke zijn dit?

➤ *Zo ja, doorvragen of het mogelijk is wagenpark te diversifiëren.*

V4: Leiden zorgen van potentiële klanten met betrekking tot persoonlijke gegevens tot het afzien van autodelen?

V5: Kunnen en willen jullie het voor mensen mogelijk maken om zonder reservering gebruik te maken van deelauto's?

➤ *Uitleggen dat gebruik zonder reservering positief kan bijdragen aan het gevoel van autonomie, dat van waarde wordt geacht bij automobilititeit.*

V6: Zetten jullie je in om voor kwetsbare doelgroepen zoals ouderen en laaggeletterden autodelen makkelijker te maken?

V7: Is er op dit moment een mogelijkheid om tegen sterk gereduceerd tarief of andere voordelen deelauto's te kunnen testen voor een korte tijd?

➤ *Doorvragen m.b.t. de noodzaak tot verruimen ervan*

V8: Hebben jullie als autodeelbedrijf inspraak in de locatie van nieuwe deelauto's in de wijk of vinden jullie dat jullie daar niet genoeg in worden meegenomen?

V9: Zijn jullie betrokken in het proces dat bij de WABO-vergunningen deelauto's moeten worden geleverd als onderdeel van het oplossen van de parkeervraag in nieuwbouw en verbouwsituaties?

➤ *Vragen om toelichting hoe dit proces loopt en kan worden verbeterd*

V10: Hebben jullie aandeel bij de aanbidding van deelauto's op private parkeerterreinen?

➤ *Vragen om toelichting hoe dit proces loopt en kan worden verbeterd*

V11: Zijn er situaties waarin lokale overheden met jullie in overleg gaan om op grotere schaal deelauto initiatieven uit te rollen voor een groep bewoners?

➤ *Zo ja, vragen om toelichting hoe dit proces loopt en kan worden verbeterd*

V12: Heeft u nog toevoegingen op datgene wat is besproken?