Car Sharing Adoption in the Netherlands: An Explorative Research on User Experiences Among Various Sharing Models

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Preface

Presenting my master's thesis, the result of intense study, committed research, and priceless experiences, brings me immense relief and gratitude. The path I've taken thus far has been both extremely difficult and fruitful, providing opportunities for both intellectual and personal growth that far exceeded my expectations when I initially set out on this journey.

This thesis is not just the result of my own work; rather, it is a tribute to the help and guidance I have received from numerous individuals who have significantly impacted my personal development and academic career. I would like to sincerely thank Clemens Driessen and Tamara Metze, my thesis advisers, whose wise counsel, helpful criticism, and unfailing support have greatly influenced the course and quality of this work, as well as my immense personal growth alongside it. Their expertise and patience have provided me with the tools and confidence needed to tackle complex issues and explore new ideas. Their constant support and encouragement have made it possible for me to finally present this thesis.

Also, a special thanks to all the interviewees who contributed to this research, making it possible to conduct this study. Lastly, I would like to express my gratitude to my friends and family, in particular my sister and Udo, for not giving up on me and supporting me whenever I needed it most. It has been a hell of a ride, but without you, I would not be where I am today.

Enjoy reading!
Jikke de Lange
Amsterdam, 11 July 2024

Abstract

This thesis explores car sharing in urban areas of the Netherlands, focusing on user experiences across four car sharing models: Business-to-Consumer (B2C) Round-Trip, B2C Free-Floating, Peer-to-Peer (P2P), and Cooperative car sharing. The study aims to understand the factors influencing car sharing adoption and usage, employing the Theory of Planned Behaviour (TPB) and Social Practice Theory (SPT) to analyse user motivations, barriers, and behavioural changes.

Car sharing is identified as a significant component of the sharing economy, offering environmental benefits by reducing car ownership and optimizing urban mobility. Through interviews and data analysis, the research identifies key motivations to engage in car sharing such as the need for access to a car without ownership, cost efficiency, and the reduction of responsibilities related to car maintenance. However, barriers such as flexibility, reliability, and user convenience are also highlighted.

The study finds that different car sharing models present unique user experiences and challenges. B2C models are seen as convenient, as they divert responsibilities to the provider, but they are also experienced as expensive. P2P models offer more flexible booking slots, yet they are also perceived as costly. Cooperative models foster a sense of community responsibility and have a non-profit approach, but they require a certain level of commitment from users.

Overall, the research suggests that car sharing should become a more viable and attractive alternative for urban residents, ultimately contributing to a more sustainable and efficient transportation system. The dual application of TPB and SPT provides a comprehensive understanding of car sharing behaviours, offering insights for policymakers and stakeholders to promote car sharing adoption in urban settings.

Key words: car sharing, various models, user experience, motivations and barriers, driving practice

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Chapter One: Introduction

The sharing economy, also known as collaborative consumption, represents a transformative economic model that facilitates the exchange of goods and services among individuals, possibly with financial incentive for the “renter”. By harnessing digital platforms, it allows people to share access to assets, resources, and skills, thereby optimizing the use of underutilized resources and fostering community connections (Frenken et al., 2015)). The sharing economy has revolutionized consumption patterns by eliminating the need for ownership, particularly in the transport sector, where it has introduced new modes of transport previously unavailable or only accessible on a small, informal scale (George & Julsrud, 2019). Consumers are now engaging in ridesharing, ride-sourcing, and car sharing, collectively termed shared automobility, which relies on digital platforms. These platforms are part of the broader sharing economy, which includes the product-service, on-demand, and second-hand economies (George & Julsrud, 2019). As a form of shared automobility, car sharing aligns with the principles of the sharing economy, offering significant environmental benefits by reducing car ownership and optimizing urban mobility (George & Julsrud, 2018; Shaheen & Chan, 2016). It leverages the underutilized capacity of cars, which are idle 95% of the time (Shoup, 2018).

In this context, car sharing is defined as "a practice whereby registered members of an organization or platform can rent and operate vehicles on a self-access basis for short- and medium-term use" (George & Julsrud, 2019). Research on shared automobility shows that it positively impacts the environment, traffic congestion, public health, and regulatory compliance. Generally, shared automobility reduces car use, carbon emissions, and traffic accidents, although the impact can vary depending on the situation (George & Julsrud, 2018). One of the primary benefits of car sharing is its ability to regulate the sector’s environmental impact. There is a general consensus that the current generation's car usage significantly contributes to climate change, affecting future generations due to its unsustainable nature (Gärling et al., 2014). Automobiles require non-renewable resources such as fossil fuels and raw materials for manufacturing and use. According to recent studies, car sharing generally reduces the number of cars owned as well as the distance driven, reducing greenhouse gas emissions, although the impacts vary between car sharing types (Shaheen et al., 2019).

Additionally, the space required for infrastructure related to car use and the subsequent habitat fragmentation leads to ecological deterioration and other challenges for both the environment and local populations (Gärling et al., 2014). Despite arguments regarding the economic and developmental benefits of new infrastructure, strict climate change targets set by organizations like the EU, rising CO2 emissions from the transport sector, and the depletion of fossil resources all underscore the unsustainability of current car usage trends (Gärling et al., 2014). Car sharing is seen as a promising solution to urban mobility challenges, including traffic congestion, parking needs, air pollution, and high private car ownership costs, while also providing profit opportunities for operators (George & Julsrud, 2019; Roblek et al., 2021).

In the Netherlands, among the twenty major municipalities, over 55% of the public street space is allotted for vehicles, with 10% going toward parking facilities (van Liere et al., 2017; van der Linden, 2023). Car sharing can alleviate crowded streets and car parks in cities, as studies illustrate that car sharing vehicles can significantly replace private vehicles (Ceder, 2021). A common private car replacement ratio (RR) is 9 to 13 private cars being replaced by 1 shared car (Greenblatt & Saxena, 2015; Fagnant & Kockelman, 2015; Iacobucci et al., 2018). The successful implementation of car sharing systems can be influenced by policies that focus on aspects such as parking allocation, fee structures, and integration with public transport (Melo & Rolim, 2015).

Sharing in this manner offers crucial benefits, such as reducing collective costs associated with car location, mobility needs, and environmental and social externalities, all while maintaining the mobility provided by car usage (Roblek et al., 2021). However, research suggests that the main way car sharing can reduce overall car usage is by influencing car ownership. Users who decrease their car ownership tend to use cars less (Low Auto Users), while those who do not change their car ownership actually

end up using cars more (High Auto Users). Therefore, car sharing only leads to a significant reduction in car use if it substantially impacts car ownership (Chapman et al., 2020).

Hensher et al. (2022) argue that the traditional concept of the car isn't disappearing soon; instead, the challenge is to use cars more effectively while progressing towards sustainable goals. According to Hensher, et.al. (2022), car sharing schemes could act as a steppingstone in moving away from owning private cars toward wider adoption of car sharing, with a specific focus on electric car sharing.

This thesis focuses on the possible shift from private car ownership to car sharing, a practice inherently more sustainable than owning a private vehicle. Here, sustainability is contextualized not only in terms of climate change and decarbonization, but also as consumers making ethical choices to support sustainability (Boussauw & Vanoutrive, 2017). Sustainability in this context refers to ethical consumer choices supporting sustainable practices, as suggested by Skidelsky & Skidelsky (2012). While car sharing appears to be a more ethical choice compared to private car use, it remains to be seen how much the availability of car sharing options influences ownership decisions. For instance, despite the spreading of car sharing models, research conducted in Australia indicates that the availability of these options does not significantly influence the decision to own a vehicle (Zhou et al., 2020). Similarly, in the Netherlands, while car sharing has expanded—with 87,800 shared cars available by 2021 out of a national total of 7.6 million cars (Meelen & Münzel, 2023)—it remains a supplementary rather than a primary transportation choice for consumers. These findings suggest that even with accessible car sharing options, consumers continue to favour vehicle ownership, leading to sustained growth in the car market. This underscores the importance of exploring why consumers might remain hesitant to adopt car sharing, despite its potential to promote environmental sustainability.

The previous arguments highlight that car sharing offers numerous benefits and can positively address issues such as the environment, traffic, parking, and costs. This raises the question of how car sharing alters the practice of driving for consumers, what types of motivations lead consumers to choose sharing as a method of consumption and what factors might prevent them from participating in the sharing economy.

The majority of the early research on car sharing solely focused on advantages to society, including the effects on automobile ownership and use (Martin & Shaheen, 2011a, 2011b; Cervero, 2003; Cervero et al., 2007; Lane, 2005). According to a 2019 literature assessment on car share motivators, more than 60% of peer-reviewed and grey literature studies solely cited convenience and cost savings as important factors (Münzel et al., 2019b). Although the reasons behind car sharing have been investigated, the majority of the research used quantitative questionnaires (Jain et al., 2020). Furthermore, although very useful in establishing evidence, quantitative studies have not sufficiently investigated ideas like "convenience." There are reportedly several intricate meanings of convenience. Some people associate convenience with time-efficiency, whereas others associate it with single- versus multimodal travel, as well as with the journey's purpose and distance (Buys and Miller, 2011). And Dill & McNeil (2021) acknowledge that research on car sharing has rarely examined barriers to use. Therefore, if car sharing service design and policies are to be enhanced to fit user demands, a deeper exploration of the driving practice, user motives and barriers is required.

The focus of this research on car sharing is predominantly on urban areas rather than rural ones due to the significantly higher demand for car sharing services in urban settings (Prieto et al, 2017). This disparity can be attributed to various factors that make car ownership more challenging and expensive in urban environments, such as the scarcity of parking spaces. Car sharing is largely an urban phenomenon (Celsor & Millard-Ball, 2007; Stillwater et al., 2009; Becker et al., 2017), driven by several urban-specific characteristics. These include higher walkability and cyclability, which make alternative modes of transport more feasible and attractive. Urban areas typically offer better access to public transport, making it easier for residents to incorporate car sharing into their mobility options. Additionally, the availability of shared vehicles in urban areas is more pronounced, as the dense

population and higher usage rates justify the investment and operational costs associated with maintaining a car sharing fleet (Coll et al., 2014).

Although there are many providers of car sharing services, the models can be broadly categorized into four main types: Business to Consumer (B2C) Round Trip, Business to Consumer (B2C) Free-Floating, Peer to Peer(P2P) and Car Sharing Cooperatives. Each of these models will be described in detail in the methodology section of this thesis. The various differences in functionality and the consumer practices required for each model are illustrated schematically in Table X.
The usage patterns and effects of different types of car sharing vary significantly (Becker et al., 2017). Additionally, there could be substantial differences in the psycho-social factors influencing their use. Therefore, it is important to examine consumer behaviours across various car sharing models.

In this research the Theory of Planned Behaviour (TPB) and Social Practice Theory (SPT) are employed to gain a comprehensive understanding of the factors influencing car sharing behaviours, to evaluate opportunities to possibly increase car sharing adoption. The TPB, as proposed by Ajzen (1991), is instrumental in focusing on the motivations and barriers that predict an individual's intention to engage in a specific behaviour. It delves deeply into individual motivations, explaining why people choose certain behaviours and identifying the obstacles that might prevent them from adopting new practices.

On the other hand, Social Practice offers a broader perspective by examining changes in social practices that can influence behaviour (Shove et al, 2012). SPT looks beyond individual actions to understand how habits evolve, challenging initial values, and showing how new behaviours are adopted and integrated into everyday practices (Shove et al, 2012). This approach reflects higher societal impacts by studying the influence of these changes on collective behaviour and societal norms. SPT is particularly valuable as a tool of analysis for considering activities in the abstract, moving beyond a sole focus on individual actions and decisions (Reckwitz, 2002). Studies, such as those by Kent and Dowling (2013), have shown that viewing car sharing as a routinely performed social practice provides valuable insights into its emergence and sustainability.

By combining TPB and SPT, this research benefits from a detailed analysis of individual motivations and barriers, as well as a broader understanding of how changes in practice can lead to significant societal impacts. This dual approach allows for a holistic view of how car sharing behaviours can be encouraged and sustained, ultimately promoting a shift towards more sustainable modes of travel. This dual approach has not yet been performed in earlier studies.

This thesis aims to address the following research question:

"What implications can the experiences of users of various car sharing models have for promoting the adoption of car sharing within urban areas of the Netherlands?"

This research will be guided by the following sub-questions:

1. What are the key characteristics and features of car sharing programs currently available in the Netherlands?
2. What are the primary motivations and significant barriers experienced by consumers when participating in car sharing programs in urban areas of the Netherlands?
3. How is the driving behaviour influenced when individuals transition to car sharing?

1.1. Scientific & Social Relevance

Based on the discussions included in the previous sections, it can be argued that there has been a growing interest in the sharing economy as it garners increasing attention among researchers. The sharing economy provides access to underutilized goods, such as cars, and offers a model that can benefit the environment, reduce traffic, and address cost-related issues while providing more accessible transportation options (George & Julsrud, 2018). Although car sharing is not a new concept, it represents a tangible good that researchers believe can be easily shared, contributing to a more sustainable future and offering many other benefits (Hensher et al., 2022).

Previous research has explored the acceptance of car sharing among users through a comparative approach to compare countries such as Norway, Sweden, and the Netherlands (Svennevik et al., 2021). However, there has been a lack of studies in the Netherlands specifically focusing on car sharing users across different consumer sharing models, such as B2C, P2P, and cooperative models. This research aims to gain insights into the changes in user practices and the motivations and barriers they encounter, thereby filling a crucial gap in understanding the full dynamics of car sharing in the Netherlands.

While achieving a more sustainable future is vital for the survival of our planet and living environment, it can also address many everyday issues faced by commuters. Transitioning from car ownership to car sharing has significant societal implications, like reducing greenhouse gas emissions and the possibility to alleviate crowded streets and car parks in cities (Shaheen et al., 2019; Ceder, 2021), necessitating the adoption of this new behaviour and habit in daily life. This shift could transform our perception of mobility and promote a more sustainable alternative to current travel practices. Identifying motivators and barriers among car sharing users, as well as seeing how the practice of car driving will be altered by replacing private vehicles with shared alternatives is imperative to find means to increase adoption rates and ultimately promote sustainable transportation solutions.

1.2. Outline

This first chapter provided the context by introducing the research topic, addressing the research problem, formulating the research question and sub questions, and highlighting the added value this research brings to both the scientific community and society. The following chapter, Chapter 2, reviews previous literature on car sharing and illustrates the diverse car sharing models in the Netherlands, answering the first sub question. Chapter 3 describes the theories used as the basis of this study. Chapter 4 discusses the methods used to find and analyse empirical data to answer the research question. Chapter 5 presents and thoroughly describes the results, answering the second and third sub questions. Chapter 6 discusses the findings in relation to the existing literature described in Chapter 2, highlights the limitations of the research and presents recommendations. The seventh and final chapter concludes the research by answering the main research question.

Chapter Two: Literature Review

In this literature review, the broader phenomenon sharing economy is first explained. Next, previous literature on car sharing is presented. Finally, the various models available for car sharing in the Netherlands are presented.

2.1. Sharing Economy

Sharing is a consumption act in which there is no transfer of ownership, either ownership is in common or someone is given the right to use the product owned by the sharer, however, it is expected that it is returned to the rightful owner (Belk, 2010). With the rise of the Internet and the Web 2.0, new forms of consumption emerged that go beyond the traditional mode of ownership and money exchange and with that changing the relationship between consumer and product (Bucher et al 2016; Eckhardt et al., 2019). These new forms of consumption enabled consumers to gain access to goods for their use without having to own them (Kumar et al., 2018), resulting in multiple users of a resource, in which it is evident that sharing is happening (Rudmin, 2016).

Frenken et al. (2015) define the sharing economy as: "consumers granting each other temporary access to under-utilized physical assets ("idle capacity"), possibly for money". Sharing economy is often seen as an "umbrella" concept for a multitude of new-ownership forms of consumption and exchange that have grown with the internet age (Sundararajan, 2016). Luri Minami et al. (2021) argue that the concept of sharing economy however is misleading, looking at the definition of sharing provided by Belk (2007, 2010, 2014) where no compensation is expected in the act of sharing and Benoit et al (2017) who define sharing as an exchange between two or more individuals, where there is no transfer of ownership, but ownership is usually shared wherein the process of sharing is not mediated through the market, but by social mechanism.

Another term frequently used is collaborative consumption. Botsman and Rogers (2010) describe collaborative consumption as "the rapid explosion in swapping, sharing, bartering, trading and renting being reinvented through the latest technologies and peer-to-peer marketplaces in ways and on a scale never possible before. This is not reinventing what we consume, but how we consume". In 2013, Botsman defined collaborative consumption as "an economic model based on sharing, swapping, trading, or renting products and services, enabling access over ownership". In 2017, Benoit et al. delineated collaborative consumption from sharing, access-based consumption and renting and see collaborative consumption as a triadic exchange among a platform provider, peer service provider and a customer. There is no transfer of ownership, but a usage for an agreed (short) period of time of an underutilized asset and it is mediated through market mechanisms.

In these new concepts the main focus of sharing is that scarce resources are now shared among more people, utilizing the internet, not only the owner can use the resource, but more people can access the resources and benefit of the use (Rudmin, 2016). Sharing was previously mostly seen as an act of kindness and altruism, where reciprocity is not expected (Belk, 2007). With the rise of the sharing economy the act of sharing has changed to sharing the use of the resources with more people. Belk believes that this shift has been positive, it has created new ways on how we can view ownership and use (Hyde, 2010; Rudmin, 2016). The sharing economy has also helped us to think of more sustainable forms of using limited resources (Lawrie, 2012) and has shown different ways on how we can distribute these resources fairly (Ferguson, 2015; Widlok, 2017; Gollnhofer et al., 2016). The sharing economy has encouraged us to consider more sustainable ways of utilizing limited resources and demonstrated various methods for distributing these resources fairly (Lawrie, 2012). It is driven by environmental concerns, social interactions, and economic considerations as people join the sharing economy for practical reasons like preferring access over ownership, enjoying the experience, and trusting the system (Gollnhofer et al., 2016). However, there are challenges to its widespread adoption. These include balancing the desire to help others with the need to earn money, relying heavily on specific platforms, the risk of increased consumption (the rebound effect), and the difficulty of changing long-established habits (Gollnhofer et al., 2016).

2.2. Car Sharing

As previously mentioned, the sharing economy has the potential to produce significant economic, environmental, and social benefits. Car-sharing, as a facet of the sharing economy, aims to reduce total trips, diversify travel modes, decrease total travel distances, and increase efficiency (Shaheen et al., 2015; Shaheen et al., 2016). Car-sharing programs can convert fixed costs (i.e., buying and owning a vehicle) into variable costs (i.e., paying only for the trips taken). This shift enables customers to understand the actual cost of a trip better, reducing the impulse to drive and encouraging alternative modes of transport such as transit, cycling, and walking (Millard-Ball, 2005; Duncan, 2011; Shaheen et al., 2012).

In previous research several motivations have been found around car sharing. One key factor is the perceived hassle of owning a private car, consumers enjoy the convenience offered by shared transportation, eliminating burdens of responsibility and expenses around maintenance, insurance, taxes and other responsibilities (Burkhardt & Millard-Ball, 2006; Chatterjee et al., 2013; Acheampong and Siiba, 2019). Improved mobility and flexibility are also significant motivators, as car sharing allows users to access vehicles as needed (Ballús-Armet et al., 2014; Burkhardt & Millard-Ball, 2006; Dill et al., 2017). Additionally, users appreciate the access to a variety of vehicles (Lindloff et al., 2014; Wilhelms et al., 2017), as well as the latest technology and reduced parking hassles (Paundra et al., 2017). The research of Paundra et al. (2017) expressed the intention to use car sharing was influenced by the proximity the car was parked to the user's house.

Research has also shown that adopting a car sharing program is influenced by pro-environmental sentiments (Acheampong and Siiba, 2019; Steininger et al., 1996; Hjorteset & Böcker, 2020). However, others have pointed out that sustainability is perceived as a bonus benefit rather than the key motivator (Hartl et al., 2018). Another study indicates that incorporating electric vehicles into the car sharing fleet positively influences individuals' decisions to join the service (Carteni et al, 2016).

Although studies on car sharing barriers are limited (Dill & McNeil, 2021), existing research highlights several significant challenges faced by users. Huwer (2004) noted barriers such as lack of awareness about car sharing, insufficient vehicle variety, and higher costs compared to transit. Other issues identified are concerning access issues, such as car sharing systems being complicated, impractical, time-consuming, or not available close to home (Lightfoot, 1997). Kim et al. (2017) confirmed that the likelihood of using car sharing decreases when waiting times increase due to insufficient vehicle availability. Shaheen et al. (2012) found that limited knowledge about insurance and liability is a significant barrier for car sharing users. Additionally, Keetels (2012) concluded that trust issues are prominent barriers, especially in peer-to-peer (P2P) platforms where more verified identities increase customer willingness to rent cars.

According to Isaksson and Pongolini (2023), car sharing also faces challenges related to planning and punctuality. They reported that car sharing does not align well with activities that cannot be planned in advance or require punctuality due to uncertain access to available cars, unreliable technology, or unpredictable behaviour from previous drivers. Sharing a vehicle, as opposed to using a personal car, involves negotiating and compromising, such as planning in advance, making sure it was booked in advance, being mindful of responsibilities, and coordinating bookings with colleagues and partners. This can make participants reluctant to give up their personal cars due to the perceived additional time and energy required for these adjustments (Sopjani et al., 2020). Particularly, ensuring flexibility for rescheduling plans is a critical challenge. Christensen et al. (2022) found that people need to develop different skill sets to cope with the planning required for car sharing. While a more widespread adoption of car sharing could increase the pool of shared cars and lessen these planning constraints, the inherent nature of shared resources means that access to shared cars will always be more limited than access to privately owned cars (Christensen et al, 2022).

Private cars play a crucial role in providing flexibility, freedom, and comfort to users, creating significant challenges for car sharing to offer comparable values (Kent, 2014). The inherent benefits of

private car ownership, such as on-demand availability, the ability to personalize the vehicle, and the assurance of having a vehicle ready for use at any time, contribute to the strong preference for owning cars over sharing them. This preference underscores the substantial barriers that car sharing must overcome to be seen as a viable alternative (Shaheen et al., 2012; George & Julsrud, 2019). It should also be recognized that some individuals drive not only out of necessity but also because they enjoy the experience. This enjoyment of driving might be another reason why efforts to influence car usage have not been very successful, potentially explaining the resistance to policies designed to reduce car use (Steg, 2005).

Additionally, utilising Church's model (Church, 2000), Turoń (2021), suggests that there are numerous types of exclusions through which consumers can be excluded from car sharing, these include economic, physical, geographic, spatial, fear-based, time-based, and facility-access barriers. Economic barriers are related to travel costs and the proportion of public to private services, affecting the feasibility of using alternative transport modes. Physical barriers involve societal physical and mental difficulties, including mobility issues and educational challenges. Geographic barriers arise from the unavailability of transport services in certain areas, leading to spatial isolation and disruptions in the labour market. Spatial barriers result from local transport policies or their absence, such as parking decisions and traffic restrictions. Fear-based barriers stem from anxieties about using specific transport modes, including fears of disease spread, misunderstandings of service operations, and concerns about vehicle condition or parking availability. Time-based barriers involve travel time issues and related aspects, like childcare and scheduling difficulties. Facility-access barriers pertain to limited access to necessary facilities (Turoń, 2021).

Furthermore, research from Melbourne shows that significant life events, such as the birth of a child, are usually associated with a shift back to personal vehicle purchase and discontinuation of car share use (Jain et al., 2020).

2.3. Car Sharing Models in the Netherlands

When opting for the car as a form of transport in urban areas in the Netherlands, there are various options available. Firstly, one could choose to purchase a private car, where no sharing is needed (except when the car is shared with friends/family by the owner). When opting not to purchase a private car or look for alternative travel options next to a private car, various sharing options are available. Within car sharing, various business models have been distinguished (Cohen & Kietzmann, 2014; Remane et al., 2016). This research distinguishes between the following business models: *Business to Consumer (B2C) Round-trip, Business to Consumer (B2C) Free-Floating, Peer to Peer (P2P) and car sharing Cooperatives*. Figure 2.3.1 shows these different models. Next to the car sharing model, the use of a private car will also be presented. Below each model will be described in detail. The numerous differences in functionality and consumer actions (practices) required between these models are schematically depicted in table 2.3.1.

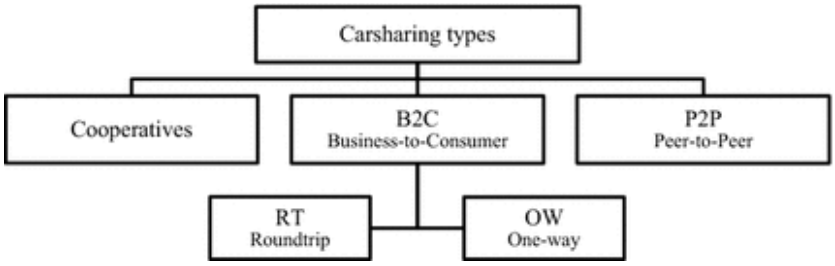

Figure 2.3.1.
Types of Car Sharing Available in the Netherlands (Münzel et al., 2019a)

Table 2.3.1.
Characteristics and actions for the different ways to use a car.

	Private car	***B2C: round-trip***	***B2C: free- floating***	***P2P***	***Cooperatives***
Reservation/ booking	No action needed	Reserve in advance via platform app Pick start and end time Time sloths per 15 min Shows details car, costs and reach for electric cars	On demand, search for an available car in the app Reserve 15 min in advance via platform app Shows reach, details car & costs	Request a car in advance, or instant booking option Book for ½ day or full days (pick start and end time) Shows picture, details car, costs, reviews & free kms	Reserve in advance car via app Pick start and end time
Finding	Where you parked it last	Location car in app	Location car in app	Location car in app	Fixed locations, shown in app
Opening & starting	Personal key	Via the app/ OV card (Greenwheels) Report damages/ irregularities	Via the app Report damages/ irregularities	Pick up key at owner or keyless Register fuel level Check condition car and report damages	Via the app Check for damages
Driving	Pay for used fuel/electricity No end time	Refuel with fuel card, recharge if needed End time	Recharge if needed No end time	Refuel/charge to agreed level End time	Recharge if needed End time
Parking	Anywhere	Fixed parking spot, to finish drive is free Parking during trip at own expense	Anywhere in operating zone for free	Park car within agreements of owner Parking during trip at own expense	Fixed parking spot with charging station Parking during trip at own expense
Completing drive	No actions needed	Park at the required spot Via app, car closes If electric, connect to charging station	Anywhere in operating zone via app Earn a voucher by connecting it to charging station	Park at the required spot Finish drive via app or with owner	Park at fixed parking spot Connect to the charging station Finish via app
Payment/ costs	Investment costs car Fixed depreciation Variable depreciation Fees for road tax & insurance Fixed and variable costs maintenance Fuel costs Possible parking costs	Pay per km and per hour Different rates per type of car Subscriptions possible Option to lower own risk/deductibles	Pay per min of use 200 km free, after that pay extra per km Different rates per type of car Option to lower own risk/deductibles	Costs per ½ day or day (includes certain amount of free kms) Costs for extra kms Different rates chosen by owners	Create a trip analysis, pay for expected use Pay extra or receive money back if costs are different to analysis Cost-analysis made on time and kms use Subscription fee of €15
Responsibilities/ financial obligations	Maintenance Insurance Road assistance Cleaning Registration fees	No responsibilities, included in fee Of course, keep it clean	No responsibilities, included in fee Of course, keep it clean	No responsibilities, included in fee Of course, keep it clean	Shared responsibilities for the maintenance & cleaning Subscription fee of €15
Rules/ regulations	x	Leave car with ¼ of fuel tank or battery (fine) Anyone with a license can use Adjust booking up to 24 hours before	Minimum age of 21 (certain vehicles 25)	Leave car with same fuel level or the agreement you made with the renter Minimum age of 21 for cars and 23 for vans Cancel 24 hours before booking, otherwise pay	Agreements made with members and are revised when agreements do not function Adjust booking anytime
Type of car	Usually one car, one type	Options of electric or fuel cars Different sizes Different luxury	Different types of electric cars	Many different types of cars, rent a private car	Different type of cars chosen by the cooperation

2.3.1. Private Car

A central feature of owning a private car lies in its instant availability to the owner (provided parking is nearby the starting point and destination). There's no need for prior reservation or booking; the driver simply locates where they last parked it and can immediately begin their journey. The driver has the corresponding key, serving as the only means necessary to access and unlock the vehicle. Driving is unrestricted, with no specified end time, limited only by the availability of fuel or charging for electric vehicles. Upon reaching their destination, the driver can park the car in any designated parking area.

However, ownership of a car comes with various costs and responsibilities that extend beyond the immediate purpose of a single journey. These include initial investment costs for purchasing the vehicle, as well as both fixed (age-related) and variable (usage-dependent) depreciation. Additionally, there are ongoing expenses such as road tax, car insurance, and both fixed and variable costs associated with maintenance and fuel consumption. Additionally, it is essential to procure appropriate insurance coverage to mitigate potential financial liabilities resulting from accidents or damages. In many urban areas, significant expenditure also arises from parking arrangements, which may involve subscription fees for parking garages or permits, renting a dedicated parking space near the owner's residence, or charges incurred for parking away from home. Moreover, in the Netherlands, individuals commonly opt for road-side assistance services provided by the ANWB, which come with subscription costs.

As mentioned, owning a personal vehicle entails a variety of significant responsibilities. Principally, there is the obligation to maintain the vehicle regularly, which often involves adhering to periodic inspections such as the annual or biennial APK in the Netherlands. Furthermore, ensuring the cleanliness of the vehicle is the responsibility of the owner. Lastly, proper registration of the vehicle with the relevant authorities is a responsibility that every owner must fulfil.

2.3.2. Business to Consumer (B2C): Round-trip

In this thesis, B2C Round-Trip consumers are represented by users of *Greenwheels* and *MyWheels*. However, it is important to note that various other platforms in the Netherlands also offer similar services. The B2C round-trip model involves consumers renting a car from a designated location, which subsequently serves as the drop-off point following use, as specific parking spots are made available for carsharing organisations (Münzel et al., 2019a). The rental is for a bounded period, within a fixed time slot. Final costs of the trip are a combination of the amount of time that the car is rented, and the kilometres that are driven in that time slot.

Car reservations are made through the rental platform's app, enabling consumers to select their preferred start and end times for the trip. Time slots are offered in fifteen-minute increments, with the app providing information on available cars, associated costs, and, for electric vehicles, their range. Users can also view the parking locations of available cars within the app. Upon renting the car, access can be gained either through the application or, in the case of Greenwheels, also by utilizing a personal Dutch public transport ("OV") card. Before commencing the journey, users are required to report any damages or irregularities observed in/on the vehicle.

If the car uses fuel, a fuel card is available in the car to top up the tank, and the user solely pays for the kilometres driven. In an electric car, a card is available that allows the user to attach the car to a charging station. After the drive, parking the car back in the designated parking spot is cost-free, however parking the car elsewhere during the rental time is at the user’s own expense. Upon finishing the trip, the driver closes the car using the app. If the car is electric, the driver must connect it to a charging station when the battery is below 80%, otherwise, the user may be fined. Fuel cars with less than ¼ of a tank of fuel also risk a fine.

2.3.3. Business to Consumer (B2C): Free-floating

In this thesis, B2C Free-Floating consumers are represented by users of *SIXT* (Share). However, it is important to note that other platforms in the Netherlands also offer similar services. The B2C free-floating model involves consumers renting a car from the platform on-demand, searching a car that is available in the platform's app and reserving said car 15 minutes in advance. The app provides information on available cars, their associated costs, and, for their range (all *SIXT* cars are electric in the Netherlands). Users can also view the parking locations of available cars within the app. There are various types of cars available at three price point levels, and prices can also fluctuate depending on occupancy and time of day (e.g., rush hour). Users pay a fee per minute, which includes a certain amount of free kilometres; any additional kilometres incur extra charges.

The rental duration for the vehicle is unrestricted. Rental options encompass per-minute rates, as well as structured rates for durations of 3 hours, 6 hours, 1 day, 2 days, 3 days, or 7 days, with complimentary kilometres allocated per hour. In the event of exceeding the initially allocated time, any additional minutes beyond the original booking are subject to charges at the standard per-minute rate.

Upon renting the car, access can be gained through the application. Before commencing the journey, users are required to report any damages or irregularities observed in/on the vehicle. Irregularities also include when the car has been left in an unhygienic state by the previous driver. Cars do not have to be returned to the starting location; they can be dropped off anywhere within the provider's operational zone (Münzel et al., 2019a). With the service operating in several cities, it is possible to park the car in a different city from where it was rented. Parking a rented car within the operational zone is free.

When connecting the car to a charging station upon departure, the consumer receives a voucher or discount for their subsequent drive. Consumers are relieved of responsibilities concerning vehicle maintenance, insurance, or registration. While they have the option to enhance their service with insurance coverage, administrative tasks related to vehicle registration are assumed by the service provider. Nonetheless, consumers are expected to uphold the cleanliness of the vehicle for subsequent users.

Consumers are obligated to comply with regulations set by the service provider. There is a minimum age requirement of 21 for renting a car, and for certain models, the age requirement may be raised to 25 years.

2.3.4. Peer-to-Peer (P2P)

In this thesis, Peer-to-Peer (P2P) consumers are represented by users of *SnappCar*, currently the only platform in the Netherlands offering this distinctive service. SnappCar facilitates a P2P car rental model wherein individual car owners rent out their personal vehicles to consumers via the SnappCar platform (Münzel et al., 2019a). Acting merely as an intermediary, the app connects these two parties, while earning a fee for its services.

SnappCar provides consumers with the flexibility to book cars either in advance or on demand, with rental durations customizable to half days or full days, allowing consumers to specify their desired start and end times with the owner. The app provides comprehensive information about each car, including images, specifications, location, pricing details, allotted free kilometres, and user reviews.

Using the car either involves retrieving the key from the vehicle owner or accessing it through the app via the keyless function. Upon acquiring the vehicle, the consumer records the fuel level and notes any existing damages, establishing an agreement with the owner regarding the desired fuel level for return.

At the conclusion of the rental period, the consumer is responsible for parking the vehicle at the predetermined drop-off location, possibly identical to the pick-up location, though alternative arrangements may be agreed upon.

Consumers are relieved of responsibilities concerning vehicle maintenance, insurance, or registration. Administrative tasks related to vehicle registration and insurance are assumed by the car owner. Nonetheless, consumers are expected to uphold the cleanliness of the vehicle.

There is a minimum age requirement of 21 for renting a car, and 23 for renting a van. Cancellation of bookings is permissible up to 24 hours before the scheduled rental period, beyond which a fee is incurred by the consumer payable to the car owner.

2.3.5. Sharing within a Cooperation

A car sharing cooperative is a member-owned organization where individuals collectively own, operate, and share access to a fleet of vehicles. Unlike traditional car rental companies or peer-to-peer platforms, car sharing cooperatives operate on a cooperative ownership model, wherein members collectively own and manage (a fleet of) vehicles. Cooperative have a communal interest to share cars and have a not-for-profit orientation (Münzel et al., 2017).

In a car sharing cooperative, individuals become members by contributing financially to the cooperative and agreeing to abide by its rules and regulations. Importantly, decision-making within the cooperative is typically democratic, with members having a voice in key decisions such as vehicle acquisition, pricing, and operational policies. Regulations governing the cooperative are flexible, determined by members and subject to adjustment if found to be ineffective. The availability of vehicles within the cooperative is contingent upon decisions made by its members. A trip-analysis is made for members, resulting in a monthly fee estimated to the anticipated distance to be travelled. Any discrepancies between the estimated and actual distance travelled result in either additional payment or reimbursement for the member.

Members of the cooperative reserve their preferred vehicle through the app, provided by an external party, selecting both the desired start and end times for their reservation. The app displays the fixed parking locations where vehicles are stationed. Upon accessing the vehicle via the app, members are asked to do an inspection for damages and assess the cleanliness of the car, reporting any irregularities. Parking at the conclusion of the trip occurs at designated spots equipped with charging stations, while parking during the trip is at the member's own expense. Prior to concluding the trip, users are obliged to connect the car to the charging station.

Members are subject to a monthly fee depending on the cooperation, usually between €15 - 25. Additionally, members share collective responsibility for the maintenance and cleanliness of the vehicles, but the costs, like the insurance, road assistance, and registration expenses for the vehicles, are shared with the cooperation.

Chapter Three: Theoretical Framework

Based on the contextual discussions included above it can be argued that the transition from personal car ownership to car sharing offers a promising solution to the challenges posed by unsustainable transport systems. As discussed above this research focuses on car sharing in urban areas of the Netherlands, investigating 4 different models: B2C round-trip, B2C free-floating, P2P, and cooperatives. By understanding user perspectives and employing the Theory of Planned Behaviour (TPB) and the Social Practice Theory (SPT), the study aims to identify the change in mobility practices and the key motivations and barriers influencing car sharing adoption.

3.1. Theory of Planned Behaviour

The first theory used, is the Theory of Planned Behaviour (TPB). In 1991, Ajzen introduced TPB as an expansion on the Theory of Reasoned Action (TRA), which Ajzen first presented with Fishbein in 1980. TPB holds that a person's intention to carry out a particular action accurately forecasts that person's actual behaviour. Three major elements impact this intention: (I) the person's attitude toward the action; (II) subjective norms that reflect perceived social pressures; and (III) the person's perception of their behavioural control, or their confidence in their ability to carry out the behaviour (Ajzen, 1991).

In TPB, attitudes indicate whether the person thinks the action is favourable or unfavourable. Subjective norms are the perceived social pressures and expectations associated with engaging in the action or refraining from it. The term "perceived behavioural control" describes a person's perception regarding their capacity to do the activity in various situations. These variables are affected by a variety of contextual elements and are shaped by the person's personal views (Ajzen & Fishbein, 2005). In simpler terms, compatibility is a key component of the TPB, which makes sure that the target, action, context, and duration of the behaviour of interest are all exactly aligned with each other and with each other's definitions. The intention to carry out a behaviour is its immediate precursor; greater intentions increase the possibility that the activity will be carried out, although a number of unanticipated circumstances may prevent this. Subjective norms, perceived behavioural control, and attitude toward the behaviour all influence one's behavioural intentions. Ideas about the results of an action influence attitude, ideas about social approval and the actions of others influence subjective norms, and beliefs about the existence of enabling or hindering circumstances determine perceived behavioural control. Together, these factors affect how likely it is that intention will translate into action. The following image 3.1.1 illustrates the TPB.

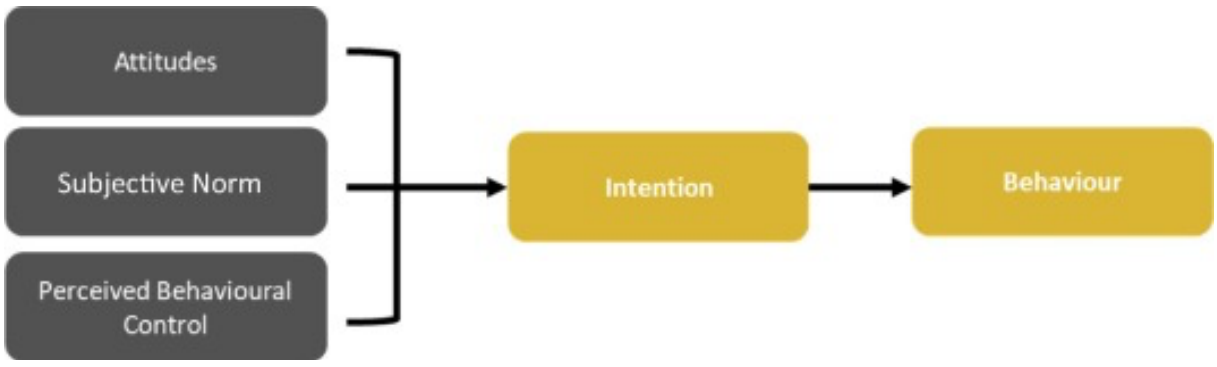

Figure 3.1.1.
Image illustrating the Theory of Planned Behaviour by Ajzen (1991)

Based on its ability to explain individual choices, the TPB has a popular choice amongst scholars to study these behaviours specially as consumers. This is also true in the context of sustainability and green choices made by consumers. The study by Wu & Chen (2014), used the TPB to analyse the green consumption and found the following: 1. Perceived benefits of green consumption greatly influence consumer attitudes in a positive manner. 2. The perceived risk associated with green

consumption has a strong negative impact on consumer attitudes. 3. Normative beliefs and moral responsibility significantly contribute to shaping the subjective norms of consumers. 4. The ability to govern consumer behaviour is significantly strengthened by both control strength and control belief. 5. Customer behavioural intention is strongly positively affected by attitude, subjective norms, and behaviour control. 6. The actual behaviour of consumers is greatly affected by both behavioural intention and behaviour control (Wu & Chen, 2014). Thus, indicating a connection between the TPB and its ability to explain consumer behaviour.

Another study found that perceived behavioural control and subjective norms are key factors influencing sustainable consumer behaviour. Additionally, the findings suggest that sustainable practices are more prevalent among female consumers, middle-income consumers, young consumers (under 30), and those with education up to the senior secondary level (Sheoran & Kumar, 2022).

While TPB is widely accepted as a method of studying consumer behaviour, scholars have also started using extended TPB by also analysing *'personal norm and past behaviour as predictors and the attractiveness of unsustainable alternatives as a moderator'* (Han et al., 2017, 292). In this context, this study specifically investigates the new trends in bicycle tourism and suggests that compared to the original TPB, the improved algorithm was able to predict travellers' intentions more accurately. The results of the investigation demonstrated that intention is highly influenced by individual characteristics such as attitudes, subjective norms, perceived behavioural control, and personal norms. An important point that the study raises is also how the influence of subjective standards on intention was mitigated by personal norms. Moreover, the study also found the degree to which bicycle travellers find unsustainable alternatives appealing influences their decision-making process (Han et al., 2017).

A study conducted in China analysed the behaviour of students in car sharing practices and found that both subjective norm and perceived behavioural control have a direct and positive relationship with the intention to use car sharing. However, attitude and environmental concern do not have a direct correlation with this intention. Moreover, environmental concern indirectly affects Chinese college students' intention to use car sharing through its impact on subjective norm (Zhang & Li, 2020).

The TPB thus has been instrumental in studying consumer behaviour, suggesting a decision-making process influenced by several factors, including self-selection. Regarding the main research question of this thesis, self-selection plays a crucial role in consumer choice. Van Wee (2009) emphasizes the importance of understanding self-selection processes to enhance our comprehension of travel habits, destination preferences, and transportation effects.

3.2. Social Practice Theory

Another relevant theoretical framework in this context is the Social Practice Theory (SPT). SPT aims to comprehend how interactions between different components within social practices shape, sustain, and modify human behaviours (Shove et al., 2012). Practices, considered routine forms of activity, are made up, as identified by Shove et al. (2012), of interconnected materials, competencies, and meanings, and are examined as the primary unit of analysis in SPT, contrasting with theories that focus solely on individual actions or external social structures.

As mentioned, SPT involves the interplay of three core elements: materials, competences, and meanings. "Materials" refers to the physical objects and technologies integral to performing a practice, such as vehicles and driving infrastructure in the context of mobility. "Competences" encompasses the skills, knowledge, and abilities required to perform the practice effectively, like the ability to drive or navigate transportation systems. "Meanings" relates to the social and symbolic significance attached to the practice, such as cultural norms and values associated with car ownership or environmental consciousness. By examining how these elements interact and influence each other, SPT provides a framework for understanding how practices are sustained, transformed, or disrupted (Shove et al., 2012). For example, introducing electric vehicles (a material change) can alter the competences

needed (such as knowledge of charging infrastructure) and shift the meanings associated with driving (like being eco-friendly), thereby reshaping the practice of driving in society. Understanding these dynamics can inform interventions aimed at promoting sustainable behaviours and integrating new practices into daily life.

In “Making and Breaking Links”, Shove et al. (2012) suggest that social practices are dynamic systems composed of various elements, which become integrated when practices are enacted. The persistence, emergence, and disappearance of these practices depend on the formation and dissolution of links between their defining elements. By focusing on the elements of practice—materials, competences, and meanings—and the connections between them, the authors argue that we can analyse the dynamics of social practices without prioritizing either human agency or social structure (Shove et al., 2012, 21-41). The following image, figure 3.2.1, illustrates this.

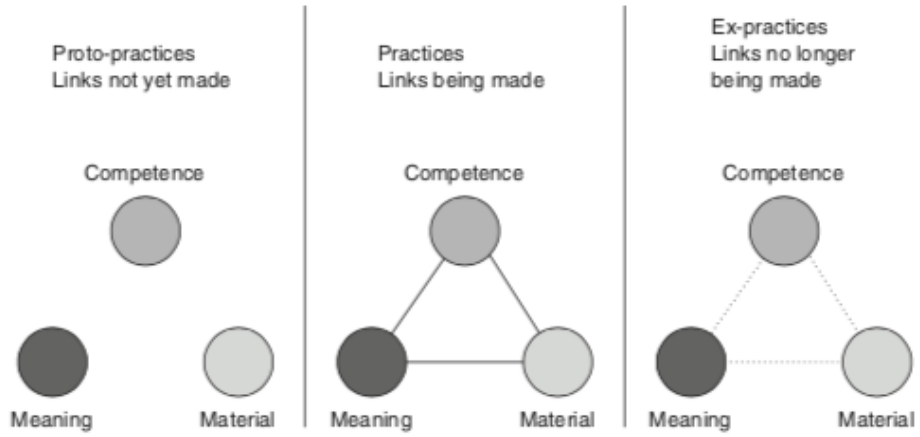

Figure 2.1 Proto-practices, practices and ex-practices

Figure 3.2.1.
Image explaining the “Making and Breaking Links” by Shove et al. (2012)

Practices extend beyond individual choices, encompassing forms of knowledge and technologies that lie beyond the control of single actors (Langendahl et al., 2016). In SPT, agents are both bodies and minds that 'carry' and 'carry out' social practices (Reckwitz, 2002). To understand this point better, STP suggests that the social world is primarily composed of diverse social practices enacted by these agents, who consist in the performance of practices, including both physical and mental routines. They comprehend the world and themselves, utilizing know-how and motivational knowledge specific to each practice. These practices, as vocabularies, do not reach the core of a real social world but provide contingent systems of interpretation, allowing us to make specific empirical statements while excluding other forms of empirical statements.

One of the core principles of SPT is that people's engagement in particular daily behaviours contributes to the perpetuation of social structures (Bourdieu, 1977; Giddens, 1984; Schatzki, 1996). According to Shove et al. (2012) and Warde (2005), practices are the essential social components that aid in our understanding of behaviours, establishments, and structures suggesting an interconnection between these components.

The inherent value of Social Practice Theory (SPT) has been shown by numerous studies. One such study indicates that, unlike traditional approaches which emphasize individualistic and rationalist perspectives, SPT shifts the focus from individuals to the social and collective organization of practices. These practices are thus explained through broad cultural entities that shape how individuals perceive, interpret, and act within the world (Hargreaves, 2011). The study is relevant as it focuses on an analysis of the planning and implementation of the Environment Champions initiative though the use of SPT, offering a more comprehensive and contextually grounded perspective on behaviour

change processes. In using the SPT the study highlighted the value of numerous mundane yet significant opportunities for behavioural change beyond merely altering individuals' attitudes or values. Additionally, it also found that several significant challenges exist while trying to modify and transform practices, challenges that transcend the mere elimination of contextual barriers and implicate the fundamental organization of everyday life (Hargreaves, 2011).

In the context of the research question of the thesis, Cass and Faulconbridge (2016), emphasize how various forms and modes including 'the social, material, temporal, and spatial factors 'affect commuting choices such as driving a car, enabling socially valued activities like going to work and school, shopping, and visiting friends. The study using the SPT also stresses the integration of mobility into daily life in the context of policy suggestions (Cass & Faulconbridge, 2016; Shove et al., 2012). Thus, for the purposes of SPT, routines and habits are regarded as the replication of consistent social practices, emphasizing the continuing relationship between social and communal temporalities as well as the arrangement and dispersion of practices in daily life (Southerton, 2012).

In this context of this thesis, SPT helps to examine transportation behaviours and highlights how useful it is for understanding the intricacies of sustainable mobility. It also illustrates how material shifts, such as the adoption of electric cars, can affect meanings and competencies and impact society practices. Moreover, SPT tackles the drawbacks of individualized approaches in the study of and promotion of environmentally beneficial actions, posing as a relevant addition for the analysis.

3.2.1. The Practice Driving

According to the theory of social practice, "materials," "competences," and "meanings" are the fundamental components that make up any social practice. Over time, these components interact dynamically to create, maintain, and change social practices (Shove et al., 2012).

When discussing driving, "materials" refers to the actual infrastructure and items, such as vehicles, roads, and traffic signals. Currently the practice is predominately owned by private vehicles. Competencies include the talents, knowledge, and skills needed to carry out the exercise, such as driving and comprehending traffic rules (Shove et al., 2012). The meanings associated with driving can be categorized into instrumental, symbolic, and independence aspects (Steg, 2005). The instrumental aspect encompasses practical reasons for car use, such as transportation and mobility. It assumes that individuals choose the mode of transportation that offers the highest utility or relative advantage (Dong et al., 2006). The instrumental value of a car relates to its functionality as a means of mobility and accessibility, including factors like financial costs and travel time (Wardman et al., 2001).

The independence aspect involves individual freedom and benefits such as flexibility and comfort (Jensen, 1999; Anable, 2005; Hagman, 2003). Studies indicate that people are willing to use different transportation modes if they provide similar services (Beirao & Cabral, 2007). Gatersleben & Uzzell (2007) posits that feelings of independence are strongly tied to positive car-use experiences.

Lastly, the symbolic aspect highlights that some individuals drive not just out of necessity but also by choice (Handy et al., 2005). This includes motives such as sensation, power, status, and superiority (Steg, 2005). The car contributes significantly to a person's identity and social status, portraying social status, confidence, power, and competence (Moody, 2019).

In this context of the SPT, it is relevant to note that the practice of car sharing reconfigures the established practice of driving by altering one critical material component: vehicle ownership. In the theoretical framework of practice theory, individuals are seen as "empty" containers that internalize and evolve meaning and competence through the integration of materials into their practices (Schatzki, 1996; Shove et al., 2012). Car sharing transforms this material aspect of driving from private car ownership to shared access, thereby influencing the associated meanings and competencies. This shift in material disrupts traditional meanings of ownership, status, and personal autonomy tied to driving,

while simultaneously fostering new meanings centred around sustainability, community, and flexibility (Bardhi & Eckhardt, 2012). Competence is also impacted as individuals adapt to the logistics of car sharing, such as booking systems, vehicle maintenance, and coordination with other users, thus acquiring new skills and knowledge (Kent & Dowling, 2013).

3.3. Use of Theory of Planned Behaviour and Social Practice Theory

As mentioned earlier, in this thesis both the TPB and the SPT approach will be used to analyse the data. The TPB focusses on the individual behaviour predicting the intention of the individual to engage in the behaviour, exploring the motivations and barriers impacting the behaviour. The TPB primarily looks at behaviour change from an individual perspective, considering how personal changes in beliefs and attitudes lead to behaviour change (Ajzen, 1991). The SPT shifts the focus from individual behaviour and motivations to the broader practices that people engage in, considering the interplay between material, competence, and meaning. By examining how these elements come together to form social practices, SPT can reveal how changes in practices can influence behaviour and potentially lead to larger societal shifts (Shove et al., 2012). This perspective emphasizes the collective and systemic nature of behaviour change, highlighting how altering practices can have a significant societal impact, potentially transforming those practices entirely.

There is critique on the combined use of TPB and SPT. One of the most important critique in this fields have been suggested by Shove (2010), who strongly opposes the integration of psycho-social theories such as the TPB, with practice theories. The main argument in this regard suggests that "*social theories of practice on the one hand, and of behaviour on the other, are like chalk and cheese*" and emphasizes "*the incommensurability of these contrasting paradigms, and hence about the impossibility of merger and incorporation*" (Shove, 2010, p. 1279).

Despite this, it is undeniable that psychology has developed effective techniques for identifying the motivations and feelings that constitute parts of a practice (Barr, 2015). Although social practice theory and psychology originate from fundamentally different ontological and theoretical perspectives, a practice approach can still benefit from the methods psychology uses to understand mental processes, particularly how these methods have been refined in transportation studies (Kent, 2021). According to Kent (2021), transport researchers must develop an understanding of the complexities in transportation that can be seamlessly translated into effective transport policy.

As can be concluded, both approaches aim to understand consumer behaviour, possibly resulting in overlap as the data is obtained from individuals. However, this dual approach could be a more effective and holistic strategy for promoting behaviour change in contexts like car sharing and sustainable transportation.

Chapter Four: Methods

In this chapter the methodology employed to analyse the data and answer the research questions is discussed. Section 4.1 discusses the research design, section 4.2 discusses the research setting, section 4.3 elaborates on the participants, section 4.4 explains the procedure of data collection and the final section, section 4.5, explains the data analysis.

4.1. Research Design

For this explorative study, a qualitative research design was employed to investigate the motivations and barriers for individuals to participate in car sharing initiatives, and to gain insight into the driving practice with a shared car. Semi-structured interviews (n= 22) were conducted to gather rich, detailed insights into participants' perspectives and experiences.

The choice of a qualitative approach was deemed appropriate for several reasons. Firstly, qualitative methods allow for in-depth exploration of complex phenomena, such as individual motivations and barriers and a broader insight in the practice, providing a deeper understanding of the underlying factors driving behaviour (Silverman, 2020). Secondly, semi-structured interviews offer flexibility, allowing participants to express their thoughts and feelings freely, which is particularly relevant when exploring subjective experiences and perceptions (Adams, 2015).

Moreover, qualitative research aligns well with the exploratory nature of this study, as it enables the researcher to uncover new insights and generate hypotheses for further investigation. By delving into the nuances of participants' attitudes and behaviours, qualitative methods facilitate the identification of patterns, themes, and relationships within the data (Silverman, 2020).

In the field of social sciences, qualitative research is widely recognized as a legitimate and rigorous approach for studying human behaviour and experiences (Silverman, 2020). It offers valuable insights that complement quantitative approaches, contributing to a holistic understanding of complex phenomena. In this study, the qualitative research design was considered the most suitable approach for achieving the research objectives, as it allowed for a nuanced exploration of the motivations and barriers influencing individuals' decisions to engage in car sharing initiatives, and to gain a good understanding of the change in the practice of driving with the introduction of a shared car.

4.2. Setting

This study primarily took place in urban areas of the Netherlands, specifically Amsterdam, Rotterdam, and The Hague, due to their prominence in urban car sharing initiatives. Amsterdam and Rotterdam were selected as they have well-established Business to Consumer (B2C) and Peer to Peer (P2P) car sharing initiatives, having been in operation for a considerable duration. However, car sharing cooperatives are less developed in these cities. Recruitment efforts were initially focused on Amsterdam-based cooperatives. However, limited response was received due to the early stage of cooperative development in the city. Consequently, the majority of interviews with participants in car sharing cooperatives were conducted in the Hague, where they are more prominent and well developed.

4.3. Participants

Participants for the study were recruited through a multi-faceted approach altered to the specific characteristics of each car sharing category. In total, 22 participants were interviewed, distributed across four distinct sharing categories: Business to Consumer (B2C) round-trip (5 interviewees), B2C free-floating (3 interviewees), P2P (4 interviewees), and car sharing cooperatives (10 interviewees from 5 different cooperatives). The B2C round-trip is represented by users of both *Greenwheels* and *MyWheels*, these are the biggest players in NL, the B2C free-floating is represented by users of *SIXT* and P2P is represented by the only operating P2P platform in the Netherlands, *SnappCar*.

Table 4.3.1. below presents a comprehensive overview of all interviewees, including their (pseudo) names and the respective car sharing platforms they are affiliated with.

Table 4.3.1.
Table depicting all interviewees

	Platform / Initiative	***Pseudonym***
Business to Consumer (B2C)	Round-trip (Greenwheels, MyWheels)	Lana Anna Alex James Emma
	Free-floating (SIXT)	Jonah Lucas Claire
Peer to Peer (P2P)	SnappCar	Jacob Olivia Sophie Theo
	Bezuidenhout (the Hague)	Lily Isaac Mateo
Cooperation	DH Cooperatie (the Hague)	Ella & Tom Robert Ian Jack
	Bloemenbuurt (the Hague)	Luke
	Spaandammerbuurt DEELt (Amsterdam)	Maria
	DEELCentrum (Amsterdam)	Tessa

Recruitment for both B2C and P2P participants involved several strategies. Initially, potential participants were identified through the researcher's personal network of car sharing users on WhatsApp, which resulted in 6 interviewees. These interviewees then asked around in their social

circle, leading to an additional 5 interviewees. Additionally, the researcher reached out to several random people on the P2P platform SnappCar, where one participant responded.

As mentioned before, approaching cooperatives in Amsterdam posed challenges in securing participation, ultimately resulting in interviews with only two relevant individuals from the city. Consequently, efforts were extended to The Hague, where a more robust cooperative network exists. Ultimately, 10 participants from 3 cooperatives in The Hague were interviewed, with varying levels of cooperative size and operational maturity represented. All the cooperatives represented were established by the same initiative, called DEEL.

While ensuring diversity within the participant pool is often a key consideration in research design (Silverman, 2020), the primary objective of this study was to explore motivations and barriers for individuals participating in car sharing initiatives and to gain insight in the possibly altered practice driving across different platforms. Given the specific research questions and the exploratory nature of the study, the focus was more on depth of understanding rather than breadth of representation. Therefore, while efforts were made to include participants from various neighbourhoods and cooperatives, the emphasis was on capturing a range of perspectives within the context of car sharing, rather than achieving demographic representativeness. This approach allowed for a nuanced exploration of user behaviour, which is crucial for informing future research and practical interventions in the field of sustainable transportation.

4.4. Procedure of Data Collection

The research relied on semi-structured interviews as the primary data collection instrument to explore behaviours of individuals participating in car sharing initiatives. Semi-structured interviews offer a flexible yet focused approach to qualitative data collection, allowing for a balance between predefined questions and the exploration of emergent themes during the interview process (Adams, 2015). Structured into four sections, each interview segment aimed to delve into specific aspects related to car sharing participation while allowing flexibility for in-depth exploration based on participant responses.

The four sections that were explored are:
Introduction to car sharing: This section sought to uncover participants' initial engagement with car sharing, including motivations for participation, the type of car sharing mode and why, the reasons for car use, the impressions of car sharing, whether the participant owned a car, the perceived trust in the service and the perceived sense of ownership associated with the service.
Routine of using shared cars: Here, the focus was to dive deeper into the practical aspects, exploring participants' routines and experiences with shared cars.
Barriers to participation: Participants were prompted to identify and discuss any challenges or obstacles encountered while using car sharing services, providing valuable insights into potential limitations of these initiatives. The semi-structured format allowed for probing follow-up questions to delve deeper into participants' experiences and perceptions.
Future vision: The final section aimed to capture participants' perspectives on the future of car sharing, including envisioned improvements or changes to existing services.

Semi-structured interviews are particularly well-suited for exploring participants' future aspirations and expectations, as they allow for open-ended discussions that encourage reflection and exploration of ideas.

The interviews were conducted over a period of 9 weeks. Each interview, lasting approximately one hour on average, was conducted in a conversational manner to foster natural discussion while ensuring all relevant themes were addressed. Before the interview, participants were presented with a consent form outlining the study's purpose and their rights. While audio recording (carried out through either zoom-recording or mobile audio recording during in-person interviews) was standard, participants had the option to decline, along with assurance of anonymity through the use of pseudonyms. One

participant declined the use of audio recordings. In this case the researcher took detailed hand-written notes of the participant's answers.

The researcher guided the interviews, striving for non-bias while maintaining engagement. The researcher ensured self-awareness throughout the data collection process, aiming for neutrality and consistency in interview conduct and note-taking. The structured interview format and comprehensive notes ensured coverage of all themes, with flexibility to adapt question order as needed.

4.5. Data Analysis

Full transcriptions of audio recordings were performed by the researcher for nine out of twenty-two interviews to facilitate in-depth analysis and coding of the data. Atlas.ti was used for deep coding, with subsequent transfer of codes to Excel for further organization and including the quotes of the other interviews. Outstanding quotes from interviews were compiled in Excel, guiding the selection of codes and quotes for the results section. The deep coding of nine interviews indicated consistent trends within target groups, allowing for the remaining fourteen interviews to surpass the deep coding phase and rather jump to organization in Excel. The codebook can be found in Appendix A.

Chapter Five: Results

The following chapter presents the study's findings. The first section demonstrates the ongoing demand for car use. The second section focusses on the behaviour change due to car sharing. It employs the Theory of Planned Behaviour to uncover individual motivations and barriers and utilizes the Social Practice Theory to illustrate changes in materials, competences, and meanings resulting from car sharing. The third section presents the impact of car sharing on other mobility practices as indicated by the interviews. The final section summarizes the found differences among the different car sharing models.

5.1. Demand for Car Use

Cars are useful instruments for a variety of reasons, reflecting people's varying requirements and preferences. In the interviews, respondents mentioned several different reasons why they use the car. The main reasons the car is still used, analysed from the interviews, are to navigate destinations with limited to no public transportation access, to transport goods, to be mobile with the family, to accomplish a planned (group) trip and when a car is preferred to alternative forms of transportation.

5.1.1. Navigating Destinations with Limited to no Public Transport Access

"Due to a very good public transport network here in the city, I can afford it to share cars. However, I do need a car when public transport is unable to get me where I am going"
- Lily

One of the biggest reasons respondents still feel the need to use the car is when they need to reach destinations that have limited to no access with public transport. Most of these locations, as stated by the interviewees, are outside of the cities. Public transport usually suffices within cities, as Lily points out in the quotation above, however there are still destinations that are challenging to reach by public transport that are easily reachable by car. Claire, another interviewee, even mentioned the limited public transport access to be the main reason for car use: "The main reason I use a car is when the final destination is difficult to get to by public transportation". Both Jacob and Lana highlighted the example of the distribution centres just outside the city that do not have easy public transport access and by deciding to take the car they save a lot of time and view it as safer. Lana indicated the importance of how long public transport can take at times for her choice in taking the car: "But as soon as I know that public transport is a bit more complicated, I immediately have the urge to take the car. Especially if I don't have much time one day, so it is in relation with my work, which is an important one. If I would have all day, it wouldn't matter as much."

Besides locations having limited access by public transport, some locations get even more restricted due to time. During certain hours, destinations become even more inaccessible because public transport doesn't operate at those times. Theo mentioned that he opts for a car when he knows he'll be traveling during hours when public transport isn't running: "I'd choose a car if public transport isn't available at that time, whether it's for going home or if I need to be somewhere early". Robert echoed this sentiment, noting that his work is situated in an area with limited public transport options: "Because of my irregular working hours I rely on a car, since public transport doesn't run 24 hours a day where I need to be".

In general, it is clear that individuals still rely on cars to access locations that are difficult or impossible to reach by public transportation. This indicates that public transportation either takes too long in comparison to the car, or it does not get them there at all.

5.1.2. Transporting Goods

"What do you need a car for, yeah to be able to transport things?! We're not really into driving for fun."
– Ella & Tom

The utilization of cars for transporting goods, such as furniture and groceries, stands out as a significant reason for their popularity. Ella & Tom underscore this practical aspect of cars in their statement. Numerous interviewees have emphasized the necessity of a car for transporting bulky or heavy objects, or for conducting extensive shopping trips requiring the transport of large or many items. The convenience of a car becomes evident when you have items to carry – you load them into the car, drive to your destination, and unload them with ease. In contrast, public transport often involves transfers and the hassle of walking with your belongings, making the journey more cumbersome. When the objects that you want to move become substantial, like Robert that moved cupboards, Jacob that transported a Christmas tree or Sophie that recently used a car to pick up a piece of furniture, a car becomes a necessity.

Similarly, when relocating to a new residence and opting to handle the moving process personally, as highlighted by Olivia and Emma, a car, or even a van, becomes essential. Mateo also emphasized the need for a car during his recent house renovation, stating: "During my recent house renovation, I frequently needed a car to transport construction materials and furnishings." Other interviewees also mentioned instances where a car was indispensable, such as Olivia using it to transport items to the dump, James renting a van to transport a harmonium from Groningen to Amsterdam and Jacob transporting installation equipment for professional appointments.

Furthermore, using a car makes shopping for large and many items manageable. Whether it is shopping for furniture at Ikea, passing Gamma to buy construction materials or conducting extensive grocery shopping, a car provides a practical solution for transporting these items. Claire, for instance, mentioned her recent use of a car for a significant grocery shopping trip: "I used a car recently when I had to do a lot of groceries for a party that I organized".

Moreover, the need to travel with things is evident for specific activities. Sports enthusiasts like Anna, Olivia and Claire find it practical for activities such as golf and kite surfing, where a car allows them to easily transport their gear along. Anna said: "I always go by car to the golf course, so I could take everything with me that I want and need."

In conclusion, the widespread use of cars for transporting goods, whether it be furniture, groceries, or (sports) equipment, remains a key factor in their popularity and necessity. The convenience of loading items into a car, driving to the destination, and unloading them with ease contrasts with the challenges posed by for example public transport, making cars essential for various tasks, from shopping trips to moving to a new house.

5.1.3. Family Mobility

"When we started a family, we bought a car. It was a lot easier to bring the kids to school and commute to work by car"
– Jack

The interviews highlighted that having a family significantly increases the practicality of using a car for transportation. As Jack mentioned, it's much easier to manage tasks like taking the kids to school and continuing your journey to work with a car. Tessa also noted that a car is essential for transporting kids to school and various activities like sports, considering the added travel routes and movements when you have children. Ella and Tom agreed with this: "We are currently retired and do not have kids at home, but we can understand the need for a car when you have kids. Just imagine, if you have a family and one child has hockey practice while the other has soccer somewhere else, it's obvious they would need a car." Also, Alex mentioned the need for a car when moving around with a baby: "Well, now with a baby that of course changes a bit. It is too small, so it is not allowed to go on a bicycle yet, so we actually have to either walk or go by car."

Besides the added travel routes due to kids, the previous reason for car use – transporting goods – is also more apparent with children. With a family you do a lot more groceries at once, and a car makes

it easier to transport them. Tessa mentioned doing the groceries for the family more easily by car. Additionally, going on a trip or holiday with the family is more practical with the car, as you can easily load all luggage and other essentials in the car all at once. Ian mentioned he used the car for holidays and going on trips with his daughter. And James noted that the recent train holiday they went on did result in some inconvenience for their son: "And well, on the one hand it was a bit sad for a son. He was given fourteen blocks of Duplo, because we had to carry it all, that's the difference when you have a car."

Furthermore, even respondents who do not yet have children expressed their intention to consider a car for family use in the future. As Emma mentioned: "Young parents really do need a car I believe. When I start my family, I really would like to have a car". Claire echoed this statement: "With kids you will have a lot more stuff and a car becomes very practical. In the future with kids, I definitely will need to use a car." And Isaac, who does not want kids, mentioned that this influences their decision-making regarding car use: "We do not have a desire to have children, so that does not weigh in our decision making for using the car."

Overall, the experiences and expectations shared by the respondents demonstrate that having children often necessitates the use of a car for its practicality in family life, as it allows for easier mobility and facilitates various activities and outings.

5.1.4. Planned (group) Trips

"I use a car when I go away for the weekend or other trips with my friends. It is easy to take along our luggage and have our freedom when we go by car. It is a practical reason, but also a social reason, as I enjoy the commuting with my friends in the car".

– Emma

The interviews revealed another significant reason for using cars: to go on planned group trips. As Emma stated above, she relies on a car for weekend getaways and other trips with friends, appreciating the ease of transporting luggage and the social aspect of commuting together. And Alex mentioned: "I take the car to go to the beach, or to visit someone out of town". Mateo also mentioned he uses the car to go away for the weekends. And Sophie stated: "I used the car recently with friends, when we travelled with a group to an event of another friend".

The same goes for holidays, it is popular to go on holiday by car. As James highlighted: "And by car, yes, if you leave the Netherlands, I think that is the greatest convenience, that you put all the stuff in your car until it is full and that you no longer have to think about it." And other interviewees, like Lucas, Olivia and Ian all mentioned they do see the car as the most practical way to go on holiday and also use it accordingly. The car makes transporting luggage easy and it provides freedom when you are at the destination, to move around, do the groceries and not be reliant on other transport modes.

The car is often experienced as the most fitting transport mode for a trip, due to the ease of transporting your luggage and other essentials, having everyone and everything together and the freedom to be mobile at the destination you travel to. In the previous paragraph around family mobility, the practicality of the car for a group was also already highlighted.

5.1.5. Preference for a Car

"A car brings freedom and comfort; you get addicted to it."

– Mateo

The interviews shed light on several other reasons why people value the use of cars in their daily lives. One of the reasons is the sense of freedom and independence that cars provide, as Mateo also mentioned. Unlike public transportation, which is often bound by fixed schedules and routes, cars offer unparalleled flexibility, allowing individuals to travel wherever and whenever they want. This freedom from time constraints enables people to move around without having to worry too much

about the availability of transportation options nearby (Interviews of Lucas, Anna, Jonah, Alex). Ian highlighted how a car provided him and his family with a sense of freedom, particularly during the COVID-19 pandemic when public transport was restricted, to still be able to move around. Moreover, cars offer a more private and personal way of commuting. As Lucas pointed out: “And I have the convenience of going by car and can also just drive that way with friends in private, so to speak, instead of having to take the train and on some timetable, which is sometimes unreliable.”

Similarly, Alex and Theo echoed this sentiment, emphasizing the feeling of freedom compared to using public transport, as they could drive wherever they wanted easily. Alex said, “I have the feeling of freedom, I can drive wherever I want compared to public transport,” and Theo said, “With access to a car you experience freedom, as you have the possibility to go somewhere easily by car.” It is evident that cars offer a level of autonomy that other modes of transportation cannot match. Jonah prefers using a car because it allows him to make his own decisions and choose his own route, offering him a sense of control over his commute. Equally, Anna emphasized the usefulness of cars in providing freedom, allowing individuals to easily get from A to B without being dependent on waiting times or unreliable public transportation.

Additionally, many individuals simply enjoy the act of driving itself. Claire expressed her enjoyment of driving, while Anna stated her preference for driving over sitting on the train. Jonah echoed this sentiment: “I am a type of a person, which I like driving a car. I enjoy traveling somewhere with the car, so if I have to travel, if it's a reasonable distance, I would rather drive than taking a train, for example, because I enjoy taking a ride.”

Cars also provide protection from the elements, such as rain, keeping passengers dry and comfortable. Jonah mentioned considering taking the car to work when it's raining, and Ella & Tom stated that they recently used a car as it was heavily raining. Mateo expressed: “A car is a luxury, I find it more comfortable, especially when it rains.”

Overall, the interviews highlighted that cars are valued not only for their convenience and practicality but also for the sense of freedom, independence, privacy, shelter and personal enjoyment they provide to individuals in their daily lives.

5.2. Car Sharing

The following section will present the findings regarding car sharing user experiences, using the Theory of Planned Behaviour and the Social Practice Theory.

5.2.1. Theory of Planned Behaviour: Motivations and Barriers

Using the Theory of Planned Behaviour (TPB), this study identifies the motivations and barriers experienced by car sharing users. First the motivations and barriers that determine the attitudes are presented, then those controlling the subjective norms and lastly the ones shaping the perceived behavioural control.

5.2.1.1. Attitudes

The results of our study reveal a diverse range of attitudes, the positive and negative outcomes experienced, towards car sharing among users. Understanding these attitudes is crucial as they could significantly influence user behaviour and adoption rates of car sharing platforms. By delving into these attitudes, we can gain valuable insights into how car sharing services are perceived and identify areas for improvement to enhance user satisfaction and engagement. The following results highlight the key findings related to the attitudes.

Need for a Car

“At various points in your adult life, it's inevitable that you'll require a car from time to time.”
- Mateo

The need for a car is a primary motivation cited by users of car sharing services, to use a shared car. As detailed in the preceding section on reasons for car use, individuals, like Mateo mentioned above, often require a car for various transportation purposes. With car sharing, a new form of access to a car is created.

Within the interviews it became clear that car sharing creates access differently for different scenarios. One distinct group comprises individuals who have fully divested from car ownership and now rely on car sharing to fulfil their transportation needs. Theo, a long-time user of car sharing, exemplifies this sentiment: “I got rid of my car 14 years ago, as the maintenance for the car was very expensive and for sustainability. I believe the use of cars could be limited and I felt like I did not need to have a private car. With sharing this option became possible, as I do not have to own my own car, but I do have the convenience to get a car if I need it.” Similarly, Maria, who previously owned a private car but seldom utilized it, found that car sharing provided a viable alternative without the need for ownership. And Lana expressed the importance of the accessibility of shared cars in the next quote: “If there had been no shared cars, my husband and I would probably have a private car as we still need to use a car.” James also highlighted the feasibility of replacing car ownership with a shared car. He recognized the challenges but found enjoyment in overcoming them. And Jack expressed: “Our car broke down and then we started car sharing. We found it very frightening to not have a car in front of our door, however we have never had the urge anymore to buy a car. Car sharing confirmed that having a private car is unnecessary for us.” Lastly, Ella & Tom liked the idea of not having a private car anymore, but still have access to a car if they need it, reflecting the evolving attitudes towards car ownership facilitated by car sharing services.

Especially among respondents who have yet to acquire a car or have consciously chosen not to, the benefits of newfound access to a vehicle are apparent. This access defers the necessity of car ownership and provides easier accessibility to a car. Ian, previously refraining from car ownership for sustainable reasons, emphasized the newfound importance of car access, stating, "Without access to a car, our journeys were a lot more limited. With the car, we have the possibility to do a lot more; it provides us freedom, and therefore it adds to our overall happiness." Similarly, Robert underscored the comfort of having access to a car for work or emergencies: “I decided not to own a car for sustainability reasons, but when my job moved further away, I found myself needing a car to get there. Car sharing provided me with the option to still have access without the need for an additional car in the system. It also gives comfort I have a car accessible for possible emergencies.” Mateo, among those who had not yet owned a car, found car sharing valuable for granting him access to a vehicle without the need for constant borrowing. He also mentioned: “I don't use the car enough to justify owning a private one. This way, I have access to a car for those times when I can't avoid using it once in a while. And in the future, I would like to have the extra comfort and freedom of my own car, but now I do not have a family, so I do not need it.” Emma echoed this statement: “I currently do not feel the need to buy a car and will keep sharing for the times I do need one. In the future when I might start a family, I might however be more tempted to buy a car.” Sophie also appreciates using someone else's car presently and hopes to avoid purchasing a car in the future, contingent upon factors such as proximity to her job. This shows that while car ownership may become necessary, according to the users, when circumstances change, car sharing serves as an excellent alternative for minimal car use when those conditions are not yet present.

Also, users who own private cars appreciate the convenience of shared vehicles as an additional travel option. Lucas, a private car owner, noted: "It's an extra travel option in moments such as when the trains are not running, when my own car is gone, or when I think it's cheaper or nice and easy." Alex echoed this sentiment: “It is incredibly relaxing that it is there at all, we look too much at only the negative sides. And so, I think it's a nice mix, that I have the luxury of having those shared vehicles and having my own.” Users with a private vehicle in their household, like Jonah, also mentioned: "We have one car, but there are two of us. Sometimes we need cars at the same time, so we use the shared car instead of getting a second one." Users with private cars typically preferred to use their own vehicles, but resorted to car sharing under specific circumstances, such as when their car was unavailable, when they needed a different size vehicle or to avoid high parking costs. This highlights

the practicality of car sharing, ensuring mobility even when one's primary vehicle is unavailable, and with that eliminating the possible need for a second car in the household.

The widespread adoption of car sharing services reflects a shift in transportation attitudes, providing users with an accessible alternative to traditional car ownership. Particularly among those who have consciously chosen to forego car ownership, the benefits of newfound access to vehicles are evident, deferring the need for ownership and promoting sustainability. Additionally, even among individuals who own private cars, the convenience of shared vehicles as supplementary travel options is appreciated, underscoring the practicality and versatility of car sharing services in meeting diverse transportation needs while reducing the dependency on multiple car ownership within households.

Less Cars

"We want to contribute what we can, and not pollute the streets with an extra car if we do not need it."
– Ella & Tom

Many users of car sharing services, like Ella & Tom, advocate for the reduction of cars on the streets as a means of enhancing urban spaces. Mateo sees the reduction of cars as an opportunity to repurpose urban spaces for more beneficial uses like street gardens or bike parking. This sentiment is echoed by Jack and Tessa, who believe that fewer cars would create more space for walking and recreational activities, enhancing the overall quality of life in urban areas. Olivia also highlights the issue of underutilized parking spaces: "All those parking spaces are just full of cars that are used once every two weeks, because I think that really happens with a bizarre number of cars, and with more than we actually know about. If we can get rid of some, then you might have space for an extra park or more trees." And Alex was clear what he thought about cars: "I find it incredibly ugly that there are so many cars on the streets in the Netherlands. So, if you can bring that back by sharing, I think it's very good. Less cars creates space which is more relaxing."

A few users mentioned the environmental benefits of reducing the number of cars. For example, Lana expressed this, emphasizing that fewer vehicles, which she refers to as "big, black, noisy things", would lead to less pollution and consumption of resources. Similarly, Sophie stated: "I enjoy the fact that I use someone's car instead of adding a new car to the streets, it is more sustainable". And Maria reflected on the unnecessary nature of owning a private car: "I find it nonsense to have my own car; I barely use it here in the city. I do not want to add an extra car to the streets."

Overall, these perspectives reflect a growing awareness of the need to rethink the role of cars in urban environments and the desire to reduce the number of cars to create space for alternatives, motivating people to share instead of own.

No to Less Responsibilities for Car

"Responsibility is offloaded when you get in the car, it's insured, it's maintained, etc. and I like that."
– Jacob

Car sharing significantly alters the responsibilities typically associated with car ownership. When owning a car, individuals must manage maintenance, insurance, repairs etc. In contrast, car sharing, particularly B2C and P2P models, offloads these responsibilities from users, serving as a significant motivator for many. This sentiment is common among car sharing users who appreciate not having to worry about the upkeep of a vehicle, as is highlighted by Jacob in the quote above. Mateo also highlights the freedom from worries that car sharing provides compared to private car ownership: "Private car results in responsibilities and worries", as did many other car sharing users.

Within cooperatives, while some responsibilities remain, they are limited and shared among members. This collective approach is not seen as a burden but rather a positive aspect, fostering a sense of community and shared effort. Lily noted that the collective nature of maintenance within cooperatives is experienced as "a nice feeling of doing it together".

The overall experience of reduced responsibilities regarding ownership obligations is a significant benefit for car sharing users. As Lana sums it up: “I especially like that it is not my car, no need to take care of it, there is just a car that works.” This reduced burden of maintenance, insurance, and repair is a compelling advantage of car sharing, allowing users to enjoy the benefits of having access to a car without the associated responsibilities.

Cost Evaluation of Transportation
The cost evaluation of transportation can be divided into two elements: no use, no costs and the cost efficiency. These will be explained in detail below.

No use, no costs

> “With a private car, I started to experience the inconvenience of owning a car more and more. You own something you do not use daily, and whether you use it or not, it still costs you money.”
> – Lana

One of the primary advantages of car sharing is the elimination of many costs associated with private car ownership. Car sharing users do not have to worry about running expenses such as insurance, road assistance, registration and taxes, depreciation costs or with expenses related to maintenance and repairs. Lana succinctly expressed this sentiment in the quote above. Her experience highlights the financial burden of owning a car that sits idle for much of the time, still incurring costs regardless of usage. Ian echoes this view, emphasizing his preference to only pay for the usage: “I do not want to have a private car; I like to only pay for my use.” Theo also emphasizes the financial aspect, noting that private car ownership incurs fixed costs even when the vehicle is not in use. This perspective is shared by many car sharing users who appreciate the pay-as-you-go model, which eliminates fixed and certain variable costs associated with car ownership. Lily also highlighted her newfound insights into the actual costs of car use, expressing: "I found out how expensive it actually is to have and use a car."

While cooperatives may require a modest subscription fee, unlike the B2C or P2P platforms, this is not experienced as a significant barrier. In cooperatives, a financial subscription fee is typically asked to maintain a buffer for unforeseen circumstances. For example, a €15 - €25 subscription fee is common, and most members do not see this as a deterrent but rather a “reasonable, necessary and understandable cost” (Ian). The low commitment level associated with this fee means it does not create a significant attitude of favourability or adversity among users.

In summary, car sharing offers a significant financial advantage by eliminating many of the costs associated with car ownership. Users benefit from only paying for what they use, which aligns with modern preferences for flexibility and cost-efficiency. The cooperative model, with its minimal subscription fees and non-profit approach, further enhances the affordability and appeal of car sharing services with their non-profit model.

Cost Efficiency

> “Car sharing becomes a financial consideration. I am always looking for the sweet spot of use and costs. With my current car use sharing is the most profitable solution. However, it is not really profitable to take a shared car on holiday.”
> - Mateo

Car sharing could offer significant cost-effectiveness, particularly for individuals who do not use a car frequently. As mentioned earlier, the expense of maintaining, insuring, and managing a private car can be prohibitive for those with limited usage needs. Emma highlights this point, noting that owning a private car is too expensive if not used often, making car sharing a good alternative. Similarly, Sophie states, “I currently do not use a car often, then a private car is way too expensive. Getting a shared car for the moments I do need a car is economically more beneficial.”

For many users, like Mateo mentioned above, the consideration of cost drives the decision to opt for car sharing over ownership, especially if their need for a vehicle is sporadic. Jacob notes that if there isn't a regular need for a car, it doesn't make sense to own one: “If we didn't have to travel so often, I wouldn't bother buying one.” However, he acknowledges that frequent travel for him necessitates owning a car, as “the costs of sharing quickly add up”.

Interestingly, Jack reflects, also brought up by Lana and Ella & Tom (all users that replaced car ownership for sharing), that car sharing reduced his car use, making it a cheaper option: “Use of a shared car is relatively expensive, but without a private car, our car use reduced, and with that, car sharing did reduce our car expenses. We got rid of our car for sharing, and along the way, sharing has proven to us that car ownership is unnecessary. We started to use public transport a lot more.” Theo, who replaced his private car 14 years ago for sharing, echoed this as well: “I am now more mindful about my car use”.

According to the users, frequent or extended use of car sharing services can quickly become more expensive than owning a private car. Anna expressed that “owning a car can be more cost-effective than sharing one daily”. Emma agrees, stating, “When you need to use it frequently, like 3 or 4 times a week, owning a car is definitely cheaper. I find car sharing rather expensive.” Olivia adds that renting a car for holidays or for jobs far away can quickly become costly as well: “Going on holiday, renting a car for a certain period of time, quickly becomes expensive.” Regular users like Alex find car sharing less hassle than owning a car but note that frequent use can lead to higher costs. He mentions, “I never had a car when I lived in Germany or in England. If you don't use it that often, it's just better and cheaper to share.” Lana also reflects on this, saying, “It becomes too expensive. Look, I think it's smart, just the consideration if you need a car twice a week. Someone has thought about this very cleverly. Yes, but then it is equal ownership again, but then it becomes a consideration of, are we not selling ourselves short, then it will be more expensive than for example a Short Lease contract.” Luke highlights the necessity for car sharing to remain attractive and proportionate to car ownership: “When I use it often, I could have had my own private lease car. Car sharing must be proportionate to car ownership.”

The experience of frequent car sharing being expensive is consistent among various sharing models. The users of the cooperatives, however, do perceive their model as the most affordable option among the sharing models, because “it operates on a non-profit basis” (Lily, Jack), charging only actual costs without a profit margin. Robert, a cooperative user, highlighted the inherent costs of the round-trip model: “Reserving is reserving; if your times change and you come back earlier, you still need to pay for the reserved time.” In contrast, the free-floating model charges only for actual use time. Despite this, users of the free-floating model still perceive car sharing as expensive, as Claire noted, “If you can’t afford a car, it will also be difficult to afford SIXT.”

Sharing a car with a group amplifies the cost-effectiveness, as users highlight the financial benefits compared to alternative transportation like trains. Lily notes that public transport is more expensive than using a shared car when used with the family: “I use a car often with the family, when we go away to visit friends or family or on another trip. Public transport with the 4 of us in our experience is more expensive than taking a car. So of course, we then take the car, as it is also a very practical way to move around with the family.” Jacob and Mateo also emphasized the cost-effectiveness of car sharing with multiple passengers for events. Tessa underscores the economic advantage of car travel for family outings: “When we go away with the family, we are with the four of us, it is cheaper to go by shared car than pay for four separate train tickets.”

In summary, car sharing offers a cost-effective solution for those with occasional car needs. However, as usage becomes more frequent, costs can accumulate rapidly, making car ownership potentially more economical. Balancing usage frequency and cost is crucial for individuals deciding between car sharing and car ownership.

Parking Advantages

"The fact that the (cooperative) cars have a private parking spot is a huge advantage compared to having my own car. I always have a spot available, do not need to search, which saves time and effort."
– Ian

The parking arrangements offered by car sharing are perceived as a significant benefit by the users. Both B2C round-trip and the cooperative model provide fixed parking spots, which users find incredibly practical, like Ian mentioned above. These designated spots make it easy for users to park and locate the car, enhancing the overall user experience. Ella and Tom highlighted this advantage: "The cars have a private parking spot, so you know where it is located and there is a spot available when we come home." Similarly, Alex mentioned, "There is always a parking place available when I get home." Lana added, "Parking is difficult in the city, so fixed parking with sharing is a big advantage."

In contrast, the B2C free-floating model does not offer private parking spots, but it allows users to park the car anywhere within the operational zone without incurring additional costs. This flexibility is a major motivator, especially considering the high parking costs in urban areas. Users appreciate the ability to avoid parking fees during commutes. Jonah shared, "I take a share car to avoid parking hassle and costs." The convenience of free-floating car sharing is also highlighted by the ease of traveling to and from the airport. Users have found it particularly beneficial when traveling to Schiphol Airport, to "not have to pay for the parking of my private car" (Lucas).

However, it is essential to note that with B2C free-floating models, users are bounded by the operation zone of the car sharing service. This model offers new flexibility compared to fixed parking spots however, users should be mindful of the service's geographical limits, which may restrict access to certain destinations. Lucas mentioned: "I have to keep the meter running if I park the car outside the operation zone, which quickly becomes very expensive and defeats the purpose." Alex emphasizes his desire to have the flexibility to leave the car anywhere: "Being able to put it where you want, so leave it where you want, I would think is the most important thing in sharing."

Also, cooperative users have noted a minor issue: not all other drivers are aware that cooperative cars have reserved parking spots, and at times occupy the private parking spots. The municipality is addressing this by adding stickers and improving communication, but it remains a slight inconvenience. Isaac and Mateo mentioned that this lack of awareness among other users can be annoying, but they appreciate that steps are being taken to resolve it.

Overall, the parking advantages provided by car sharing models, whether through fixed spots or free-floating options, are highly valued by users. The fixed spots reduce the stress with finding parking in busy urban areas and the free-floating model offers the benefit of parking anywhere within the operation zone, eliminating the costs for parking.

5.2.1.2. Subjective Norm

The Theory of Planned Behaviour (TPB) posits that subjective norms play a significant role in shaping individuals' intentions to engage in a particular behaviour. Subjective norms refer to the perceived social pressures to perform or not perform a specific action. In the context of car sharing, these norms encompass the influence of family, friends, peers, and societal expectations on an individual's decision to use car sharing services. Understanding the subjective norms that impact car sharing can provide valuable insights into how social influences drive or hinder the adoption of car sharing practices. The following results highlight the key findings related to subjective norms in the realm of car sharing, shedding light on the social dynamics that affect user behaviour.

Normalisation Car Sharing

"Well, my family live in Loosdrecht, and it doesn't really exist there. They heard it happen once, oh well that's funny, but for them it doesn't exist. For all my friends in the city, it's quite a normal thing to do when you don't have your own car and you need it. It very much depends on whether you live in the city. But I feel it is very well received."

– Olivia

Car sharing has become a normalized and accepted alternative for all users interviewed, though according to the users it does still remain unfamiliar to the broader public. Mateo commented on the current state of awareness: "Car sharing is not yet seen as normal; not many people know about it yet." Jack added, "People find it unbelievable that you would trade in your private car for a shared car." These sentiments highlight the ongoing challenge of normalizing car sharing within the broader population.

Users, like Olivia above, noted that people in urban areas are more familiar with car sharing, viewing it as a more common and practical mode of transportation. Among younger generations, car sharing is seen as a new and viable way of driving, as car ownership is often more uncommon like Emma notes: "Car sharing is something well known around my peers (young urban professionals); it is currently more unique when you do own a car. Car sharing is a good alternative and additional option." Sophie mentioned that her peers, young professionals, use car sharing for similar reasons: "Peers use car sharing for the same reasons as me; it is too expensive to own a car and very inconvenient in the city. Access to a shared car is a solution when you really need a car." This practical and economic motivation underscores the growing acceptance of car sharing as a viable alternative to car ownership, especially with young professionals in urban environments. In contrast, older generations, according to the current users, tend to stick to traditional car ownership possibly due to familiarity and comfort.

Rural areas, in particular, have less awareness. Like Olivia, Anna shared: "My parents were completely amazed that it existed. They live in a rural area, so that explains it. My mother thought it to be a bit dirty, but after they heard my experience with it, they understood the practicality. However, my sister and many friends of mine in the city use car sharing a lot."

The interviewees do not consider others' opinions on car sharing as important for their behaviour. Some are very convinced of their own decision to use shared cars; they believe they are engaging in more socially and environmentally responsible behaviour by using shared cars. One of them is Alex, who said: "People in my surroundings often do not feel like sharing a car or find it dirty, but that does not affect me at all. I believe I'm right to use it."

Sharers like Lucas, Claire, Emma, Sophie, and Anna mentioned they were recommended car sharing by friends or family who had positive experiences. They found it beneficial and trustworthy due to these personal endorsements and have used it since.

In summary, car sharing has become normalized among current users and they are not influenced by external pressures as they believe in the benefits of their choice. Though there is still a need to increase broader public awareness and acceptance. Peer recommendations and practical benefits are key drivers in its adoption, particularly among younger and urban populations. Currently, it is more unique to share than to own; only when you are young and do not have a car is it mostly experienced as a logical (temporary) solution.

Advocates of sharing

"I am a promoter of car sharing; I gladly share my positive experience with peers."

– Mateo

Car sharing users, like Mateo, mention they become advocates for the practice, sharing their positive experiences with others. They see car sharing as a normal part of life and actively promote it within their social circles. Theo, for example, shared his positive experiences with his friends, who then

started using car sharing themselves: “With my continuous use of shared cars, I became a promoter among my friends. They started using it as well after seeing my positive experiences.” Alex also mentions, “I recommend it to my friends.” This advocacy helps normalize car sharing and expands its adoption among new users.

5.2.1.3. Perceived Behavioural Control

Perceived behavioural control is a core component of the Theory of Planned Behaviour (TPB), referring to an individual's perception of the ease or difficulty of performing a particular behaviour. In the context of car sharing, perceived behavioural control encompasses factors such as the flexibility, reliability, responsibility and convenience associated with car sharing. Understanding the elements that influence perceived behavioural control can provide crucial insights into the practical barriers and facilitators of car sharing adoption. The following results highlight key findings related to perceived behavioural control, offering a comprehensive view of how these factors impact user intentions and behaviours in the car sharing ecosystem.

Reliability

Reliability is defined by the dependability and consistency of the car sharing service, including vehicle availability and condition, and the importance of customer support.

Reliability 1: Availability

“I think the most important thing is availability. If these cars are widely available, then maybe I'll use it more.”
– Jonah

The availability of shared cars is a critical factor in the user experience of car sharing services, as is illustrated by Jonah above. The users express that the ease of finding and accessing a car when needed can significantly influence their satisfaction and the perceived reliability of the service.

The availability concerns and issues vary among the different models. Within the B2C round-trip model most users expressed their concerns with availability. They felt like the limited number of cars could influence their experience, that at times there would not be a car available when they really need it or could not use it spontaneously. For example, Alex mentioned: “I am dependent on availability; if I want to use a car spontaneously, I have the feeling it will be more difficult to find a car.” And James mentions experiencing stress if he does not reserve a car in time, worrying whether there will still be a car available. However, users almost never mentioned that there wasn’t a car available for rent. B2C round-trip users, like Anna, actually mentioned the supply being enough: “The supply, the number of places where they are located, that was enough. Yes, but you also notice that over the years there have been more and more of them. Previously it was somewhat less, but now it is almost everywhere. In the centre of Amsterdam there is one on almost every street corner.”

In the B2C free-floating model, users often experience limited car availability, expressing the smaller fleets, which can require traveling a considerable distance to access a car. Jonah said: “You have to walk maybe ten minutes to get to the car that you want to use. I always have to walk at least around ten minutes to get to the car.” Users do express that a 5 to 10-minute walk is acceptable depending on the purpose of the car trip. However, it can be frustrating when a car is not available nearby and a user does not have immediate access, as Lucas and Jonah pointed out to happen rather frequently. Additionally, Lucas mentioned that if a reserved car is not functioning, a quick replacement is not always available nearby, adding to the inconvenience.

P2P car sharing is dependent on the neighbourhood you are in providing their cars to share. This is varying, however according to the P2P users interviewed (Jacob, Olivia, Sophie & Theo), there is a wide variety and availability in their neighbourhoods. They have not experienced any availability issues as of yet.

Within cooperatives they actively track car availability and continuously search for the optimal number of vehicles to meet the community's needs. If members frequently find no cars available, the cooperative will consider adding more vehicles to the fleet. This responsive approach ensures that the cooperative can adapt to the community's changing needs, maintaining a balance between supply and demand. If no cooperative cars are available, members have the option to use a Greenwheels car at the same rate as the cooperative's pricing. This agreement between the cooperative and Greenwheels creates a buffer that enhances availability and provides users with greater certainty. Only Jack mentioned that he missed out on a cooperative car once and had to use a Greenwheels car. Other members did not report similar experiences but noted that the option to use Greenwheels was reassuring and built confidence in the system's reliability.

According to the users, combining different car sharing platforms into a unified system could greatly improve availability and reduce inconvenience. Jacob suggests: “If there were just loads of them all over the place, you wouldn’t even have to think about it. And if you could interchange between all the different providers, then you also wouldn’t have to think about it.” He adds: “If it was one system, then it would already be better, because then there would just be more cars. Once you join one, you can use them all. Then it would go much, much quicker. I wouldn’t have bought a new car if this was the case.” Jacob also highlights the inefficiencies of the current system: “You can't just rely on one. There’s not enough to rely on. And also, I'm not going to maintain four different memberships and passwords.” James also points out the difficulties of navigating multiple platforms and their different conditions: "Everyone has their own conditions. Prices. How do you compare it now? And if you always have to create an account again, and if it is not necessary, then I think well then, I will stay, in terms of price it will not be much different." However, he appreciates the variety offered: "If you are good at it and you know what all the options are, you can sometimes choose SIXT (free-floating) and sometimes Greenwheels (round-trip)."

In summary, the availability of shared cars varies across different car sharing models and is a crucial factor impacting user satisfaction. Enhancing the perception and actual availability of cars can significantly improve the user experience, making car sharing a more viable and attractive alternative to private car ownership. One potential solution is to combine all platforms into one unified system, eliminating the need to switch between providers and platforms to search for a car. According to the users, this approach would streamline the process, increase availability, and improve overall user convenience.

Reliability 2: Condition Car

“It is definitely bothersome when the car does not work when you need it and therefore you are late for the appointment, or that the car is dirty, I have had both of this happen several times.”
- Lucas

The condition of the car significantly impacts the user experience in car sharing, as can be seen from Lucas’ experience above. The reliability of a car is paramount. Alex highlights this by comparing the frequency of issues with shared cars to those with private ones: “Problems with your own car probably happen around 1 in 100 times, and here a problem occurs more often, perhaps 1 in 4 times.” And Lana expressed the importance: “I find reliability the most important, the car needs to be there and work, I have experienced otherwise”. Consistent functionality is found crucial for users to feel confident in the service. Ian also points out infrastructure issues: “I have had a few times that the charging station at our fixed parking spot did not work, which is of course inconvenient.” These functional issues make planning and reliability a concern for users, emphasizing the need for well-maintained vehicles and infrastructure.

Cleanliness is another critical aspect. Emma notes, “I find it a bit dirtier to travel in a shared car; however, it is part of sharing facilities. Same for public transport.” Alex emphasizes the importance of this: “Yes, that it is just clean and perhaps also a bit new and attractive. Those Greenwheels are dirty and run-down and unattractive.” B2C users often report cars being dirty, which is echoed by Jonah, Lucas, Lana, and Alex. However, P2P users and cooperative members have not mentioned this issue,

likely due to the sense of collective responsibility within cooperatives and the reputation of the renter in P2P.

In cooperatives, members feel a sense of responsibility to maintain the car's condition, ensuring it is clean for everyone. Ian, Robert, and Jack all highlight the cooperative model's success in this area. Typically, a designated person is responsible for maintaining the car, which ensures that the vehicle remains in good condition. This system helps maintain high standards of cleanliness and functionality, fostering a positive user experience.

In summary, the condition of shared cars, including their functionality and cleanliness, plays a crucial role in user satisfaction, as it can deter users from choosing shared cars over private ownership. Addressing these aspects can significantly enhance the car sharing experience, making it a more attractive alternative.

Reliability 3: Customer Support

"Issues regarding the service are always irritating, as it always concerns transport, so you always have to go somewhere, and if that does not happen or is not possible the way you want it to be is frustrating. Quick help and solutions are important for a positive experience."

- Lucas

Customer support plays a crucial role in ensuring a positive car sharing experience, especially when issues arise, as Lucas illustrated above. Users depend on the reliability of the car and the efficiency of the support system to resolve problems promptly. Good customer support could save time and guarantees a smoother experience comparable to a private car. As Alex noted, he experienced more problems with shared cars than with a private car, emphasizing the need for support that can quickly address and resolve issues, but also according to him "a more robust attitude is needed, and users need to appreciate that mobility is accessible everywhere".

Lana emphasizes the importance of reliable customer support: "The reliability of the car is important. That the car is there and that it works, and that the app works. I have experienced situations where the app didn't connect or the car didn't work, and then good service is important to solve it. It did take quite a while and that is annoying if you need to go somewhere." Platform dependency can sometimes lead to problems locating the car. If the car is not well signalled on the app, it creates inconvenience, as Lucas has experienced: "I often find that a car is not parked where the GPS indicates." Quick support again is essential to locate the car and ensure smooth travel. Anna shares an instance where customer support was crucial and contributed to her positive experience: "The parking spot was occupied, but I could park for free at a parking place close by. MyWheels moved the car back themselves." This demonstrates how prompt support can quickly resolve issues, ensuring a smooth experience for the users.

For B2C car sharing users, dealing with cleanliness issues can also require effective customer support. Jonah notes, "I prefer when I report dirt in the car that the provider confirms they took action. There is quite often dirt in the cars, which is inconvenient, and now I am not sure if I report it, they will clean it."

For P2P car sharing, most issues are organized with the peer providing the car, but some aspects are managed through the platform. However, the platform may not be easily reachable, adding to the complexity. Jacob once wanted to rebook as he could not locate his booked car, and the owner was not reachable. However, "reaching the platform for assistance was difficult" (Jacob).

In cooperatives, support is generally closer, as users often have a group app with all members for quick communication. However, when certain car issues arise, determining the right contact can be challenging due to multiple organizations linked to the cooperative, each handling different aspects. Jack said: "Currently, I am not fully aware of whom to contact when issues arise, which creates an inconvenience. This process should be made easier." Ella and Tom emphasise this: "There are more

parties we work together with in the cooperative. Lease company, the app, insurance. All different purposes and contact numbers. We do not know well who to contact when."

In summary, the effectiveness of customer support is vital in car sharing. It ensures that issues like app connectivity, car reliability, cleanliness, and parking are promptly addressed, contributing to a smoother and more satisfactory user experience. Efficient support systems are essential for maintaining user satisfaction in car sharing services and keeping a favourable attitude towards car sharing.

Flexibility
Flexibility refers to the range of options and choices available to users, allowing them to adapt to different situations and needs easily. This includes the ability to modify plans and decisions without significant difficulty.

Flexibility 1: Need for Booking/Reservation

"You really need to think about your use of the car, as you need to reserve the car. "
– Luke

While car sharing offers many benefits, the necessity to reserve a car in advance can be a significant barrier for users, as Luke mentioned above. For individuals accustomed to the freedom of immediate access to a vehicle, the planning and reservation process can feel cumbersome. The spontaneity often associated with owning a car is diminished because shared car users must plan and reserve a vehicle ahead of time to ensure availability. This requirement can be seen as a significant inconvenience, especially for those who "prefer last-minute decisions", like Alex mentioned.

Ella & Tom highlight the practical challenges: "We do not use the car quickly, as it takes actions to reserve it. An obstacle to rent a car is the booking. It is a lot easier to use a car when you do not need to reserve or are dependent on whether there is one available. The biggest hindrance is maybe actually that you don't just reserve a car for every little thing because you do have to make some effort to do it. You have to reserve it." This extra step can deter users from opting for car sharing for impromptu trips, reducing the overall convenience.

Lana emphasizes the freedom associated with owning a car: "Well, I think, if you have your own car, you have the freedom to come and go whenever you think about it; you don't have to organize it that way." This ability to use a car at a moment's notice is a significant advantage of car ownership that is not fully replicated in car sharing models requiring reservations, according to the users. Luke, in quote above, and Lily both touch on the mindset shift required for car sharing. Lily said: "The new action of reserving a car, it is a new mindset. To me, it is not a barrier; however, it is a new action you do need to learn and make your own."

With the B2C free-floating model, it is not possible to reserve ahead; you rely on the availability of a car in your vicinity at the moment you want to use one. This can be a limiting factor for those who need guaranteed access to a vehicle at a specific time, as availability issues, as mentioned earlier, have been expressed by the users.

In summary, while car sharing provides numerous benefits, the need for advance booking present challenges that can detract from its overall appeal.

Flexibility 2: Return Time

"Sometimes I get stressed about wanting to use the car for longer, but I worry that if someone else reserves it, then I actually have to be back."
- James

One of the significant inconveniences of car sharing compared to owning a private car is the need to adhere to return times, as James illustrates above. Extending the booking is dependent on availability again. This requirement can introduce stress and anxiety, as James mentioned, as users must ensure that the car is returned on time for the next person who has booked it. Jacob also highlights this issue, noting that the system, while good, comes with anxiety about getting the car back on time. “It is a good system, but it came with anxiety and the anxiety was getting the car back on time, getting the car back in the right slot on time. You had to be quite strict with your own planning in your head.” He adds, “And then if you don't get it back on time, you know, there might be somebody else that has booked it straight after you. So, you're really on the telephone in the car, oh no I can't get back on time, is there somebody after me. So, I like the SnappCar concept that it's like just days and half days. A lot more freedom with it.”

As Jacob already initiates, the experience does vary depending on the car sharing model. The reservation slots and with that the return times of B2C round-trip models are often narrowly booked back-to-back, according to the interviewees. Within P2P, there is only the possibility to book for half a day or a full day. As Jacob mentioned, this created a sense of freedom for him, in comparison to the B2C model. In cooperative models, short contact lines and good communication through group apps can mitigate some of this stress. Robert explains, “I can quite easily extend my booking.” He adds, “Due to good communication via the app, whenever there are unforeseen circumstances, I could easily rebook and look for a solution with the next user.”

The B2C free-floating model offers more flexibility as it does not have fixed return times, using a one-way tariff system instead. This can alleviate the pressure of strict time constraints, as no users mention any concerns in this regard.

In summary, while car sharing introduces the inconvenience of adhering to return times, the impact can be mitigated through effective communication and flexible booking options. Models that offer less rigid time constraints, such as B2C free-floating and P2P half-day/full-day bookings, could provide users with greater freedom and potentially reduce the stress associated with returning the car on time.

Flexibility 3: Access to Various Types of Cars

“When you own your own car, you are fixed to the car which you have. With sharing you can pick the car according the goal.”
- Jacob

The access of different types of cars is a motivating factor for many users, like Jacob, of car sharing services. With car sharing, individuals have access to a variety of vehicles tailored to their specific needs, adding flexibility and convenience to their driving experience. Users appreciate the ability to choose a car that corresponds to the purpose of their trip, opting for smaller vehicles for solo travel and larger ones for family outings or transporting bulky items. Robert highlighted the convenience of having access to different types of cars depending on the circumstances: “I pick the smallest car when I travel by myself, I would actually like it to have a micro car for individual travel purposes. With the family or when I move big items, I pick a bigger car. It is nice to have the opportunity to pick the type of car you need for the use.” Jack also mentioned: “I usually pick the smallest car, as this is also the cheapest option, and I do not need a bigger car”. And Theo, a P2P user, addressed that he usually picks “the most (fuel-)efficient option”, among the available cars in the neighbourhood.

This flexibility allows them to select the most suitable car for each situation, enhancing the overall utility of car sharing compared to private ownership. Both Lucas and James appreciated the

opportunity to experiment with different car models, as James stated: “I find it more fun to share that I can always try different cars and that I enjoy seeing how the technology and what can be done with it.” Within the providers the types of cars do differ. Especially the P2P users expressed the wide variety of cars that are on demand.

Overall, the availability of various car options enhances the appeal of car sharing as a flexible and convenient transportation solution.

Responsibility
Responsibility refers to the duties and obligations that users have when using a car sharing service.

Responsibility 1: User Coordination

“You do not need to consider other users when you have your own car. I know someone else is going to use it, so I have to tidy up.”
– Olivia

Coordination among users is experienced a crucial aspect of car sharing that impacts the user experience. Unlike owning a private car, where individuals have full control over the vehicle's availability and condition, car sharing requires users to be mindful of others who also use the car. The condition in which a previous user leaves the car directly influences the experience of the next user. Olivia captures this difference in the quote above. In car sharing it is important that users clean up after themselves and ensure the car is ready for the next person. Ian emphasizes the importance of this consideration: “It is a means to an end, but you do need to pay attention to keep it clean for other users. Please clean it up after use.” This shared responsibility ensures a pleasant experience for everyone but can lead to frustration if others do not follow through, as was already highlighted in “condition of car” previously.

Within different car sharing models, user dependence and experiences vary. In B2C models, users are fully dependent on the previous user and the proactiveness of the provider, with no direct influence over other users. In P2P sharing models, you share a car with only the owner, who possibly checks the car after someone has used it to ensure a good experience for the next user. This creates shorter lines of responsibility and often results in better-maintained vehicles, as no P2P users mentioned problems with this.

Within cooperatives, the dynamic is different. Members can hold each other accountable due to direct contact and community involvement. When issues arise, such as problems with the car or timing conflicts, members can communicate directly to resolve them. This creates a flexible and adaptive model, with a higher acceptance rate for delays or issues due to familiarity among users. Jack mentioned: “The cooperation works as you know each other, and issues can be addressed via the app. There is always someone willing to help.” However, this model's strength is also its weakness, as it relies on volunteer work and active participation from members. Lily expressed concerns about the sustainability of this system: “it requires continuous effort and willing participants to maintain the cooperative”.

In summary, user coordination in car sharing is essential for maintaining vehicle condition and ensuring a smooth experience. Effective communication and shared responsibility can enhance user satisfaction, but challenges remain in managing dependencies and ensuring all users contribute to the system's upkeep.

Responsibility 2: Non-Possession Constraint

“In the future I would like to own a private car, as I would like to have the opportunity to leave stuff behind in the car. More my private space.”
- Mateo

One of the common drawbacks of car sharing mentioned, is the inability to leave personal belongings in the car, such as a golf bag or a children's seat. Mateo expressed his desire to own a private car in the future in the quote above. This sentiment is shared by others like Ella & Tom and Robert, who also highlighted the limitation of not being able to leave anything behind in the car. Car sharing requires users to remove all personal items after each use, preventing the car from being used as a storage space for personal belongings, as others also use the same car.

Convenience

Convenience refers to the ease and simplicity with which users can access and use the car sharing service.

Convenience 1: Ubiquitous Car Access

"I find it more favourable because if I am suddenly stuck in the office, need to go to Utrecht, and am running late, I don't have to cycle home to get my car. I can just take the shared car that is right in front of the door. It's incredibly relaxing that it's available, and we tend to focus too much on the negative sides."

– Alex

Car sharing offers the significant advantage of ubiquitous car access, as Alex explained in the quote above. With B2C and P2P car sharing models, cars are accessible in multiple areas, providing a broader range of access points compared to owning a private car, which is only accessible from one location. This widespread accessibility enhances the convenience and utility of car sharing, particularly for individuals who combine travel modes often or have variable transportation needs. It eliminates the dependency on a single private vehicle and creates a wide range of access points for cars. James noted that when he was out, he appreciated the access to cars: "Then I just go there and look, and there are all kinds of cars available there, so then I'm already there, and then you reserve one that is around the corner."

The ability to combine different modes of transportation is another advantage. Users can switch between public transport, biking, and car sharing, depending on their immediate needs and location. For instance, if someone commutes to work by train but needs a car to attend a meeting or run errands during the day, car sharing provides a convenient solution. Jacob illustrated this benefit: "I like combining different modes of transportation. Taking the train to Den Haag, for example, and then getting a car at the station was much less stressful. You can actually do something on the way in the train, like work on your laptop, which makes the journey also more productive."

In contrast, cooperative car sharing models function more like private car ownership, where the vehicle is typically located within the user's neighbourhood. Cooperative members did not mention the asset of ubiquitous access, as the cars are only available within their immediate vicinity.

In summary, the ubiquitous access provided by B2C and P2P car sharing models adds significant value by offering convenience, allowing users to access cars in various locations and combine different modes of transportation seamlessly. This widespread accessibility makes car sharing a practical and attractive alternative to traditional car ownership, especially for those who need occasional or flexible access to a vehicle.

Convenience 2: Adapting to Different Vehicles

"The cars in the fleet are all a bit different, so you do need to get used to the car a little bit."

– Ella & Tom

Car sharers, like Ella & Tom, often find themselves needing to adapt to the variety of cars available in car sharing fleets. James highlighted the need to familiarize oneself with the specific functionalities of each car, from how it drives to where essential features are located. Olivia echoed this sentiment, emphasizing the importance of becoming "accustomed to the intricacies of different cars". Anna noted

that some car sharing services offer a consistent selection of vehicles, which can expedite the process of getting used to a particular model. Theo intentionally rents the same car multiple times to become acquainted with it and limit inconveniences. Isaac acknowledged the challenge of not knowing a car well when various models are offered.

The cooperation users mentioned that they received an introduction to the cars when they join the cooperation and could find instructional videos online. The fleet of the cooperation is also rather fixed, further limiting this inconvenience.

Although getting used to new cars may initially pose a minor inconvenience, respondents generally adapt quickly. They mentioned it is aided by consistent vehicle options and community support, such as instructional videos.

Convenience 3: No Children Seat

"The shared car doesn't have child seats available. Juggling the kids, your belongings, and then adding a child seat makes the trip to the car very impractical."

– Jack

The absence of child seats in shared cars emerged as a common challenge among respondents with young children, causing significant inconvenience. In the quotation above, Jack clearly expressed frustration. Jacob echoed this sentiment, noting the necessity of bringing his own child seat for his daughter's safety. Similarly, Alex emphasized the added complexity of traveling with a baby in a shared car due to the absence of a fixed seat, creating a hassle during the journey. James also experienced it as a hurdle: “There is no children seat ready for young kids, which creates a hurdle, as you need to carry it along.”

All the previous findings corresponding to the TPB can be summarized into the following table, Table 5.2.1.1.

Table 5.2.1.1.
Schematic overview of the findings through the lens of the TPB.

	Car Sharing
Attitudes	Need for a car Less cars No to less responsibilities Cost evaluation of transportation - No use, no costs - Cost efficiency Parking advantages
Subjective Norm	Car sharing normalized Advocates of sharing
Perceived Behavioural Control	Reliability - Availability - Condition car - Customer support Flexibility - Need for booking/reservation - Return time - Access to various type of cars Responsibility - User coordination - Non-possession constraint Convenience - Ubiquitous car access - Adapting to different vehicles - No children seat

5.2.2. Social Practice Theory: Impact on the Driving Practice

The following section will explore the influence of car sharing on driving practices through the use of Social Practice Theory (SPT). Car sharing reshapes the materials, competences, and meanings associated with driving. SPT emphasizes the dynamic interplay between these elements, illustrating how shared cars transform driving habits and behaviours. First the change in materials will be illustrated, secondly the new competences needed to be able to perform the new behaviour are illustrated and thirdly, the new meanings associated with the change in practice are described. Lastly, the link to other mobility practices found within the interviews will be presented.

5.2.2.1. Materials

Car sharing introduces various materials that alter the traditional driving practice: ubiquitous access to different cars, the platform economy, and parking changes. These material changes differ significantly from private car ownership, transforming the practice of driving and leading to new competences and meanings associated with it. These material changes will be elaborated on further below.

Ubiquitous access to various cars

With the advent of car sharing, the traditional reliance on a single private car has been replaced by ubiquitous access to a variety of vehicles through digital platforms (George & Julsrud, 2019). Users can now access cars at multiple locations, except for cooperative users who are limited to a specific area, and choose different types based on their specific transportation needs. This provides a wider range of mobility options and, as found in the interviews and earlier expressed in the TPB framework, allows users to select a larger vehicle for transporting goods or accommodating more people like a family, or a compact car for solo commutes to for example work.

Furthermore, the inclusion of electric cars in car sharing fleets marks a notable transformation. Although the availability of electric vehicles varies by provider, there is a substantial presence of electric cars, particularly in B2C free-floating models and cooperative car sharing models. The cooperatives have consciously decided to offer only electric cars, aligning with their members' preferences and sustainability goals. In the B2C free-floating model, the entire fleet consists of electric vehicles that can be conveniently charged at stations when not in use. The B2C round-trip model offers both fuel and electric vehicles, and the P2P offer varies widely.

Platform Economy

The advent of sharing has introduced digital platforms as crucial materials in the practice (Frenken et al., 2015). Access to shared vehicles is now facilitated by various digital platforms that connect users with available cars. These platforms, integral to the broader sharing economy, utilize technology to enable seamless access to shared resources (Frenken et al., 2015). The role of these platforms extends beyond simple vehicle access—they are essential for the entire car sharing experience, including booking, locating, unlocking, and locking the car, as well as managing transactions.

Parking Changes

Car sharing has introduced new parking arrangements as new materials. For B2C round-trip and cooperative cars, fixed parking spots are provided. This means that users pick up the car from a specific spot and return it to the same parking spot after use. In contrast, the free-floating model of car sharing enables users to leave the car at any legal parking space within a designated area. The P2P model does not have specific parking arrangements.

5.2.2.2. Competences

The practice of car sharing necessitates acquiring new skills and knowledge compared to traditional car ownership. These include: get accustomed with different cars, learn to plan and book in advance, the need for technological knowledge, the skill to consider various platforms, be able to evaluate mobility options and learn to coordinate with other users. These elements will be further elaborated below.

Different Car Per Use
The transition from owning a single private car to accessing various vehicles through car sharing platforms has altered the competences required for driving. With car sharing, users must adapt to driving different cars each time they use the service. This includes getting accustomed to different sizes, technologies, and handling characteristics, as each car in the fleet may function slightly differently. As Claire and Ella & Tom noted: "Things do always work a little differently than you are used to, and you need to get used to this."

In both the B2C models, cars can vary significantly. While some suppliers maintain a rather fixed fleet, others, like the free-floating model SIXT, offer more inconsistency, requiring users to become familiar with each new car. This varied supply generally necessitates that users continually learn how different cars operate. As James noted, "You have to discover exactly how such a car works every time; it does take some time."

In the P2P model, the variety of available cars is even much broader since they are private cars offered by individuals. Theo mentioned to mitigate this inconvenience of constantly having to learn new car systems by trying to “rent the same car whenever I have a positive experience with one”.

In the cooperative models, there is a standard fleet. Users are introduced to the cars and can access instructional videos on how they operate. Initially, it takes some time to familiarize oneself with the car, but as the fleet is fixed, users quickly get used to it (Lily, Jack, Isaac, Mateo, Ella & Tom).

For electric vehicles, in particular, there are additional competences to develop. Users unfamiliar with electric cars need to learn how driving dynamics change, such as the reach of the car, which can differ from what is portrayed, and the necessity to charge the vehicle regularly. Lucas mentioned: “I find it difficult to understand the actual reach of an electric car. I believe it changes whether you drive on the highway or in the city, resulting in a possible faster decline in reach than anticipated, which is confusing”. James expressed that he had to learn how to disconnect the charging cable from the charging station, by opening the car first. The users highlighted these challenges of adapting to the new requirements of electric vehicles, but with time, these skills do become integrated.

Overall, the introduction of various car models in car sharing necessitates a continual learning process, developing new competences in adapting to different vehicle technologies and functionalities, thereby enriching the driving experience and potentially facilitating broader adoption of diverse vehicle types, including electric cars.

Planning/Booking
The shift to car sharing introduces a significant change in the competences required for effective use, particularly regarding planning and booking vehicles. Unlike owning a private car, where immediate access is typically available, as stated earlier, car sharing requires users to navigate digital platforms to reserve a vehicle.

With more users sharing the same cars, platforms require booking time slots to ensure vehicle availability. This necessitates that users plan their trips ahead of time, selecting both a start and end time. As Luke mentioned: “You really need to think about your use of the car, as you need to reserve the car”. As a result, individuals must become adept at organizing their schedules to fit within the availability of shared vehicles. Lily mentioned that this new requirement introduces “a mindset shift”, as users must think ahead and be precise about their travel plans, including the return time of the vehicle.

With the B2C free-floating model, it is not possible to reserve ahead; you rely on the availability of a car in your vicinity at the moment you want to use one. This eliminates the new mindset of having to book a car in advance.

Technological Knowledge
The introduction of car sharing platforms has necessitated a new set of competences centred around technological knowledge. Users must understand how to access and navigate these digital platforms, which are integral to booking, managing payments, and handling cancellations. While this might seem like a significant adjustment, none of the interviewed users mentioned not having the knowledge to be able to navigate around the platform. Possibly it is a skill that many users already possess due to the widespread familiarity with similar technologies.

Navigating Mobility Options
The introduction of car sharing has broadened mobility options, requiring users to develop new skills in evaluating and incorporating these options into their routines. With diverse providers and sharing models, even those without a private vehicle can easily access cars. B2C and P2P users can download the platform, register, and start using the service quickly. Jonah said: "The registration process was very straightforward. I was able to register in a few minutes or less than five minutes, and I was able to rent. I could easily just reserve a car." However, the many different providers introduce unique apps with separate registration, prices, regulations, availability, subscriptions etc. Alex mentioned: "I know exactly in which situation which provider works best". And James said: "Every form of car sharing has its own advantages, and if you are good at it and know all the options, you can benefit from it". However, James also acknowledged that: "You always have to create an account again, and if it is not necessary, then I will stay, as I believe in terms of price it is not much different. However, I will keep looking if I can't make it with what I know now". This acknowledges the new competence of evaluating mobility options. Often users express sticking to what they know and are already familiar with. Claire said: "There is no specific reason why I just have SnappCar, I just had it first and that's the app that I use and stick with". Similarly, Lucas said: "I have not actually looked into other providers than the one I use now." In contrast, the cooperation users mentioned that they only use their current platform, not expressing considering other options.

Another added consideration is the type of car. Various types of cars are available for access through car sharing, and consumers can choose the one to rent, obviously depending on availability. New considerations like whether to rent a smaller or bigger car (Emma, Jacob, Olivia, Sophie, Lily, Robert, Mateo, Alex) or a fuel or electric car (Lana, James, Theo) have become part of the practice. Especially when planned, illustrated by Alex: "When I want to leave immediately, I grab what is available nearby. If I go with my family, I book it further in advance, to ensure the right vehicle."

To navigate these options effectively, the need to develop competences in evaluating the potential benefits of the various providers and familiarize with multiple systems and options is evident. It does allow users to tailor their transportation choices to their immediate needs.

User coordination
Car sharing introduces a new form of competence and thus responsibility: user coordination. Car sharing facilitates that more users can access the cars and benefit of the use (Rudmin, 2016), introducing more users for the same car. In the interviews, users mention the expectation of others to use it responsibly and express the need to do that as well. Olivia said: "You do not need to consider other users when you have your own car. In car sharing, I know someone else is going to use it, so I have to tidy up." Jack expressed his want in leaving the car behind neatly for others. Ian mentioned: "It is an instrument, however, do pay attention to keep it clean."

5.2.2.3. Meaning
In the following paragraphs the new meanings due to car sharing are displayed. Car sharing reshapes the instrumental, independence and symbolic meaning attached to driving. These changes to these meanings will be explained below.

Instrumental meaning
The concept of needing a car remains fundamentally unchanged with the advent of car sharing; the practice still revolves around using a car to facilitate transportation from A to B. Lana stated, “As long as it gets me from point A to B, which a shared car does.” The car is still needed for various reasons, as shown in section 5.1. However, car sharing introduces significant shifts in the meaning of practicality of the car used and the costs associated with car usage, influencing the instrumental meaning of car usage in the practice of driving.

With car sharing, users are no longer constrained to a single vehicle. They can choose different cars based on their specific needs, enhancing the practicality and thus utility of car use. As Jacob stated, "When you own your own car, you are fixed to the car which you have. With sharing, you can pick the car according to the goal." As illustrated earlier, users mention picking a larger car is for transporting goods or traveling with family, while choosing a smaller car for solo city commutes. This flexibility adds a layer of utility that traditional ownership cannot provide. Users expressed that they mostly choose smaller cars and only switch to larger ones when necessary or when no smaller cars are available.

Another change in the instrumental meaning is the association of costs with the car. Car users are often not fully aware of their actual costs, due to the many spread-out expenses over the ownership period. Car sharers expressed a heightened awareness of the costs associated with the car. Lily mentioned: "I found out how expensive it actually is to have and use a car”. In car sharing, users only pay for the car when they use it, rather than having fixed costs throughout the ownership period, possibly resulting in a reduction in costs. However, the cost advantage depends on the frequency of use, as expressed by the users. If a car is used frequently, according to the users and already illustrated earlier, car sharing may not be more affordable than ownership.

Independence Meaning
From the analysis, it is apparent that the introduction of car sharing altered the values traditionally associated with private car ownership, particularly regarding the concept of independence. The values altered are categorized into the following: reliability, flexibility, responsibility and convenience.

One significant element of private car ownership that is challenged by car sharing is reliability. In car sharing, users depend on both the provider and other users. This dependence impacts the availability and condition of the car, leading to a changed perception of reliability. Users in a car sharing system must contend with the variable availability of vehicles, influenced by the supply of providers and the demand from other users. Availability becomes a critical factor for success in the sharing system, as highlighted by respondents in the interviews. For example, Jonah mentioned, "I think the most important thing is availability, if these cars are widely available then maybe we'll use it more." However, active issues with availability were primarily noted by users of the B2C free-floating model, such as Jonah, who stated, "I always have to walk at least around ten minutes to get to the car. Having a car available within your vicinity is challenging." Similarly, Lucas and Claire experienced situations where they had to travel considerable distances to access a car. Conversely, users of the B2C round-trip model, P2P users, and cooperative members did not report experiencing any availability issues, mentioning that they often find a car within a reasonable distance. B2C round-trip users did express concerns about potential availability issues if more people were to use the service (Lana, Anna, James). Cooperative members benefit from an agreement with Greenwheels, providing access to their cars at the same rate as the cooperative when the cooperative cars are unavailable, thereby dismissing availability concerns with the users. Ella & Tom expressed: “We would like to add an important benefit. If there are no cars available, you have the possibility to reserve a Greenwheels, paying the same fee as the cooperation. This elevates the availability of a car”.

Another aspect affecting the perceived reliability in car sharing is the condition of the car. Users do not know in advance the exact state of the vehicle they will receive. Issues such as malfunctioning cars or vehicles that are dirty can lead to frustration and hesitance to use the service. For example, Alex mentioned that shared cars are more frequently problematic compared to private cars, necessitating a

“robust and flexible attitude”. Notable, the expectation of cleanliness is crucial; dirty cars are a significant annoyance for users (Lucas, Jonah, Lana, Jacob, Anna, Alex). Issues with malfunctioning cars were mentioned, however this only resulted in frustrations when there was no alternative available within a certain distance, which was made available for the user. Lucas mentioned: “I have experienced a few times that the car did not work. I had to find a new car, however there were not many available within the vicinity. It resulted in me being late to my work appointment”. Both these frustrations were predominantly reported by users of B2C platforms, whereas cooperative members typically communicated with each other about inconveniences, holding each other accountable and setting clear rules and standards to maintain the vehicles.

Car sharing also demands a new form of flexibility from users. The need to book and reserve cars introduces a planning aspect that differs from the spontaneity allowed by private car ownership. Users of the B2C round-trip model and cooperatives must adhere to specific return times, limiting flexibility (James, Jacob, Lana, Axel). For B2C round-trip users it sometimes results in stress. James expressed: “Sometimes I get stressed again that you actually want to continue to use that car for longer and you think: yes, if someone else reserves it now then I actually have to be back”. In contrast, the P2P model offers more lenient return times, according to Jacob providing a “greater sense of flexibility in return time due to the only available half day and full day windows”. The B2C free-floating model, while flexible in not requiring return times, is limited by the operational zone and the short-term reservation window, adding stress and anxiety due to the uncertainty of availability and thus flexibility.

Despite these challenges, car sharing introduces enhanced flexibility in other ways. The ability to choose different types of cars for various occasions enhances practicality. Respondents mentioned that they mostly pick small cars and only opt for larger ones if the goal of the trip requires it or if smaller ones are not available (Robert, Lana, Alex, Ella & Tom, Lily). However, users must adapt to the differences in vehicle types, illustrated by Olivia that mentioned: “I need to get accustomed to the intricacies of different cars”, which can impact the convenience of simply jumping into a car and driving off.

The newfound ubiquitous access to vehicles through car sharing platforms allows users to access cars in multiple locations, significantly enhancing convenience and flexibility. Users can find a car wherever there is supply within the area they are in at that time. The B2C and P2P platforms are widely accessible, considering the operation zones of the free-floating model, enabling car use even when users are away from home. Alex expressed this convenience: “I find it more convenient because I am suddenly stuck in the office, have to go to Utrecht and am late. And then I don't have to cycle home to get my car. Then I just take the shared car that is in front of the door.” This convenience does not apply to the cooperation model, as these are fixed to their neighbourhood.

Another new aspect of convenience is the parking arrangement that comes with car sharing. While fixed parking spots in the round-trip model and cooperatives might limit the freedom to park closer to one's home, they are perceived as particularly beneficial in urban areas where parking is scarce. Users appreciate the convenience of always having a guaranteed parking spot, eliminating the hassle of searching for space, which is often nearly impossible in crowded city environments. Lana expressed this: “Having a parking space available is very important, you can easily locate and drive away and are guaranteed a parking spot when you return”. Additionally, these fixed spots are typically equipped with charging stations for electric cars, making it easy for users to recharge the vehicle for the next customer.

Car sharing is also less convenient for users with younger children. Jack expressed: "The shared car doesn't have child seats available. Juggling the kids, your belongings, and then adding a child seat makes the trip to the car very impractical."

One of the most significant shifts from car ownership to car sharing is the redistribution of responsibilities. In traditional car ownership, individuals bear the full burden of maintenance, taxes, repairs, and insurance. Car sharing alleviates these ongoing obligations, shifting responsibilities and

thus skills to the provider. This change is evident in B2C and P2P models, where the operator manages all aspects of car care. Users only need to keep the car clean and use it respectfully, significantly reducing the stress and effort associated with vehicle upkeep, making car sharing an attractive option. Mateo stated: “A private car results in responsibilities and worries”.

In cooperative car sharing models, responsibilities for upkeep of the car are shared among members, fostering a sense of community and greater attachment to the cooperative car, as user express. Lily said: “I like that we take care of the car together”. And Isaac said: “I notice a lot of volunteerism among our participants, and it inspires me and others to contribute as well”. And according to Jack, “it is sympathetic to take such action (reducing cars) in conjunction with the neighbourhood”. While the leasing company manages maintenance and insurance, members are responsible for keeping the car clean, charged, and reporting any issues. This shared responsibility enhances the collective experience and ensures the car is maintained to a higher standard, as no users mentioned issues regarding the condition of the car. This model encourages a collaborative environment, differing from the minimal engagement required in B2C and P2P models.

Symbolic Meaning
With car sharing, the identity and attachment related to the car you drive might undergo transformations. Traditionally, car ownership could be associated with a strong personal connection to the vehicle, which then serves as an extension of oneself. However, with car sharing the car is not your own, and so shifts this perspective.

A few respondents mentioned the need to shift away from the identity first associated with owning a car. Others focused solely on the car's utility, indicating its unchanged value as a means to an end. Jonah said, "Driving a car is part of your image. Okay, maybe not for me anymore at this age, but when I was young the car I drove felt like my personality. With sharing I do not have that". Lana mentioned: “My husband has more difficulty with sharing than I. He misses the image aspect. It is nice to have a nice car and a car from the brand you prefer, but it does not really matter to me as long as I get from A to B". This shift highlights a transition from private ownership, reflecting personal identity, to a utilitarian approach where the car is simply a means to an end.

It can be observed that the attachment to the car changes significantly from "my car" in private ownership to various forms of attachment in different car sharing models. In B2C models, users refer to using "a car," emphasizing accessibility over ownership. Jacob referred to the car by mentioning “having the option to just jump in a car” and “if there hadn’t been a car” and “getting a car”. Lana referred to the use of a B2C shared car with "I rent a car”, “just a car that works” and “when you get a car”. The main objective for these users is the utility of the vehicle, instead of the personal attachment.

In P2P models, the attachment shifts to "someone’s car." This personal connection makes users extra careful, especially if they know or have met the provider of the car, as it would make them feel guilty if something went wrong. Olivia said: “But if I dent someone’s car, I immediately have that feeling of oh no. With SnappCar you have an individual, so I feel bad about that for that individual”. Despite this care, Olivia expressed that a car is just a car and that providers should not be overly attached to it, acknowledging that accidents can happen. Theo also referred to using “someone’s car”, highlighting the preference of renting from the same person, as he gets to know the person, providing him with a sense of trust. He also expressed that he “uses the car more carefully”. This model introduces a sense of responsibility towards the actual owner, influencing possibly how users handle the vehicle.

In cooperative models, users refer to the car more as if it is their car. Terms used in the interviews like “our car”, “the cooperation’s car”, “the car” instead of “a car” or “someone’s car” reflect a possible higher attachment than users experience in B2C models and P2P models. Mateo also highlights this: “I now feel more like I have my own car rather than when I use a SIXT share. I take better care of the car”. This also illustrates that care for the car is heightened, with a higher sense of ownership. Isaac also expressed this by saying: “People in our cooperation treat the car as their own property.” Lily expressed the feeling of ownership: “I am now 1/50th owner of this car” and expressed the sense of

community present in a cooperation with “together we take care of our car”. Thus, members take care of the car together, sharing the responsibilities of maintenance and cleanliness. This shared responsibility fosters a community spirit and a stronger attachment to the car as a collective asset.

Users who prioritize sustainability find that car sharing aligns well with their values, reinforcing the practice’s environmental significance. They view sharing as an “environmentally conscious and sustainable alternative that still provides the freedom of mobility” (Ian, Robert, Tessa, Lily, Theo, James). This perspective underscores the value of car sharing, combining the benefits of reduced car ownership with the practical advantages of access to a car when needed.

There are however not many users motivated purely by environmental consciousness. All the other users did not directly associate car sharing with sustainability. Instead, they are more motivated by the reduction of vehicles in overcrowded cities, contributing to “more available space” and the “removal of unsightly excess cars” (Maria, Lana, Alex, Mateo, Luke). While the reduction of materials and resources used for car production is an environmental benefit, users did not always frame it in this way. They are primarily concerned with the practical advantages of fewer cars in urban areas.

Sharing services, particularly the B2C free-floating model and cooperatives, frequently provide access to electric cars, possibly enhancing the sustainability of the practice. Ian expressed: “I am happy it provides me with access to electric cars, if I would have bought a car it would possibly be an old fuel car”. Most users, like Ian, appreciate the opportunity to drive electric vehicles, as it contributes to a cleaner conscience. However, this does not typically influence their decision to use a shared car for environmental reasons; rather, it is seen as an added benefit or associated with the fun of driving a new type of vehicle. Lucas said he “enjoyed learning about the new technology of an electric vehicle. It is nice to drive. I did not consciously decide to drive an electric car for sustainability reasons”. Claire expressed: “I like that they are electric cars, which is more sustainable than fuel cars. But the electric does not motivate me to use sharing.” Jonah expressed concern about whether electric cars are genuinely more sustainable than fuel cars, highlighting a common scepticism. While sustainability may not always be the primary motivation for using car sharing services, the eco-friendly aspect of electric cars is widely regarded as a significant advantage. Ella & Tom mentioned: “The cars are electric, and we think that is wonderful”. Other users, such as Ian and Lily, who could not afford an electric car themselves and were environmentally conscious, expressed their appreciation for having access to one through car sharing.

Additionally, users mention that with car sharing, they have the possibility to "pick the car according to the goal" (Jacob). Jack expressed, "I usually pick the smallest car, as this is also the cheapest option, and I do not need a bigger car." This indicates a potential shift towards selecting car sizes that fit specific purposes, possibly increasing the use of smaller cars. Currently, large cars are often used for solo travels as private car owners are fixed to their type. As Jacob mentioned: “When you own your own car, you are fixed to the car you have”.

Car sharing has transformed the practice of driving by altering the materials involved, necessitating new competences, and shifting the meanings associated with mobility. This change reflects broader societal trends towards sustainability and independence, marking a significant evolution in how we understand and engage in the practice of driving.

All the previous findings corresponding to the SPT can be summarized into the following table 5.2.2.1:

Table 5.2.2.1.
Schematic overview of the findings through the lens of the SPT.

	Car Sharing
Materials	Ubiquitous access to various cars Platform economy Parking changes
Competence	Different car per use Planning/booking Technological knowledge Platform consideration Mobility consideration User coordination
Meaning	Instrumental meaning - Costs - Pick car for goal Independence meaning - Reliability: Availability, condition car - Flexibility: Booking, return time, various cars - Convenience: Ubiquitous car access, parking, young kids - Responsibility: For car, user coordination Symbolic meaning - Identity - Attachment - Environmental consideration - Various type of cars

5.2.2.4. Impact of Car Sharing on Other Mobility Practices

When users do not own a private car (anymore) and therefore eliminate it from their driving practice, interestingly, notable from the interviews, other forms of mobility become more attractive to them. Living in the city provides many mobility opportunities, with access to public transport and the ease of cycling (especially in the Netherlands) or walking for shorter distances (Celsor & Millard-Ball, 2007; Stillwater et al., 2009; Becker et al., 2017). All respondents acknowledge this privilege of having access to many forms of mobility close by. The following insights from interviews highlight the changes in mobility practices by the users and indicating a possible shift towards more sustainable transportation options.

When users get rid of their car, they become more aware of their options and realize that a car is not always necessary for the trips they make. These users started to use cars a lot less in general. For instance, Lily, Isaac, Lana and Ella & Tom, who previously owned a car, mentioned that car sharing made them more conscious of alternative transportation methods, like using a bike for groceries or using public transport even though it might take somewhat longer. Ian shared, “We got rid of our car for sharing, and along the way sharing has proven to us that car ownership is unnecessary. We started to use public transport a lot more.”

Lana, Emma, James, Sophie, Lily, Maria and Ella & Tom all mentioned enjoying traveling by public transport, especially the train and do not find it a significant inconvenience compared to a car. Some users, however, expressed annoyance with public transport, due to restrictions related to schedules and destinations (Lucas, Theo), as well as the potential need for multiple transfers (Anna), which diverts them back to a car.

On the positive side, many users appreciate the ability to relax or work while traveling by train, instead of having to concentrate on driving. They expressed that they did not have difficulty with traveling by public transport and actually enjoyed it, especially by train. Ella & Tom mentioned, “We really only use the car when we travel out of the city to places without nearby train stations, because we do prefer to travel by train.” Jacob also expressed: “You could actually do something on the way because you could work on your laptop on the train”. Olivia added that the hassle of first having to search for a car and pick it up makes her gravitate to the train, which she experiences to be just as fast and cheaper.

In the interviews, it became apparent that cargo bikes, usually electric, could replace short trips typically done by car, such as taking kids to their activities or school, transporting goods like going to the dump, or for daily activities like grocery shopping, especially in the city they are convenient. The increasing popularity of electric bicycles, specifically the electric cargo bike, has significantly facilitated cycling, particularly for longer distances. Interviewees consistently reported that cargo bikes have replaced several short car trips, including those to the grocery store and the dump, and for transporting children to school or various activities. Jacob noted, "I see the combination of transport, with the cargo bike replacing the trips that you make with your children to their sports destinations, for example. I see the cargo bike eliminating the need for a car, but I do think a car is still needed for visits to grandparents every now and again. So, it will be a combination of these electric bikes, the cargo bike, and car sharing." This statement highlights that while cargo bikes do not completely eliminate car use, they offer a viable alternative for specific types of trips now usually performed by car. Jacob also emphasized that cargo bikes effectively remove the necessity for a "run-around car for the kids," illustrating their practicality for daily short-distance travel. Moreover, another notable application of the cargo bike is for waste disposal trips. James mentioned that in Amsterdam, local dumping grounds offer the possibility to rent a cargo bike for transporting waste. This initiative further underscores the versatility of cargo bikes in replacing conventional car trips.

Ella & Tom provided additional insights, stating, "We notice now that when we don't have the car standing in front anymore, we more easily grab the cargo bike to do our grocery shopping." This observation suggests a behavioural shift towards more frequent use of the cargo bike in the absence of a readily available car. Tessa shares a similar experience, "We share a cargo bike with our neighbours, and since we started doing this, we use the car much less often. Previously, we would quickly grab the car for groceries, but now we find it convenient to take the cargo bike to the supermarket around the corner. It's even more convenient, and we easily got into this habit." This anecdote further supports the notion that the cargo bike can replace car trips for everyday tasks, promoting more sustainable transportation habits, considering a cargo bike is more environmentally friendly than a car.

The elimination of the private car from the driving practice could lead to a significant shift in mobility practices, encouraging the use of more sustainable transportation modes like public transport and (electric) (cargo) bicycles. Users who do not own private cars become more aware of and reliant on these alternatives, possibly fostering a more diverse and environmentally friendly transportation pattern. This shift could enhance the adoption of sustainable mobility solutions, reducing reliance on private car ownership and increase the overall efficiency and convenience of urban transportation.

5.2.3. Summary of the Findings Among the Various Models

From the results, several differences between the models can be identified. These are shown in Table 5.2.3.1. and described below. A full summary of the previous findings can be found in Appendix B.

Table 5.2.3.1.
Table describing the differences found between each car sharing model.

B2C: Round-trip "A car"	***B2C: Free-floating "A car"***	***P2P "Someone's car"***	***Cooperatives "Our car"***
No responsibilities for car	No responsibilities for car	No responsibilities for car	Shared responsibilities for car
Expensive	Expensive	Expensive	Cheapest sharing option
No subscription costs	No subscription costs	No subscription costs	Subscription costs
Availability concerns	Little availability	Wide availability	Availability checked
Ubiquitous car access	Car access in operation zone	Ubiquitous car access	No ubiquitous car access
Electric and fuel cars	Electric cars	Electric and fuel cars	Mostly electric
Need for reservation	No reservation	Need for reservation	Need for reservation
Return time	No return times	Return time	Return time
Issues with condition car	Issues with condition car	No issues with condition car	No issues with condition car
No feedback	No feedback	Feedback in reviews	Feedback among members
Fixed parking	Free parking, bounded by operation zone	Parking dependent on provider	Fixed parking

A significant observation is the difference in attachment. In B2C models, users typically focus on functionality rather than forming a personal attachment to the car, referring to it as "a car". In the P2P model, awareness of using someone else's car promotes carefulness. In cooperatives, users feel a collective attachment, often referring to the vehicle as "our car," which enhances community spirit and responsibility.

Responsibilities vary, with no car maintenance duties in the B2C and P2P models, whereas the cooperative model demands user involvement, fostering a sense of community responsibility.
The B2C models are generally considered the most expensive due to their pay-per-use pricing. Although the free-floating model offers one-way trips without charging for idle time, it remains costly to the users. The P2P model has set prices for half-day or full-day rentals, but users still find it expensive. Cooperative users believe their model is the most cost-effective due to its non-profit nature. Despite a typical small subscription fee, users understand this commitment and still view it as the most affordable option.

The results show that in the B2C round-trip model, users are primarily concerned about future availability but have not faced significant issues. In the free-floating model, the small fleet often results in cars being located far away, requiring users to travel to reach them. The P2P model offers wide availability, dependent on neighbourhood offerings, with users noting many options. Cooperatives actively track availability to adjust the fleet based on member needs. An agreement with Greenwheels allows access to their cars when cooperative vehicles are unavailable, enhancing availability and providing a greater sense of reliability.

In the B2C round-trip model, cars are ubiquitously accessible within urban areas. P2P offers are also widely available. The free-floating model, though limited to its operational zone, remains accessible in the urban areas studied. In cooperatives, cars are accessible only within the cooperative's active area, limiting their widespread availability.

The supply of cars varies among the models. The B2C round-trip and P2P models offer both electric and fuel cars. The free-floating model exclusively provides electric vehicles, while all cooperatives, except one, offer only electric leased cars.

The booking procedures differ among the models. All models, except the free-floating model, require reservations. The inability to reserve in the free-floating model affects reliability, as a car may not be available in the area. In other models, users can clearly see which car is available when. However, the free-floating model offers more flexibility with no required return times, whereas the other models necessitate planning by indicating a return time. In cooperatives, short communication lines enhance flexibility, allowing users to coordinate or manage unforeseen circumstances with the next user.

Issues regarding the condition of the car were prominently addressed in the B2C model. In contrast, neither the P2P nor the cooperative model users experienced significant issues with the condition of the car.

Customer support varies among the models. B2C models often lack feedback when complaints are made. In the P2P model, support depends on the owner, but reviews set user expectations. In cooperatives, feedback channels are direct, with planned meetings and a group chat, enhancing community support and collaboratively optimizing the service.

Lastly, users experience parking advantages that differ among the models. B2C round-trip and cooperatives offer fixed parking spots, which are highly beneficial in urban areas, ensuring a parking spot upon return. The free-floating model provides more flexibility, allowing parking without costs but users are limited to operational zones. P2P users depend on the owner's parking arrangements, which do not typically offer advantages.

Chapter Six: Discussion

The following chapter will discuss the findings of this research, present the limitations, and provide recommendations for further research, policies, and car sharing providers.

6.1. Discussion of Findings

The results of this study underscore the persistent need for cars in various situations, reflecting Cass and Faulconbridge's (2016) emphasis on the essential role of cars in facilitating socially valued activities like commuting, shopping, and family transportation. Despite the growing appeal of alternative modes of transport, the traditional concept of car use remains deeply embedded in society (Hensher et al., 2022). This aligns with findings that users are still using cars, expressing how cars provide them with mobility options that other models are not always able to provide. Reasons for car use found are to reach destinations not adequately covered by public transport, to conveniently transport bulky or heavy items like furniture or groceries, to provide practicality for families in transporting children and managing family activities, to use for (group) trips and holidays to provide convenience and practicality and when a car is preferred to other mobility due to their ability to offer freedom, privacy, shelter and personal enjoyment. This enjoyment of driving might be one reason why efforts to influence car usage have not been very successful, potentially explaining the resistance to policies designed to reduce car use, also recognized by Steg (2005).

6.1.1. Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) provides a framework for understanding user motivations and barriers. Attitudes towards car sharing are shaped by its favourable benefits, which vary among models, including factors such as decreased parking hassles, also identified by Paundra et al. (2017). In the research of Paundra et al. (2017), the intention of car sharing was affected by the parking proximity of the shared car. Users in this research mentioned additional values associated with parking. The fixed parking spot offered by round-trip models (B2C and Cooperatives) ensures users always have a place to park upon return, reducing the stress of finding a spot in a crowded city. In contrast, the free-floating model allows users to travel to their destination within the operational zone without worrying about parking fees, thereby motivating the use of shared cars.

Another important motivator identified in this research is the pay-as-you-go model, which promotes cost savings and improved understanding of the actual costs of car use. This resonates with existing research that highlight cost savings and convenience as key motivators for car sharing (Burkhardt and Millard-Ball, 2006; Chatterjee et al., 2013; Juliet Schor, 2016; Acheampong and Siiba, 2019). Surprisingly, the finding of this thesis that frequent users perceive car sharing to be more expensive than ownership, contradicts with previous studies which suggest that car sharing is a cost-effective alternative (Gärling et al., 2022). This suggests a need to reassess pricing strategies to make car sharing more competitive with car ownership, thereby enhancing user satisfaction and appeal. However, it's crucial to ensure that this does not divert people away from more sustainable modes of mobility, such as public transport, cycling, and walking. Such a shift could lead to increased consumption, known as the rebound effect, as found by Gollnhofer et al. (2016).

The current model of car ownership is not sustainable; however, research agrees that the necessity for a car will not decline in the near future (Hensher at al., 2011). As a form of shared automobility, car sharing aligns with the principles of the sharing economy, offering significant environmental benefits by reducing car ownership and optimizing urban mobility (George & Julsrud, 2018; Shaheen & Chan, 2016). Users report that car sharing could replace or delay car ownership and reduce their need for a second vehicle, which resonates with literature highlighting its potential to decrease overall vehicle counts and associated emissions (Terama et al., 2018).

The interviews conducted with various users reveal that car sharing has become an attractive option for those in need of a vehicle, providing alternatives for different scenarios. The aim of this study is to

investigate how the availability of car sharing influences its adoption to reduce car ownership. The findings suggest that car sharing can impact car ownership, as some users indicated they had given up their cars due to its availability, it eliminated their need for a second vehicle, or postponed the need to buy a car. Users who replaced their private cars also reported using cars less frequently and diverting to alternative mobility options, validating the findings of Chapman et al. (2020) that a reduction in car ownership results in fewer kilometres driven. However, existing car owners expressed using car sharing as an additional mode of transport, which might increase overall car usage. Additionally, users who previously did not have access to a private car for environmental reasons now utilize shared cars, resulting in a possible rise in car usage.

The significant motivation for reducing the number of cars expressed by users is an unexpected result. While the literature highlights the positive effect of car sharing on reducing congestion in crowded streets and car parks in cities (Ceder, 2021), its relevance to users' motivations for adopting car sharing is surprising. Previous studies suggested that environmental motivations primarily influence behaviour (Han, Meng & Kim, 2017; Acheampong & Siiba, 2019; Steininger et al., 1996; Hjorteset & Böcker, 2020) and that societal environmental pressures would drive users towards car sharing (Zhang & Li, 2020). However, the interviews reveal that few users felt pressured to share instead of own for environmental reasons, viewing it mostly as a nice bonus, consistent with the finding of Hartl et al. (2018). Instead, most users expressed a desire to reduce the number of cars in the city, indicating a shift in motivation that warrants further exploration.

Environmental pressure was thus not found to impact the users that were interviewed for this research. However, notably, users did express the influence of peer recommendations in adopting car sharing. Most users were introduced to car sharing services by others, which helped them trust and become familiar with this new form of mobility, eventually integrating it into their mobility considerations. This social influence underscores the importance of community support in driving broader adoption. Additionally, some interviewees expressed their conviction that using car sharing was the most responsible behaviour, independent of others' opinions. This aligns with Han, Meng, and Kim (2017), who highlighted the influence of personal norms in mitigating the impact of subjective norms.

The third element of the Theory of Planned Behaviour (TPB) influencing the intention to perform a behaviour is perceived behavioural control. This research highlights its critical role, as users expressed various motivations and barriers affecting the ease of performing the behaviour. In this thesis, perceived behavioural control is divided into four elements: reliability, flexibility, responsibility, and convenience. Previous research primarily emphasized convenience as an important factor influencing behaviour but did not explore in depth what convenience truly means to users (Münzel et al., 2019b). This study shows that convenience is a fairly wide concept. Since convenience affects how easy and simple the action is, characteristics like reliability, flexibility, and responsibility could be included under the umbrella of convenience. It was determined to divide these components in order to obtain a better understanding and contribute to the body of existing information.

In this research, users primarily expressed the need for reliability to create a sense of control over their behaviour. Concerns about vehicle availability and the condition of cars can deter potential users, aligning with Turoń's (2021) and Kim et al.'s (2017) findings, which suggest that the likelihood of car sharing decreases due to insufficient vehicle availability or concerns about vehicle condition. Many issues with the condition of the car were expressed by B2C users, significantly expressing the desire for well-maintained vehicles. P2P and cooperative users did not mention many issues regarding the condition of the car, possibly due to (semi) owners being responsible. Issues regarding availability were mainly expressed by users of the B2C free-floating model, whereas users of the B2C round-trip model mostly expressed concerns around availability, but not actually experiencing them. The cooperative users, due to the possible diversion to Greenwheels, did not express concerns, and neither did the P2P users. Increased availability would be a logical solution; however, the objective of this study is to reduce the number of cars, and as mentioned by Christensen et al. (2022), the inherent nature of shared resources means that access to shared cars will always be more limited than access to

privately owned cars. These findings underscore the need for effective customer-support and well-maintained vehicles, to increase the appeal and reliability of car sharing services.

The second aspect that this research identified that could be of significant relevance to the sense of control for the users is flexibility. The need for planning may limit user's spontaneity, aligning with Isaksson and Pongolini's (2023) findings, which highlight the emergence of challenges related to planning and punctuality when switching to car sharing. Users mention, due to the need for planning, they need to make a new mindset their own, as also highlighted by Christensen et al. (2022). Within the round-trip models (B2C and cooperatives), planning is often essential. With more users and limited availability, booking upfront becomes more of a requirement. The booking comes with an end time, limiting the user's flexibility further. With the P2P model, due to a wider availability and solely two available time sloths, planning is less of the essence, and return times are less punctual. The free-floating model is on demand, therefore is not accessible for planning upfront, and does not set an end time for use, however the limited availability influences the user's feeling of flexibility.

Contrary to Huwer's (2004) mention of insufficient vehicle variety, the findings from this thesis suggest that the current variety of cars supplied by car sharing providers is sufficient and can enhance flexibility. Users appreciate the ability to choose car size based on their specific needs, rather than being limited to a single type of private vehicle. This flexibility allows users to select the most appropriate vehicle for different scenarios, thereby increasing the appeal and practicality of car sharing services.

The third aspect identified as influencing the sense of control over behaviour is the alteration of responsibility. With car sharing, user coordination is essential to ensure a pleasant experience for other users. As Sopjani et al. (2020) demonstrated, sharing a vehicle, as opposed to using a personal car, involves negotiating, compromising, and being mindful of responsibilities. This includes tasks such as emptying the car after each use and ensuring no possessions are left behind. These new responsibilities could influence adoption, as interviewees in this research expressed that this aspect is a disadvantage of car sharing.

The final aspect found, is the motivations and barriers that influence overall convenience. A notable discovery was the newfound convenience facilitated by ubiquitous accessibility. This accessibility allows a vehicle to serve as a mode of transportation outside of the fixed location of one's private vehicle, enabling the integration of various transportation modes within a single journey. For example, one can use public transport for parts of a journey and then switch to a shared car for the final stretch. Similarily to a private vehicle, cooperative cars are also bounded by the neighbourhood, and thus not offering this possibility. However, members of the cooperation can easily also register to the B2C or P2P platforms, offering them this same convenience. Inconveniences users expressed are the need to regularly adapt to different vehicles, as well as the absence of fixed items like child seats, acknowledged by Turoń (2021).

In conclusion, the TPB framework effectively captures the multifaceted motivations and barriers influencing the intention to adopt car sharing. By addressing the critical aspects of reliability, flexibility, responsibility, and convenience, providers can enhance user satisfaction and promote broader adoption of car sharing as a sustainable mobility solution. Costs is another important element in decision making for car sharing, as expressed, however reducing the prices might convince people to start sharing but will also divert people away from public transport. The need to make car sharing cost competitive with car ownership is therefore evident.

6.1.2. Social Practice Theory

Social Practice Theory (SPT) offers a broader perspective, highlighting the transformative potential of car sharing on traditional driving practices. The shift from private ownership to ubiquitous access to various shared vehicles represents a fundamental change in material aspects (George & Julsrud, 2019).

To facilitate sharing behaviour and connect the provider to the user, platforms are introduced and used (Rudmin, 2016; Bucher et al., 2016; Eckhardt et al., 2019). Additionally, a new parking infrastructure is created: fixed parking spots are arranged for the B2C round-trip model and cooperatives, while an operational zone with free parking is offered for the B2C free-floating model. The P2P model's parking infrastructure remains unchanged, depending on the providers parking options.

With the introduction of these new materials, users need to alter or develop competences. A new mindset is required to include the new action of booking a car upfront and possibly planning, as Christensen et al. (2022) also indicated. The free-floating model, however, does not require to develop this new skill, as users cannot book a car upfront and are dependent on the availability at the time of departure.

Another competence that is altered, is the specific knowledge needed for different car types. With a private car, one becomes familiar with the vehicle, whereas car sharing possibly involves using different types of cars, resulting in variations in use. In cooperatives, members acknowledge that they become accustomed to the types quickly, as the fleet is rather fixed, and they are also helped by instruction videos provided by the cooperative. In other models, users can choose the car type, but they are dependent on availability, which may require them to frequently get acquainted with different models possibly complicating the practice. With a wide supply of electric vehicles, users, who previously were not familiar with electric cars, mention learning how to operate and use it.

Other competences that are introduced to the driving practice due to car sharing are: technological knowledge, navigating mobility options and user coordination. To be able to utilize the newly introduced material ‘platform’, technological knowledge is needed. In the interviews none expressed not having significant technological knowledge indicating that this knowledge has significantly integrated into society. The need to consider the different mobility options offered by various platforms is another competence, as the different models B2C, P2P and the cooperatives are represented by a significant number of providers. This research only presents a few of the current active providers in the Netherlands. According to the interviews, with the many platforms come different apps, prices, rules, regulations etc, complicating the practice. Additionally, sharing is a new option for mobility adding to the mobility considerations. The interviews indicate that users of car sharing are possibly more aware of their mobility choices, relating it to the actual costs of the mobility, reducing the impulse to drive and promote alternative modes of transport, which is in line with the findings of Millard-Ball (2005), Duncan (2011) and Shaheen et al. (2012). Lastly, the need to consider other users becomes apparent in the practice to ensure a positive user experience for all, which was also stated by Kent & Dowling (2013).

The interviews do not show a significant alteration of the instrumental meaning associated with driving. The instrumental meaning assumes that individuals choose the mode of transportation that offers the highest utility or relative advantage (Dong et al., 2006). The instrumental value of a car relates to its functionality as a means of mobility and accessibility. According to the users, a car is a car, and the ultimate function, going from A to B, is not different than another car. The practicality of the car, according to the interviewees, could be influenced by the ability to access various cars tailored to specific needs. A surprising finding however, as earlier acknowledged, is the high costs associated with car sharing, with users viewing it as a more affordable alternative only when used sporadically, contrasting exciting research stating car sharing to be cost-effective (Schor, 2016). This suggests that either car sharing is too expensive compared to private car ownership or that car ownership is currently still relatively affordable, possibly retaining users to adopt car sharing instead of car ownership.

From the results can be indicated that the meaning of independence in car sharing is significantly altered compared to private car ownership. Independence traditionally involves individual freedom, flexibility, timesaving and comfort (Jensen, 1999; Anable, 2005; Hagman, 2003). Studies have shown that people are willing to use different transportation modes if they provide similar services (Beirao & Cabral, 2007), and feelings of independence are closely tied to positive car-use experiences

(Gatersleben & Uzzell, 2007). Private cars play a crucial role in providing these benefits, creating significant challenges for car sharing to offer comparable values (Kent, 2014). The interviews highlight the biggest challenges in matching the service level of private cars with shared cars. Flexibility is often compromised due to the need for planning and return times in all models, except the free-floating model. The interviews indicate that reliability issues arise from often dirty or malfunctioning cars, predominantly in B2C models, and concerns about future availability, in the B2C round-trip model, and the actual availability issues currently in the free-floating model. The new responsibility of considering other users, such as emptying the car after use, according to the users also decreases the sense of independence. Users express practical issues like the absence of child seats and the variety of car types making the practice less consistent. However, the newfound flexibility of having a car available even when not near their personal vehicle could positively influence the feeling of independence. Additionally, the essence of good customer support to quickly resolve issues is found to be crucial in maintaining user satisfaction and ensuring continued use of the service.

The transition from car ownership to car sharing also alters the symbolic meaning of vehicles. Cars are increasingly viewed as utilitarian tools offering mobility from A to B, rather than personal status symbols, reflecting a possible broader need in societal shift away from the current association of social status, power and superiority (Steg, 2005; Moody, 2019). This change in perception supports a move away from individual ownership and towards collective responsibility and sustainability, as emphasized in the sharing economy literature (Bardhi & Eckhardt, 2012; Botsman & Rogers, 2012). A surprising and possibly significant finding from the interviews is the difference in attachment between the models. In B2C models, users mainly focus on functionality rather than forming a personal attachment to the car, often referring to the shared car as “a car”. In the P2P model, awareness of using someone else’s car is prominent, with users referring to “someone’s car”, which users indicate influences carefulness, fostering a sense of respect and responsibility. Cooperatives cultivate a collective attachment, with users often referring to the vehicle as “our car,” which could imply community spirit and responsibility. This collective attachment aligns with the principles of the sharing economy, emphasizing community and shared responsibility (Botsman & Rogers, 2010).

Lastly, the SPT indicates the potential for car sharing to be a more sustainable practice. The (newfound) access for users to electric vehicles due to car sharing shifts driving towards a more sustainable practice. The use of electric cars can increase, and users get acquainted with electric vehicles, possibly speeding up the transition towards solely electric vehicles. The users did not express that the availability of electric vehicles increased their motivation to start sharing, however it was seen as a pleasant bonus, contradicting Carteni et al. (2016), whom found that incorporating electric vehicles into car sharing services positively influences user adoption. Another finding indicating a shift towards more sustainable practices is the increased mobility awareness of users when utilizing car sharing. Interviews indicate that users who do not own a car are likelier to divert away from car use and opt for other modes of transportation, such as walking, cycling, or using public transport. The interviews also highlighted a shift towards cargo bikes, consistent with previous research indicating this trend (Duncan, 2011; Millard-Ball, 2005; Shaheen et al., 2012).

A surprising finding is that users tend to choose cars based on their specific needs, with users mentioning that smaller cars are preferred for solo travels, while larger cars are selected only when necessary, such as for transporting goods or multiple passengers. This behaviour suggests a shift towards using appropriately sized cars, potentially increasing the use of smaller cars and reducing the use of larger ones. This shift could possibly positively impact sustainability by promoting more efficient use of vehicles.

6.1.3. Use of TPB and SPT

The integration of the Theory of Planned Behaviour (TPB) and Social Practice Theory (SPT) offers a comprehensive understanding of car sharing adoption by examining both individual intentions and broader societal practices.

TPB provides a robust framework for predicting and understanding individuals' intentions to engage in car sharing. By focusing on personal perspectives, TPB offers detailed insights into the motivations and psychological factors driving behaviour change. This individual-centric approach is essential for designing targeted interventions that address specific motivations and barriers, ultimately promoting the adoption of car sharing. For instance, TPB helps identify the individual situational need for a car, highlighting situations where car sharing can fulfil these needs and contrasting them with car ownership.

In contrast, SPT shifts the focus from individual behaviours and decision-making to the broader social practices encompassing car sharing. By emphasizing the collective and systemic nature of behaviour change, SPT reveals how altering practices can have significant societal impacts. SPT demonstrates a potential shift towards car use becoming a more sustainable mobility practice, with users becoming more conscious of their transportation choices, learning to drive electric vehicles, and selecting car sizes that fit their specific goals, thereby reducing unnecessary use of large cars. It also highlights the change in identity and attachment associated with car sharing.

Together, TPB and SPT provide a dynamic and holistic analysis of car sharing adoption. TPB offers a deep understanding of the motivations and barriers experienced by users, while SPT explains where these motivations and barriers come from and potential societal implications, already diving into sort of a discussion. This combination results in a comprehensive picture of car sharing behaviour and its impacts. TPB indicates where behaviour could be made more attractive by addressing current barriers and highlighting motivations, while SPT shows how changes in practice could affect users and influence the practice itself.

A significant overlap exists between perceived behavioural control and the meaning of independence in car sharing. Both concepts represent the ease or difficulty of performing the behaviour and highlight the importance of flexibility and comfort. Perceived behavioural control indicates the ease of performing the practice, suggesting that users will turn to other behaviours when sharing becomes too difficult. Similarly, the independence meaning reflects the effects of the new service on the feeling of freedom and benefits of flexibility and comfort.

By integrating TPB and SPT, this approach offers a comprehensive strategy for understanding car sharing behaviour and its impacts. TPB explains the 'why' behind behaviours, while SPT explores the 'how' of practice integration, how car sharing becomes a possible routine, and societal impact. Together, they provide a robust framework for analysing and promoting sustainable mobility solutions, encompassing both individual behaviour and broader social impacts.

6.2. Limitations of Results

Although this study provides new and interesting insights regarding the user experiences regarding car sharing, it is important to acknowledge that this study has several limitations.

First of all, a limitation of this study is that it exclusively included current users of car sharing services. The study did not include non-users, or users that have diverted away from car sharing. As a result, our ability to predict whether these insights could motivate non-users to switch to car sharing is limited, and the barriers experienced by ex-users could provide wider insights in the still limited adoption of car sharing. This restriction highlights the need for future research to include a more diverse participant pool, encompassing both current users, non-users and ex-users, to better understand the factors that might encourage broader adoption of car sharing services. By doing so, we could gain a more comprehensive understanding of the barriers and motivations that influence the decision to adopt car sharing, thereby providing more effective strategies to promote its widespread use.

Secondly, this study does not represent all car sharing providers active in the Netherlands. For the B2C round-trip model, only users of *Greenwheels* and *MyWheels* were interviewed. For the B2C free-floating model, solely *SIXT* users were approached. As P2P has only one platform, *SnappCar*, it was

represented accordingly. For cooperatives, only those affiliated with the same organization (DEEL) were included, despite the presence of other cooperatives with possibly different organizational structures in the Netherlands.

Additionally, it is important to note that some users integrate multiple platforms, creating overlap and making it difficult to distinguish between experiences with different services. While efforts were made to minimize this impact by focusing on the dominant platform each user primarily utilized, the possibility remains that users' responses could reflect their experiences with multiple platforms. Future research should consider the integrational use of multiple platforms to capture a more comprehensive and accurate picture of car sharing behaviours and preferences in the Netherlands.

Another limitation of this study, although it is of an explorative nature with the main objective of gaining deeper insights into behaviour, is the sample bias resulting from the non-random selection of participants, who were recruited within specific social circles. This sampling method may not accurately represent the broader urban population in the Netherlands, introducing a selection bias that limits the generalizability of the findings. Consequently, the results may reflect the attitudes and behaviours of a specific group rather than the diverse perspectives found in the general population. Future research should aim to include a more randomized and representative sample to better capture the variety of experiences and opinions within the urban population. This would enhance the validity of the study and provide more robust insights into the factors influencing car sharing adoption across different demographic groups.

Lastly, it should be noted that this study has uneven number of interviews conducted for the various car sharing models. This imbalance could affect the significance of certain findings, as some models were more overrepresented than others. However, given the exploratory nature of this research, the goal was not to find a representative sample, but to gain deeper insights into car sharing practices. For future research, it could be significant to have a similar number of representatives for each car sharing model to ensure a more balanced and comprehensive understanding of user experiences and behaviours across different car sharing services.

6.3. Recommendations

The following subsections will explain the recommendations resulting from this study.

6.3.1. Recommendations for Future Research

The following recommendations could guide future research.

Firstly, future research could deepen the understanding of the found motivations and barriers. With clearer insights into the motivations and barriers identified by the Theory of Planned Behaviour (TPB), future research could further interpret the significance of these factors on user behaviour and predict their intentions. This could be achieved by increasing the number of respondents, though accurately weighing these factors may still be challenging. Alternatively, quantifying the empirical results would provide valuable insights into the relative importance of different motivations and barriers in car sharing, helping to understand their precise impact on user behaviour.

Secondly, surprisingly, attachment emerged as a factor in this research. Future studies should investigate the implications of user attachment on behaviour. For example, experiences with dirty cars in this research were mainly reported within B2C models. Future research should examine to what extent this is due to the lesser attachment users feel towards the car in these models, as the lack of attachment and absence of an immediate owner might contribute to poor vehicle care. Understanding how attachment influences the responsibility users feel towards the car and each other could inform strategies to elevate car sharing experiences.

Thirdly, users in this research indicated picking the size of the car appropriate to the goal. Research should examine the practical benefits of this, assessing whether smaller, cheaper cars enhance

sustainability, provided there are no significant technical improvements. Understanding the environmental implications of these practical benefits is beneficial for optimizing transportation systems.

Lastly, this research provides a snapshot of the impact regarding adopting car sharing. Investigating the long-term effect of car sharing on car ownership reduction is essential. Longitudinal studies could track users over time to determine whether car sharing leads to a sustained decrease in private car ownership or primarily serves as an additional mode of transport. This research could also explore whether car sharing influences users' decisions to delay or forgo purchasing a vehicle altogether, thereby enhancing its sustainability benefits.

6.3.2. Policy Recommendations

To effectively promote car sharing and enhance urban sustainability, the following policy recommendations should be considered.

Firstly, policies should be implemented to discourage private car ownership. This can be achieved by making private car ownership less attractive compared to shared car usage through measures such as higher taxes on private vehicles, limited parking spaces, and increased costs for parking permits. However, it is crucial to ensure that shared car usage is not priced so low that it diverts users from more sustainable transport modes like public transport, cycling, or walking. Achieving this balance could involve setting minimum pricing standards for car sharing services.

Secondly, the promotion of car sharing should emphasize the benefit of reducing the number of cars in urban areas, which in turn increases available urban space for other uses such as parks, pedestrian zones, and bike lanes. Highlighting car sharing as a solution to urban congestion and parking scarcity can improve the quality of life in cities. This focus on the spatial benefits of car sharing can resonate with urban residents, providing a compelling argument for its adoption beyond just sustainability.

Thirdly, encouraging the development and adoption of integrated platforms that combine all car sharing providers into a single, user-friendly interface could greatly enhance availability and efficiency for users. This integration could simplify access to car sharing services and increase the range of available vehicles, making car sharing a more attractive option. By streamlining the user experience, such platforms would make it easier to find and book a car without the hassle of managing multiple accounts. A unified car sharing market could provide a broader range of vehicles and locations, further boosting the appeal and practicality of car sharing.

Lastly, to promote sustainability, car sharing operators should be encouraged to transition to fleets composed solely of electric vehicles (EVs). This transition can be supported through subsidies, tax incentives, or grants for purchasing EVs or oblige car sharing providers by regulations to solely supply EVs. By transitioning to electric fleets, car sharing services can contribute to reducing urban air pollution and greenhouse gas emissions and possibly accelerate the transition to electric vehicles as users gain hands-on experience through car sharing.

6.3.3. Recommendations for Car Sharing Operators

To enhance the overall user experience and promote the widespread adoption of car sharing services, car sharing operators should consider the following recommendations:

Firstly, improving user satisfaction is paramount, as users expressed the importance of good and efficient customer support in this research. Car sharing operators should enhance customer support by ensuring that service responsiveness addresses concerns promptly. Providing clear and timely feedback when complaints are received will ensure a more reliable and user-friendly experience. Additionally, possibly incorporating in-app features that allow users to connect with the next user can facilitate smoother transitions and enhance overall coordination.

Secondly, for the free-floating model, expanding the operation zone to cover more areas will increase flexibility and attract more users by offering greater convenience and accessibility. This expansion can make the service more appealing to a broader audience, encouraging more people to opt for car sharing over private car ownership.

Thirdly, simplifying and clarifying pricing structures is crucial for user trust and satisfaction. Transparent pricing helps users better understand costs, making it easier for them to predict and manage their expenses. By promoting clear and straightforward pricing, car sharing operators can foster a sense of trust and reliability among users.

Lastly, promoting peer recommendations through incentive programs can significantly boost user adoption, as found within this research. Introducing voucher systems for inviting friends to use the service not only helps in gaining new users but also familiarizes potential users with car sharing. As people are more likely to accept and continue using the service after experiencing it first-hand, these incentives can play a key role in expanding the user base.

By implementing these recommendations, car sharing operators can improve user satisfaction, expand their user base, and create a more efficient and appealing service, ultimately contributing to the growth and success of the car sharing industry.

Chapter Seven: Conclusion

This study aimed to explore the implications of user experiences with various car sharing models on promoting car sharing adoption within urban areas of the Netherlands. Guided by three sub-questions, the research provides a comprehensive understanding of the characteristics and features of car sharing programs, the primary motivations and barriers experienced by consumers, and the changes in driving behaviour when individuals transition to car sharing. The results found from the literature reviewed and the interviews conducted are restated below.

The experiences of users with various car sharing models in the Netherlands suggest several implications for promoting the adoption of car sharing within urban areas. The study underscores that while cars remain a vital mode of transportation due to their unmatched utility function and autonomy, the availability of car sharing provides a practical solution for different scenarios, such as postponing the need for a private car, fully diverting away from a private car, or replacing a second car. This dependency on cars is primarily driven by the limited accessibility of destinations by public transportation, the need to transport goods, the need to be mobile with children, the practicality of a car for planned group trips, and the general preference for the convenience, enjoyment and comfort that cars offer.

Car sharing can emerge as a practical compromise, bridging the gap between the need for car use and the push towards sustainability. Car sharing services can provide a newfound accessibility to a car, but significant barriers remain. Primary motivations for car sharing include reducing the number of cars in urban areas, cost savings, parking advantages, and alleviating car ownership responsibilities. However, perceived high costs for frequent users, concerns about vehicle availability and condition, and the inconvenience of adapting to different vehicles and booking systems highlight the difficulty for users to divert away from private ownership.

The transition to car sharing also influences driving behaviour significantly. Users become more aware of their mobility choices, often reducing car usage in favour of alternative transportation modes like public transport and (cargo) bicycles. Car sharing encourages users to plan their trips more carefully and consider the environmental impact of their travel decisions. However, the shift requires developing new skills and adapting to new responsibilities, which can be challenging for some users. Users experience a trade-off between the benefits of having access to a vehicle without the costs and burdens of ownership and the perceived loss of independence and control.

The diverse landscape of car sharing models—B2C Round Trip, B2C Free-Floating, P2P, and Cooperatives—caters to varying user needs and preferences. B2C and P2P models divert the responsibilities to the provider, while cooperatives involve user participation, enhancing community responsibility. However, B2C and P2P models are the most expensive at the moment, whereas cooperatives are the most affordable due to their non-profit nature. The free-floating model seems to provide the most enhanced flexibility by eliminating the process of planning and new parking advantages, but currently still faces availability issues and operational zone limitations.

To enhance car sharing adoption, policies should integrate car sharing into the broader urban mobility system, discourage private car ownership, improve access to alternative transport modes, and with that establish environmental and social benefits. Addressing barriers, that influence the perceived loss of independence and control, and leveraging positive user motivations can make car sharing a more viable and attractive alternative for urban residents. Car sharing providers and municipalities should work together to ensure service reliability, vehicle availability, and user support, fostering a more sustainable and efficient transportation ecosystem that reduces personal vehicle ownership while enhancing the appeal and convenience of car-sharing services. By addressing these factors, car sharing can become a more viable and attractive alternative for urban residents, ultimately contributing to a more sustainable and efficient transportation system.

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Chapter Nine: Appendices

9.1. Appendix A: Codebook

Theme	***Subthemes***	***Definitions***	***Examples from transcript***
Choice in transportation	Reason car use	Why a car is still needed	“But as soon as I know that public transport is a bit more complicated, I immediately have the urge. Then I rent a car for three or four hours. “ “At various points in your adult life, it's inevitable that you'll require a car from time to time.”
	Private car use	When users decide to use a private car	“And I use my own car, mostly going outside the city, for going longer destinations, etc. “It is also comfortable, because it is my own car, that is what I chose and sometimes I get other models, and then it just doesn't fit.”
	Public transport use	When users express using public transport	“Not to mention, I'm good at public transport. I can close myself off well, I enjoy working on a train and I think that is the biggest difference with some of the people around me. I think that if you have that too, you will tend to leave that car behind.”
	Cargo bike use	Newly introduced transport mode, used by the users	"We share a cargo bike with our neighbours, and since we started doing this, we use the car much less often. Previously, we would quickly grab the car for groceries, but now we find it convenient to take the cargo bike to the supermarket around the corner. It's even more convenient, and we easily got into this habit."
	Type of car	Decision in the type of car expressed by the user	“I pick the smallest car when I travel by myself, I would actually like it to have a micro car for individual travel purposes. With the family or when I move big items, I pick a bigger car. It is nice to have the opportunity to pick the type of car you need for the use.”
Attitudes	Economic motivators	Economic motivations experienced by users	“I currently do not use a car often, then a private car is way too expensive. Getting a shared car for the moments I do need a car is economically more beneficial.”

		“I do not want to have a private car; I like to only pay for my use.”
Economic barriers	Economic barriers experienced by users	“When you need to use it frequently, like 3 or 4 times a week, owning a car is definitely cheaper. I find car sharing rather expensive.” “When I use it often, I could have had my own private lease car. Car sharing must be proportionate to car ownership.”
Environmental motivators	Environmental motivations driving use	“I think we can do without it with all the facilities and I also thought in terms of sustainability, to challenge yourself to see if it can be done without it.”
Social motivators	Social motivations driving use	“I like that we get to know each other through the cooperation. Creates a sense of community”.
Social barriers	Social barriers experienced by users	“Yeah, that was always really, for me, stressful because it's like you have to, like I say, you just want to use the car, and then you're going to see the owner of the car, and then you feel really like, oh, you got to start to explain that you are gonna look after it. Of course you can look after it.
Less cars	The desire to reduce the number of cars	“We want to contribute what we can, and not pollute the streets with an extra car if we do not need it.” “I find it incredibly ugly that there are so many cars on the streets in the Netherlands. So, if you can bring that back by sharing, I think it's very good. Less cars creates space which is more relaxing.”
Parking	The effect of the new parking arrangements associated with car sharing	“Parking is difficult in the city, so fixed parking with sharing is a big advantage.” "Being able to put it where you want, so leave it where you want, I would think is the most important thing."
Responsibilities	Duties and obligations for users	“I especially like that it is not my car, no need to take care of it, there is just a car that works.” “Responsibility is offloaded when you get in the car, it's insured, it's maintained, etc. and I like that.”

Subjective Norm	Social influence	Pressures experienced from family, friends or other significant	“People in my surroundings often do not feel like sharing a car or find it dirty, but that does not affect me at all. I believe I’m right to use it.” “Peers use car sharing for the same reasons as me; it is too expensive to own a car and very inconvenient in the city. Access to a shared car is a solution when you really need a car.”
	Peer recommendation	The user expresses the influence of peer recommendation	“With my continuous use of shared cars, I became a promoter among my friends. They started using it as well after seeing my positive experiences.” “I was once recommended this by a friend.”
Perceived behavioural control	Availability	Experiences related to availability for the user	“The most important thing is really availability of a car in your vicinity. Yeah, that's probably the most important thing because when you need a car, if you can find it around, that's the best thing that may happen.” “You don't have much of a choice because whatever car is near you, you pick it up. The choice is not much.”
	Condition car	Experiences related to the condition of the car	“Yes, that it is just clean and perhaps also a bit new and attractive. Those Greenwheels are dirty and run-down and unattractive.” “The car does not work when you need it and therefore you are late for the appointment, or that the car is dirty. I have had that happen several times.”
	Customer support	Experiences related to the customer support	“I prefer when I report dirt in the car that the provider confirms they took action. There is quite often dirt in the cars, which is inconvenient, and now I am not sure if I report it, they will clean it.”
	Booking	Experiences related to the booking	“The new action of reserving a car, it is a new mindset. To me, it is not a barrier; however, it is a new action you do need to learn and make your own.”
	Return time	Experiences related to the return time	“It is a good system, but it came with anxiety and the anxiety was getting the car back on time, getting the car back in the right slot on time.

			You had to be quite strict with your own planning in your head.”
	User coordination	Experiences related to the need for user coordination	“You do not need to consider other users when you have your own car. I know someone else is going to use it, so I have to tidy up.”
	Ubiquitous access	Experiences related to the ubiquitous access of cars	"Then I just go there and look, and there are all kinds of cars available there, so then I'm already there, and then you reserve one that is around the corner."
	Ease of use car	Experiences related to the ease of use of the car	“The cars in the fleet are all a bit different, so you do need to get used to the car a little bit.”
	Ease of use platform	Experiences related to the ease of use of the platform	“And the subscription works good, with the app, you can very easily just reserve a car. You can choose your options or insurance, and you can choose your duration. I think they are all good.”
	Children	Experiences related to using shared cars with children	"The shared car doesn't have child seats available. Juggling the kids, your belongings, and then adding a child seat makes the trip to the car very impractical."
Societal impact	Identity	The identity users express relating to a shared car	“My husband does have some difficulty with it. It misses the image aspect. Yes, more because it is nice to have a nice car and a car from the brand you prefer, but it doesn't really matter to me as long as I get from A to B.”
	Attachment	The emotional and psychological connection to the shared car	“I am now 1/50th owner of this car”

9.2. Appendix B: Summary of Results

This section presents a summary of the findings of this research.

Adopting car sharing can significantly impact sustainability, and the adoption of this practice is influenced by people's behaviours toward it. This thesis evaluates these behaviours among current users of various sharing platforms, using the Theory of Planned Behaviour and the Social Practice Theory.

Results from the conducted interviews suggest that car use remains indispensable in several scenarios. Firstly, users rely on cars to reach destinations not adequately covered by public transport, especially outside urban areas. Secondly, cars are convenient for transporting bulky or heavy items like furniture, groceries, and sports equipment. Additionally, cars provide practicality for families, facilitating the transport of children and managing family activities. Cars are also used for social trips and holidays, offering convenience and flexibility for group travel. Lastly, the inherent freedom, comfort, and enjoyment of car use make it an attractive option. This highlights the car's role as an important transportation mode, offering irreplaceable convenience, autonomy, and accessibility. There still remains a need for car use, which car sharing could effectively fulfil.

Applying the Theory of Planned Behaviour (TPB) to the interviews, the study analysed the motivations and barriers experienced by car sharing users through three key elements: attitudes, subjective norms, and perceived behavioural control. Attitudes reflect whether the behaviour is viewed as favourable or unfavourable, while social norms encompass the social pressure to perform a certain behaviour. Perceived behavioural control relates to an individual's feeling of control over executing the behaviour. TPB emphasizes the psychological and social factors that could influence the adoption of car sharing, providing a comprehensive understanding of the elements that drive or hinder its use.

In the context of attitudes, behaviour is evaluated based on its favourability. Car sharing has become an attractive option for users in need of a car, providing access for various scenarios. Those without a car can now engage in activities previously inaccessible, potentially delaying the need to own a private car at different life stages, such as having children. Car owners also find car sharing beneficial as a supplementary travel option, useful when their car is unavailable or when a shared car is more favourable than other transportation modes in certain situations.

Another motivation for using shared cars extracted from the interviews, creating a positive attitude, is the desire to reduce the number of cars in the city. Car-sharing users advocate for this to enhance urban spaces, repurpose areas for green spaces, recreational activities, and walking areas. Additionally, sustainability-oriented users promote this to reduce the materials needed for car production, thereby enhancing sustainability. Also, users highly value the shift in responsibilities associated with car sharing, as it alleviates the worries related to upkeeping the vehicle. Users also appreciate the pay-as-you go model associated with car sharing, eliminating fixed costs associated with car ownership. However, it is noticeable that frequent users find car sharing expensive compared to owning a private car. With frequent use a private car is still perceived as more affordable. And lastly, influencing the attitude, are the parking advantages experienced. The B2C round-trip and cooperatives offer fixed parking spots, ensuring a parking spot upon return in a busy city. The B2C free-floating model offers a flexibility in parking in the operation zone, avoiding the expensive parking fees within the city.

Another element of the TPB is social pressure. Users in the interviews did not feel significant social pressure, but we see the importance of peer recommendations, as many were introduced this way. Positive peer experiences played a significant role in adoption. Car sharers often become advocates, promoting the benefits of car sharing within their social circles, thereby expressing their positive association with the practice.

The last element in TPB influencing intention towards behaviour is perceived behavioural control, reflecting the individual's sense of control over executing the behaviour. Users emphasize the importance of service reliability. Concerns about availability are noted, though few reported negative experiences. Challenges like functionality and cleanliness are common, and users stress the importance of effective customer support to resolve issues promptly, ensuring the service remains reliable.

Car sharing affects the flexibility of car use by introducing the need for planning, reserving, and indicating a return time, which can cause stress and reduce the spontaneity typically associated with car ownership. The free-floating model removes the stress of return times but increases reservation stress as bookings can only be made 15 minutes in advance. Despite these challenges, car sharing offers newfound flexibility by allowing users to choose a car suited to their specific needs. Users often prefer smaller cars for regular use and opt for larger ones only when necessary or for enjoyment.

Another aspect associated with car sharing is the shift in duties and obligations, creating a new responsibility for users. As you share the same car with others, the condition in which you leave the vehicle affects the next user. You are responsible for returning the car on time, keeping it clean, and ensuring it is ready for the next person, which can be frustrating if these standards are not maintained.

Lastly, car sharing impacts the aspect of convenience. Car sharing offers widespread access to cars in urban areas, enhancing convenience for accessing and combining different modes of transportation. However, adapting to different vehicles and the absence of fixed items like child seats are inconveniences for some users.

Using Social Practice Theory (SPT), this study analyses how the practice driving emerges, evolves and influences individual behaviours and societal patterns due to the introduction of car sharing, by examining the elements of material, competences, and meaning connected to practices as defined by SPT. With the SPT the higher societal and environmental impacts are highlighted.

The introduction of new materials in car sharing brings ubiquitous access to various vehicles, the platform economy and changes in parking. Users can choose different car models based on specific needs, replacing reliance on a single private car and enhancing practicality, and thus utility, and efficiency. This new wide access increases user convenience and flexibility. The inclusion of electric cars predominantly in B2C free-floating and cooperative models indicates a shift toward sustainability. Selecting the right vehicle size also impacts sustainability, as smaller cars can be used for solo commutes, reducing environmental impact.

Users appreciate the practical benefits and environmental significance of car sharing, even if sustainability is not their primary motivation. However, the variety in the fleet requires users to adapt to driving different cars, impacting the competences needed. In addition to familiarizing themselves with various vehicles, users must incorporate car sharing into their mobility planning, evaluating the most beneficial option and selecting the right car for each purpose.

Also, with the elimination of a single private car to various cars the identity and attachment related to a car change. Car sharing changes the personal connection and identity associated with car use. In private ownership, cars reflect personal preferences and identity. In car sharing, cars are viewed as functional tools rather than personal possessions. Different models create varying degrees of attachment, from "a car" in B2C models, "someone’s car" in P2P models, to "our car" in cooperatives.

The introduction of platforms in car sharing has been essential for facilitating bookings, tracking locations, and managing transactions via smartphones. Navigating these car sharing apps or websites requires technological proficiency. Most users are already familiar with similar technologies, making this transition relatively smooth. While navigating multiple systems can be frustrating, these platforms offer significant flexibility and accessibility, enhancing the user experience. Users must reserve cars, which involves understanding availability and scheduling. This shift requires advanced planning,

precise timing and is dependent on availability, contrasting with the immediate access of private car ownership.

Another change in practice is the parking arrangement within the city. Round-trip B2C providers and cooperatives offer fixed parking spots, adding convenience by guaranteeing a spot upon return. In contrast, the free-floating model allows cars to be left in any legal parking space within a designated area without incurring parking costs.

The redistribution of responsibilities is a major aspect of car sharing. Responsibilities for car upkeep and other ownership duties shift from the user to the provider, reducing stress and effort and making car sharing an attractive alternative. While this shift introduces costs, users appreciate the pay-as-you-go model, which increases awareness of transportation expenses. However, frequent use may make private car ownership more cost-effective, so there is a need to find a good balance.

The introduction of more users utilizing the same material changes the meaning of independence. Users depend on availability, influenced by provider supply, other users' demand, and rely on the condition of shared cars. While maintenance is the provider's responsibility, users must ensure the car is tidy, affecting perceived reliability and convenience. For families, shared cars may be less convenient, as shared cars are lacking child seats as sharing requires users to remove all belongings, complicating travel with children.

Eliminating private car ownership could encourage users to explore alternative mobility options in urban areas, such as public transport, cycling, and walking. Interviews reveal that former car owners have become more conscious of other transportation methods. Many users enjoy the convenience and relaxation of train travel, despite some limitations like schedules and transfers.

The rise of electric cargo bikes has significantly replaced short car trips, proving useful for errands, grocery shopping, and transporting children. This shift fosters sustainable habits, reducing the need for a car. Overall, this transition could support more environmentally friendly and diverse urban transportation practices.

From the results, several differences between the models can be identified:

Table 6.1.1.
Table describing the differences found between each car sharing model.

B2C: Round-trip "A car"	***B2C: Free-floating "A car"***	***P2P "Someone's car"***	***Cooperatives "Our car"***
No responsibilities for car	No responsibilities for car	No responsibilities for car	Shared responsibilities for car
Expensive	Expensive	Expensive	Cheapest sharing option
No subscription costs	No subscription costs	No subscription costs	Subscription costs
Availability concerns	Little availability	Wide availability	Availability checked
Ubiquitous car access	Car access in operation zone	Ubiquitous car access	No ubiquitous car access
Electric and fuel cars	Electric cars	Electric and fuel cars	Mostly electric
Need for reservation	No reservation	Need for reservation	Need for reservation
Return time	No return times	Return time	Return time
Issues with condition car	Issues with condition car	No issues with condition car	No issues with condition car
No feedback	No feedback	Feedback in reviews	Feedback among members
Fixed parking	Free parking, bounded by operation zone	Parking dependent on provider	Fixed parking

A significant observation is the difference in attachment. In B2C models, users typically focus on functionality rather than forming a personal attachment to the car. In the P2P model, awareness of using someone else's car promotes carefulness. In cooperatives, users feel a collective attachment, often referring to the vehicle as "our car," which enhances community spirit and responsibility.

Responsibilities vary, with no car maintenance duties in the B2C and P2P models, whereas the cooperative model demands user involvement, fostering a sense of community responsibility.
The B2C models are generally considered the most expensive due to their pay-per-use pricing. Although the free-floating model offers one-way trips without charging for idle time, it remains costly to the users. The P2P model has set prices for half-day or full-day rentals, but users still find it expensive. Cooperative users believe their model is the most cost-effective due to its non-profit nature. Despite a typical small subscription fee, users understand this commitment and still view it as the most affordable option.

The results show that in the B2C round-trip model, users are primarily concerned about future availability but have not faced significant issues. In the free-floating model, the small fleet often results in cars being located far away, requiring users to travel to reach them. The P2P model offers wide availability, dependent on neighbourhood offerings, with users noting many options. Cooperatives actively track availability to adjust the fleet based on member needs. An agreement with Greenwheels allows access to their cars when cooperative vehicles are unavailable, enhancing availability and providing a greater sense of reliability.

In the B2C round-trip model, cars are ubiquitously accessible within urban areas. P2P offers are also widely available. The free-floating model, though limited to its operational zone, remains accessible in the urban areas studied. In cooperatives, cars are accessible only within the cooperative's active area, limiting their widespread availability.

The supply of cars varies among the models. The B2C round-trip and P2P models offer both electric and fuel cars. The free-floating model exclusively provides electric vehicles, while all cooperatives, except one, offer only electric leased cars.

The booking procedures differ among the models. All models, except the free-floating model, require reservations. The inability to reserve in the free-floating model affects reliability, as a car may not be available in the area. In other models, users can clearly see which car is available when. However, the free-floating model offers more flexibility with no required return times, whereas the other models necessitate planning by indicating a return time. In cooperatives, short communication lines enhance flexibility, allowing users to coordinate or manage unforeseen circumstances with the next user.

Issues regarding the condition of the car were prominently addressed in the B2C model. In contrast, neither the P2P nor the cooperative model users experienced significant issues with the condition of the car.

Customer support varies among the models. B2C models often lack feedback when complaints are made. In the P2P model, support depends on the owner, but reviews set user expectations. In cooperatives, feedback channels are direct, with planned meetings and a group chat, enhancing community support and collaboratively optimizing the service.

Lastly, users experience parking advantages that differ among the models. B2C round-trip and cooperatives offer fixed parking spots, which are highly beneficial in urban areas, ensuring a parking spot upon return. The free-floating model provides more flexibility, allowing parking without costs but users are limited to operational zones. P2P users depend on the owner's parking arrangements, which do not typically offer advantages.