Exploring an ideal car club design from a user's perspective

Jae-seung Roe

A Thesis submitted in partial fulfilment of its requirements of the Royal College of Art for the degree of Doctor of Philosophy

January 2017
Royal College of Art

Abstract

In the current transport landscape, where chronic problems such as congestion, insufficient parking spaces and air pollution beset urban areas, car sharing has been suggested as an alternative to mitigate these issues.

With the emergence and growing popularity of the sharing economy, a shifting perception towards car ownership has paved the way towards rapid growth in shared mobility. The car club – or car sharing – as a service, enables people to go without their own car, yet use one when they need to. This flexible transport option has grown rapidly in many metropolises around the world. In London, it is forecast that the total number of round-trips car club memberships will increase from 137,000 in 2013 to approximately 264,000 by 2020 (Frost & Sullivan, 2014).

As car sharing's popularity rises, it is critical to better understand car club users with their varied lifestyles and mindsets. Therefore, this research focuses on obtaining an in-depth understanding of car club users and exploring more deeply the role of the car club from the users' perspective.

Three key questions were asked:

1. What are the users' perspectives towards existing car clubs?
2. What are their key suggestions as to how to improve the car club model?
3. What are the critical aspects of the proposed car club model, from the users' perspective?

The research adopts a multidisciplinary approach, with further contextual research and expert interviews with service designers in order to evaluate the role service design might play in enticing more people to consider the use of such mobility services in the future.

The ultimate aim of this research is to provide a set of mobility service guidelines designed to enhance the overall level of user experience for car clubs. Advancing the operating models of car clubs should help existing operators fulfil their role as a more adaptable and reliable alternative transport mode in urban areas.

The research outcome is expected to contribute to current car club operators' future plans and provide guidance for vehicle OEMs when developing their own mobility models in the future.

Contents

List of figures

Acknowledgements

I would like to express my gratitude to the many people who have made this research possible.

First, I would like to thank my principle supervisor, Professor Dale Harrow, for encouraging my research through sustained support. His guidance has been invaluable with insightful comments and help provided all the time of the research and writing of this thesis. Likewise, my second supervisor, Joseph Simpson, helped me significantly with his expertise on this research topic and valuable tutoring, providing a clear direction for my research.

I would also like to thank Dr. Andrew Nahum, who provided instructive tutorials and helped me to set a direction for my research. Senior tutor Matteo Conti has also provided great support with valuable comments and encouragement.
I also appreciate the contribution and support of several members of RCA staff, in particular, Wanda Polanski, former Vehicle Design administrator, Dr. Nick Leon and Inka Hella. I am also grateful for the work of Harriet Edwards in proofreading my thesis.

My colleagues, Friedemann Schaber, Andrew Parker, Dr. Lino Vital, Sheila Clark and Marco Zilvetti from Vehicle Design Research and Claudia Dutson, Austin Houldsworth, Dr. Yen-Ting Cho, Dr. Dave Pao, and Dr. Hideki Yoshimoto have further contributed greatly to my academic time and made this research journey fruitful with joyful discussion and friendship. I am also thankful for the great help and support of Eunhee Jo and Russell Mason.

Last but not the least, I would like to thank my family: My grandparents, Dr. Tae sun Roe and Nan suk Lee, my parents, Kyung jo Roe and Hyo jung Song, and to my brother, Jiseung Roe, for their love and unconditional support, always believing in me, which made it possible to complete my degree.

ABBREVIATIONS

B2C	Business-to-Consumer
CSO	Car sharing organisation
DVLA	Driver and Vehicle Licensing Agency
HVAC	Heating, Ventilating and Air conditioning
ICT	Information and Communication Technology
IP	Instrument Panel
IT	Information Technology
P2P	Peer-to-Peer
RFID	Radio Frequency Identification
SAT-NAV	Satellite Navigation
TfL	Transport for London

Author's declaration:

During the period of registered study in which this thesis was prepared the author has not been registered for any other academic award or qualification. The material included in this thesis has not been submitted wholly or in part for any academic award or qualification other than that for which it is now submitted.

Signature: 

Date: 16 January 2017

Thesis statement:

The ideal car club from a user's perspective is convenient, easy and simple to use and is supported by an advanced smartphone app because users require this level of customer experience in order to choose car clubs over private ownership of a car.

Chapter 1. Introduction

1.1 Introduction

This study 'Exploring an ideal car club design from a user's perspective' is research that investigates and analyses car club users through in-depth user interviews and participant observation along with expert interviews with the car club operators and service designers who had conducted car club design works. The diverse experiences, thoughts and opinions of current car club users have been analysed and have led to proposing a car club model. This model takes on board users' feedback in order to fulfil the role as an ideal alternative mode of transport in urban areas.

The Literature Review covers the sharing economy that has paved the way for the current rapid growth of the car sharing market, along with other forms of business, on the basis of collaborative consumption. In order to give a broad overview of the concept of car sharing, the following have been focused on: the emergence of the sharing economy; the shifting perception of ownership to sharing; the advent of the millennials who form the main user group of this sharing mobility scheme, and various aspects of three different car club types. All of these are discussed in the Literature Review.

Case studies present three different types of car clubs, namely the round-trip, the one-way and the free floating base. I investigate the process of using those mobility services and also discover several issues that could deter people from considering using car clubs. The role of service design in car clubs is also considered in order to understand how it plays a role in planning and providing a better shared mobility scheme to car club users. This is carried out through contextual reviews of several principles of service design such as co-production, a customer journey map and service design experts.

Through a comprehensive contextual review and case studies of existing car clubs, along with the contextual reviews of service design in car clubs, the

research objective has been clearly reshaped and has led to further investigation of car club user observation and analysis which has become the core research activity of this study.

The research outcomes from the case studies and user observation were analysed and collated into four key stages and a proposed car club model.

This study concludes with answers to the three research questions; it identifies the implications of this research and includes recommendations for future research.

1.2 Why was this research required?

The car club has been regarded as a solution or response to social and environmental issues created by privately owned cars. Car clubs can provide a partial answer to critical problems, such as insufficient parking spaces and carbon dioxide levels in the atmosphere. It is certain that car sharing has shown rapid growth. In terms of the forecast for growth of this mobility scheme, the total number of members is anticipated to increase from 2.3 million in 2013 to 12 million by 2020, almost 6 times as much growth in a seven year time frame (Navigant research, 2013).

In the context of London, there is an estimated increase in membership from 137,000 in 2013 to 640,000 by 2020 (Frost & Sullivan, 2014). With the existing round trip car clubs and recent participation of one-way car clubs - a model that is predicted to attract more car club members than round trip car clubs - this market is becoming more competitive than ever. This is despite its relatively late introduction to the mobility sector in comparison to other traditional relative sectors such as public transport.

Currently there are several car clubs being operated in London, namely, Zipcar, City Car Club and Hertz24/7 that are round-trip car clubs. In terms of one-way car club models in London, BMW's DriveNow began its service in December

2014 (Tovey, 2014) and Paris's Autolib has also introduced its car club, comprising 10 EVs in June 2015, and is expected to expand to up to 3,000 vehicles within five years (Prynn, 2015).

In this regard, it is evident that the car club market is growing rapidly and is predicted to continue its sharp rise because diverse mobility options, including the expansion of one-way services and the participation of other companies, will lead more and more people to join car clubs.

However, one of the crucial issues in such a rapidly growing business is that it is difficult to show distinguished aspects or differences because organisations are providing similar services and products to the same customer. Such an issue could affect not only a down turn of the profits of organisations but also affect existing customers' experiences, which might lead them to leave the service. As a result, companies have begun to be aware of the importance of customer experience and believe that customer experience will be the most significant aspect that could enhance competiveness in the market (Shaw, 2007).

At present, the existing car clubs have data on who their users are and when they use the cars but they have little in the way of qualitative evidence to understand what users really feel about the service; what they need and desire in the future, and how they could increase brand loyalty and profitability.

Thus, it is evident that in conducting an investigation to understand the core of this shared mobility scheme, the user, is the most imperative focus of this ever increasing car club and urban mobility sector. Nonetheless, there has been very little in-depth academic research of car clubs from the user's perspective in what is a relatively new field, and one which is evolving all the time.

There have been diverse researches about car clubs covering the following: the prospect of this shared mobility in the metropolis; the impact of car clubs; parking issues, and other topics related to car clubs and urban mobility issues,

but this research has not uncovered any other academic in-depth observational research and analysis of car club users in the field.

This omission validated the subject as a research topic. The original contribution of this research lies in its understanding of the car club user's perspective. This is achieved through a qualitative research methodology that has included a literature review, plus semi-structured one-to-one user interviews and participant observation, along with car club and service design expert interviews.

1.3 Objectives of the Research

The first objective of this research is to better understand the behavior and requirements of today's car club users. This is to ensure that the research – together with the context of case studies and expert interviews – leads to the proposal of an ideal future car club model for car club operators. To do this, I will explore how much is known about the users of car clubs in London. How do they use the car club and what are the key aspects of an ideal car club that could reflect car club users demands and suggestions? In order to achieve the above, I asked these three key research questions:

1. What are the users' perspectives towards existing car clubs?
2. What are their key suggestions as to how to improve the car club model?
3. What are the key aspects of the proposed car club model, from the users' perspective?

1.4 Definitions of the topic

1.4.1 Car club and research site

The car club (the term Car sharing is used interchangeably Levine et al., 2014) is a mobility service that provides access to shared cars to car club users. Car club users could use the shared cars for certain periods of time (typically less than a

car rental, which is measured in days). As a result, they could manage its rental period in more flexible terms, which could be for an hour or less. The users do not need to be concerned about fuel, insurance and maintenance of the car as these are included, which is one of distinctive advantages of using a car club. The car clubs have the following characteristics:

- The users should go through an application process in order to gain membership. This is achieved through the one-off verification of the applicant's driving licence record. There are one-off sign up fees, annual or monthly membership subscription fees.
- In terms of accessing the service, cars are conveniently located and distributed throughout the city on every other street in contrast to traditional rental car companies that tend to be based primarily at major hubs such as train stations and airports,
- The user is able to access the fleet of car club cars without repeating the paperwork of filling in the form or interacting with a member of staff.
- Most car club cars have keyless access systems, by which the user could unlock/lock the reserved car with a RFID cardkey or smartphone app. However, in the case of Peer-to-peer (p2p) car clubs, the users have to exchange the ignition key with car owners.
- Usage is charged in time increments of minutes or hours along with the distance travelled. In the case of car clubs in London, the congestion charge is also applied when the shared car enters a congestion charge zone.

The intention is that this system is attractive to customers who want to use vehicles for occasional purposes, as well as to those who would like the option of using different types of vehicle.

1.4.2 Research site of this study -London

For this research project, I have chosen London as a research site, which hosts the largest car club market in Europe for round-trip car clubs and is the second

largest worldwide. As mentioned above, it is estimated that the total number of car club memberships will increase dramatically along with the introduction of new one-way car clubs (DriveNow and Autolib) and expansion of EVs in existing car club fleet.

Currently, it is estimated that 50% of Londoners have access to a car club car within five-minutes walking distance from where they live. As more than one car club operator is now including one-way journeys as part of their car club across several boroughs in London, coverage and proximity to cars may be gradually increasing (Carplus, 2015).

In terms of case studies of car clubs operated in London, I have conducted two case studies of the round-trip clubs, the floating one-way car club in London and a station- based one-way car club in Paris respectively. The aim is to understand the different types of car club model and also try to define the usage of car clubs from the user's perspective. In case of the station based one-way car club (Autolib), I had to visit Paris to experience it because at time of study, this station-based one-way model was not available in London.

1.4.3 Service design in car club

Service design is the application of established design process and skills to the development of a service. It is a creative and practical way to improve existing services and innovate new ones. Service design projects improve factors such as ease of use, satisfaction, loyalty and efficiency right across areas such as the environment, communication and products, and not forgetting people who deliver the service (Livework, Engine Service design, 2010).

Within the scope of this project, I have covered several key aspects of service design such as the user-centred direction; the value of co-production with the users, and channel & touch points, along with the customer journey map that shows correlation between service, products and user experience.

These have been covered in order to understand how service design has been applied in terms of planning and delivering a better car club models for users.

In this research, I will not cover the theories of service design nor re-invent a service design model but look to understand the role of service design within the scope of designing car club models. I have also conducted expert interviews with those who have carried out service design projects for car clubs in London and Germany to know how service design is applied to those actual car club models and the experts' views on the role of service design in car clubs.

1.4.4 Car club user research

In order to collect rich and diverse experience, thoughts on using car clubs and suggestions for proposing an ideal car club from the user's perspective, I have conducted one-to-one in-depth interviews with eleven car club users through a semi-structured questionnaire, which was designed on the basis of research outcomes from case studies car clubs and customer journey mapping.

The majority of interviewees have had more than three years of using car clubs in London. In addition, the participant observation session was also conducted with one of the interviewees who had more than seven years of using car club for business.

Through in-depth car club user research and participant observation, I sought to observe and understand the various perspectives of car club users and this part of the research provided the primary insights for proposing an ideal car club design that reflects the user's perspective.

1.4.5 Experts in this field of research

In order to understand the experts' views in this field of research, I have conducted interviews with the following professionals in both the car club and service design field:

Car club fields:

- Alicia Agius, *Project Lead*, GoDrive Ford
- Lim-ban Kim, *Ambassador*, Autolib
- Lyndsey Donald, *Senior brand marketing manager*, Zipcar UK
- Vanessa Colombier, *Communication Manger*, Autolib
- Vicky Shipway*, Head of Marketing,* City Car Club

City Authority:

- Qasim Shafi, *Transport planner*, the London borough of Hackney

Service design fields:

- Ben Reason, *Director*, Livework
- Justin Kim, *Senior service designer*, Engine
- Lavrans Løvlie, *Founding partner*, Livework
- Robert Stulle, *Partner*, Edenspiekermann

1.5 Limitations of the study

It is evident that this research has explored the very specific topic of the car club and the user in order to understand this emerging mobility scheme and to propose an ideal car club design model from the user's perspective. Because of these parameters, there are several limitations to the research work.
First of all, the research site is limited to London.

As mentioned in chapter 1.4.2., London is the largest car club market for the round-trip car club in Europe and my base during this research was also in London. As a result, I have chosen London as a research site and carried out on-site case studies of car clubs that are operating in London along with the in-depth car club user interviews and observations.

However, since this research work has been conducted at a single research site, the research outcome is limited to a specific city – London - and cannot reflect other cities' transport circumstances, such as the density of the public transport network service, or the level of ICT along with the cooperation between car club operators and the city authority, with its local regulations about shared car mobility schemes. From this point of view, the proposed solution in this thesis may not be an applicable solution for other cities.

Secondly, the car club users' perspectives that form the core of this research work are all from Zipcar users. Zipcar is the largest car club operator in London with its round-trip model, the most common car club type in most cities. However, it must be emphasized that the car club user's perspective in this thesis is mostly limited to a specific car club model: the round-trip car club.

As a result, there is a limitation to understanding the user's perspective towards other emerging types of car clubs such as a free-floating one-way model and a station-based one-way model. This is because the process of using those types of one-way car club may reveal several distinct insights compared to the round-trip car club. In particular, the user does not need to return the car to the identical parking space.

Therefore, as more and more diverse car club models are expected to be introduced and expand their service in the metropoles, it will become necessary to collect diverse car club users' views on the existing round-trip, the one-way and other types of ride-sharing mobility schemes in future research.
Lastly, I started this research work in 2011 and have continued it until this point in time in 2016.

However, the car club is a market that is moving fast and changing rapidly along with the various related issues such as the introduction of a one-way model; diverse ride-sharing models as well as the anticipated introduction of autonomous vehicles to the car club market. Therefore, this research work does

not comprise a wider contextual picture, but rather represents a small snapshot of the car club market during my research period from 2011 to 2016.

1.6 Summary

Car clubs have created a new era of public transport in metropolitan cities. They are regarded as an effective way of alleviating the myriad health and social problems, such as air pollution and traffic congestion, that are aggravated by the volume of vehicles on the road (Braw, 2014, Ball et al., 2005).

The advent of this shared mobility scheme has brought an alternative perspective to vehicles, public transport and the future direction of the automotive industry. It is anticipated that various types of businesses, mainly from the major car manufacturers, will participate in the future car club market. This research will provide greater insight into the attitudes of those using car clubs in London today. It will culminate in an ideal car sharing club model proposal that draws on these users' perspectives.

Chapter 2 Literature review

2.1 Introduction

Since the introduction of the early stage of car sharing, operating the system with relatively low-technology and management systems back in the1940s, car sharing has shown a rapid growth over the decades and is anticipated to continue its sharp rise, playing a role as an alternative mode of transport that could mitigate chronic issues in urban areas.

The aim of this literature review is to explore a variety of relevant literature about car sharing and correlated issues, ranging from reviewing diverse views on the sharing economy to car clubs and the prospects of this sharing mobility.

In addition, this review of literature also covers the area of service design in the context of understanding its principles and its value when applied to developing an improved car sharing model. In particular, the service design thinking that puts users at the centre is crucial in designing an ideal car club from the users' perspective, making the mobility scheme a more convenient and efficient mobility service scheme through co-production with car club users.

It will further include a brief overview and analysis of the current tendencies of a major channel migration – diversified touch points and channels from the service design model thanks to the improvement of Information Communications Technology (ICT). The literature review will show that this has begun to simplify into a single channel via the Smartphone app.

2.2 History of the Car club

In 1948, some of the housing members in Zürich, Switzerland, founded an early type of car- sharing scheme, which was called the SEFAGE (Selbstfahrgemeinschaft) or 'self riding community'. The reason behind such an

early foundation of car sharing was mainly an economic one for people who needed access to a car but could not afford one (Harms, Truffer, 1998).

There were several mobility scheme attempts in the U.S and in Europe in the 1970s formed on the basis of the sharing mobility concept, such as Witkar, a self-drive hire city car sharing model in Amsterdam in 1973, and the dial-a-ride (DAR) initiative in Santa Clara county, California in North America in 1974. However, those models have failed (Shaheen et al., 1999). In terms of the failure of the DAR system, it was revealed that an inadequate customer communication system, and an immature operating system structure with insufficient numbers of vehicles were the main reasons that led to the demise of such a ride-sharing mobility system.

Most importantly, one of the main reasons was a system failure that did not result from the technological components but because of poor attempts to plan the system. For instance, advertisements [promotional literature?] did not convey information about how to use such a new mobility system and even the staff of DAR had almost no knowledge of this system, i.e. how the DAR worked, including the process of making a reservation. As a result, the customer had to spend an unusually long time to make a reservation and ended by giving up the experience of the new system. Such a negative impression of the service caused the loss of potential users while many others became permanently opposed to this mobility scheme.

Other issues, such as the failure to estimate sufficient numbers of required vehicles, led to unacceptably long waiting times and uncertainty about accessing the transport: this also made people think DAR was an unreliable service (Carlson, 1976). Since the Internet was not viable at the time of introducing the new system, providing sufficient information effectively to users would have been relatively complicated as every process, from understanding to finally booking the service, had to be managed by telephone. In the report of 'Anatomy of a system failure: dial-a-ride in Santa Clara county, California,' Carlson (1976) asserts that there were tremendous start-up difficulties of DAR as described

above, however the mobility scheme did have a significant initial cost advantage compared to other existing transport systems because the vehicle cost was relatively low while no fixed guideway construction cost was required, and therefore, the system could be withdrawn without a serious economic impact. Turning to the Witkar, this was an early model of a shared car mobility scheme, initiated in Amsterdam in the Netherlands in 1973 with a specifically designed car for shared purposes. In terms of the overall structure of this mobility system, there are lots of similarities with Paris's Autolib as this model adopted specially designed electric vehicles that could be hired from the stations and dropped to other stations: a station-based one-way model.

Figure 1: Witkar and Witkarstation in Netherlands

Users had to subscribe to the membership and received a magnetically encoded key for accessing the shared car that was a small 2-seater electric car capable of 30km/h. The entire system was controlled by a central control system, managing, releasing and returning the vehicles for use, with availability of parking space at the selected destination and also with available recording data of the usage of the vehicle.

However, there was insufficient support from the public sector at the early stage of this scheme: a factor that would have been particularly critical in developing the system and the vehicles, as well as constructing stations in the city. This brought into question the reliability of a specially designed car for shared purposes, and whether the car should be of a more rugged construction than private cars in order to serve diverse drivers. Further, solutions to prevent fraud,

the misuse of shared cars that could cause legal liability issues, were considered very difficult to tackle.

In the first phase, the scale of this system was relatively small and comprised 35 cars with 5 stations. There was a vision of expanding the service to 1000 cars with 100 stations throughout Amsterdam, but the project could only be viable with the concrete support from the public sector in order to allow for wider scale growth (Bendixson, Richards, 1976). However, this mobility scheme failed to go beyond the first phase due to a lack of support from the government (Starr, 2011).

In the late 1980s, there were approximately 200 CSO (car sharing organisations) in 450 cities in Europe including Switzerland, Germany and UK. The two oldest and largest CSOs are MobilityCarSharing Switzerland with 1200 cars as of mid 1999 and StadAuto Drive with 300 cars. It has been recognised that these two organisations were modern pioneers of car clubs, introducing the modern system of the car club control system we see today. Both organisations moved from a manual 'key box' operation system to smartcard technologies that enabled users to access the car via a smartcard and made it easy for operators to manage the large system.

However, such a transition requires a large investment that might put pressure on car sharing organisations to expand their service to generate revenue and pay off the investment. Although hundreds of car club organisations have been introduced, most of them have failed, facing difficulties in expanding the scale of the system from a neighbourhood base to a larger viable business venture scale. Financial difficulty, due for example to a miscalculation of the number of vehicles needed and expanding funds for marketing with little return, led to these organisations being merged or acquired by larger CSOs.

The Pay-As-You-Drive car club system was completed in order to explore this model as an alternative mode of transport in Ireland, Netherland and in the UK in the late 1990s. The City Car Club was recognised as one of the most advanced

car clubs in Europe as each shared car in the car fleet was equipped with on-board computers and GPS technologies for locating cars, authorising use, and vehicle security. This car club commenced its operation with an initial fleet of five cars in 1999 and had approximately 50 members as of 1999 (Shaheen et al., 1999).

According to the report, 'Car-sharing in London –Vision 2020' London has achieved a leadership position in the car club market over the last decade as this market is the largest European market and second largest worldwide with approximately 140,000 round-trip car club members as of 2014 (Frost & Sullivan, 2014).

Although the car club has been introduced relatively late to the UK in comparison to other countries such as Switzerland and Germany (Skinner et al., 2004), it has shown rapid growth with several attributable factors: the ambition of operators, public sector support and other external factors such as the rising cost of car ownership, insufficient parking spaces and the shifting perception of users towards the car.

Along with the concerns of environmental issues in London, where there is some of the worst air quality in western Europe (Vidal, 2011) that urges people to drive private cars less, there is a highly effective public transport system. It is one of the vital infrastructures that offers a propitious circumstance for operating car clubs in this city: users can find diverse transport options from tube and bus to cycling and car clubs (Fergusson, 2014).

However, outside the capital, it is relatively more complicated for car club companies to operate the system due to logistics and economic issues (Sharman, 2015), for instance, a lower public transport network density leads people to be more car-dependent.
Correspondingly, in the paper 'A short history of carsharing in the 90's', the authors insist that a dense public transport network and a variety of vehicles in the shared car fleet are the significant factors that would make CSO a more

economically successful model. Those factors would enable CSO not only to serve the diverse demands of users but could also create joint-marketing partnerships with car manufacturers and city authorities. Further, the demand for car clubs could increase when the disincentive circumstances of driving a private car - parking issues, maintenance costs, and environmental consciousness - are high (Shaheen et al., 1999).

The current system of car sharing involves members reserving a car on-line and accessing it by swiping their membership card or using their smartphone app. In contrast, the early stage of car sharing involved using key boxes and reservations by telephone with a pencil and paper system. This led to the failure of the expansion of this mobility scheme and its lack of commercial success.

However, the rapid improvement of information technology (IT) systems by the late 1990s has enabled car club operators to manage access and payment systems through a fully automated process and has offered an improved customer experience as a consequence (Le Vine, 2012).

Figure 2: A car club car in parking bay and access by membership card

2.3 The sharing Economy, Ownership and Generation Y

Sharing, also referred to as 'collaborative consumption,' is not a brand new concept to the consumers, however: they have used the benefits of sharing for a long time. There is a long tradition of sharing products and services such as transport, food and venues such as hotel or library (Gansky, 2011).

Collaborative consumption enables customers to enjoy the advantages of ownership while reducing the personal burden of maintenance, financial worries and also minimizing the environmental impact. Sharing can be regarded as an alternative form of consumption to traditional buying and ownership (Botsman, Rogers, 2010).

It is that car sharing is part of the wider sharing economy market. The concept of 'sharing' – of not needing to own stuff – which can be seen in other areas of the economy, has made consumers more comfortable about the idea of 'sharing' a car.

Currently, perhaps the two most apparent examples that represent the sharp increase of the sharing economy are Airbnb and Uber, whereby the people share the assets (space and mobility) within the registered and managed community. Regarding the growth of this unconventional accommodation sharing business, it is estimated that customers rented 12 million to 15 million rooms in 2012 and this is expected to generate $1 billion a year in revenues (Pachter, 2013). The growth of car sharing is also evident as it is expected to show 92% growth in terms of the total number of car club members in London solely by year 2020 (Frost & Sullivan, 2014).

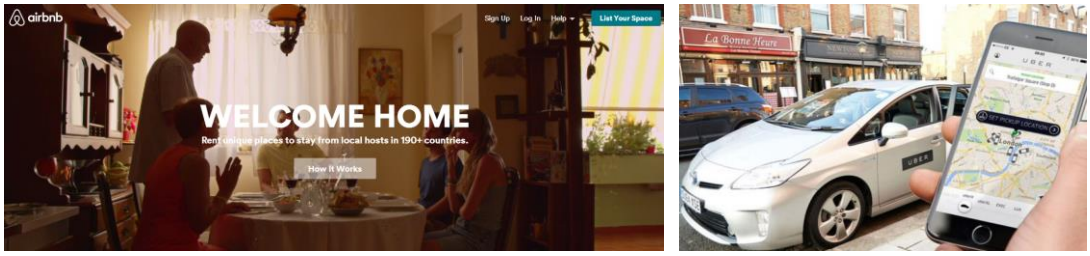


Figure 3: Airbnb and Uber

The public attention to, and growth of, the sharing economy, in particular the case of the AirBnB, is correlated with the financial collapse of 2008. At the share conference *'Share'* in San Francisco 2014, the venture capitalist Ron Conway asserted that the financial recession in 2008 instigated the phenomenon whereby house owners who had strived to maintain payments on their mortgage had started using their product by renting their room to others.

This new concept of a sharing service was spread rapidly by word of mouth because of its relatively affordable price and convenience (Jones, 2014).
At this conference, Jessica Scorpio, the founder of peer-to-peer car sharing company Getaround, claims that car sharing plays a prominent role in boosting the sharing economy as the customers who have had experience and become familiar with one sharing economy would not hesitate to use other kinds of sharing economy such as tool hire or accommodation (Jones, 2014).

In this regard, the UK government's recent review of the sharing economy and declaration of a major new initiative to create a global centre for this economy shows the potential of this sector. In a review, Matthew Hancock, Business and Enterprise Minister, points out that the positive aspects of the sharing economy are driving down costs and pushing the frontiers of innovation. Hence, supporting the sharing economy means the government is supporting the people in this sector and as a consequence, the plan has become part of the UK's long-term economic plan (UK GOV press release, *Move to make UK global centre for sharing economy*, 2014).

It is interesting to note the correlation between Airbnb and the financial crisis in 2008, the unprecedented financial circumstance that made tens of thousands of people rent out their house to save their property: a phenomenon that catalysed a dramatic growth of this house sharing economy. However, from the perspective of understanding such a sharp increase of Airbnb, it should also be acknowledged that Airbnb has created and provided a smart platform that has enabled house owners who have an extra room or house to rent to present their property to millions of users world wide in a more swift and convenient way than advertising through property agents or a local brochure.

Thanks to the on-line based platform, Airbnb's system also provides a rating of both the host and the renter. This means they can get to understand each other, and can check for good reviews, finding out whether the property is clean for instance, and whether those who want to rent are trustworthy and not going to trash the house.

To a larger and lesser extent, the financial burden of owning a car could be one of the reasons that deters people from buying and leads instead to them joining the kind of mobility sharing scheme focused on here. Indeed, 80% of the respondents to Carplus' car club annual survey do not have a car (Carplus, 2014). However, the most intrinsic reason behind its growth is that car sharing can mitigate chronic transport issues - traffic congestion, insufficient parking spaces and emissions - in the metropolis. Nonetheless, it is worth noting that the growth of a sharing economy in many sectors, including car sharing, is praised as a gateway for boosting the sharing economy outlined above.

2.3.1 Access versus Ownership

The fundamental notion of sharing in the context of goods is based on accessing property (items) without having the burden of purchasing them outright or maintaining that item. Such a notion was first documented by Jeremy Rifkin (2000), who defined the age by saying that we are living in an age of access, which people are able to access limited assets within a relatively short-term period under the circumstances that are controlled by the supplier's network system (Rifkin, 2000). The access has existed in the consumer market for a long time without the involvement of generating profits but in the form of allowing people to access public assets such as books or toys in the public library or appreciating art by visiting the national museum (Chen, 2009; Ozanne and Ballantine, 2010).

Marketing experts Bardhi and Eckhardt (2012) argue that traditional rental forms, for instance, car or apartment rentals, also derived through this accessing of property among people. However, the perception towards ownership has been seen as a normative consumption mode and provides a sense of personal independence through the security of the owned item (Bardhi and Eckhardt, 2012, Snare 1972). Home ownership is a good example of how people perceive ownership of a property: it bestows ontological security and is even regarded as a rite to adulthood. Thus, such a mode of consumption is a privilege that has ascendancy over public access or rentals (Roland, 2008).

However, there is a certain stigma attached to renting (or sharing) rather than ownership. In other words, access is seen as an inferior consumption mode to ownership (Roland, 2008). House ownership again can be an analogy to explain this mode of consumption, as the renter of the house cannot consider any investment in this property, which may lead to the attitude of non-pride from lack of ownership and lack of a sense of security (Bardhi and Eckhardt, 2012).

In the journal of '*The politics of housing consumption*', the researchers found that those who rent a house are viewed as flawed consumers, failing in three domains of social life: aesthetics, ethics and community, as the renters undermine the aesthetic value and fail to demonstrate ethical aspect of caring for their 'rented' property and for others in a neighbourly sense. The renters fail to meet the prevailing standard of home design and, as a consequence, appropriate maintenance does not take place. Similarly, the deficiency of an aesthetic can be linked to the lack of care for the self and home. As a result, all those behaviours could be seen as a lack of moral compunction towards their rented property, which might have a negative impact upon the value of other people's property in the community (Cheshire et al., 2010).

Under the circumstance of dominance of ownership over the market in the community, it would have seemed quite natural for George W. Bush to proclaim that America was an 'ownership society' after winning the re-election as President in 2004. He stated, "The more ownership there is in America, the more vitality there is in America" (Bush, 2004).

However, Walsh (2011) argues that the ownership consumption mode is questionable from the point of view of some even while they own so much stuff themselves, and have praised the virtue of this ownership mode. Such self-questioning about ownership was not caused by the flaw of the products that we have purchased but the transiting perception of the consumers due to the emergence and rapid development of IT: the era of the Internet, which partly brought the demise of the ownership society (Walsh, 2011).

The advent of the Internet has certainly influenced our perspective towards ownership. For instance, in the music industry, the introduction of the on-line music streaming service by Napster made the purchasing and owning of CDs superfluous.
This new way of consumption spread widely to other media. Moreover, as mentioned above, the financial crisis in 2008 struck at the very foundation of the ownership society, which had been built by the support of financial benefits and convenience such as sub-prime mortgage and credit cards that induced people to own rather than share. In his Time magazine article, Walsh insisted that ownership had not given the U.S. more vitality but rather, it had just about ruined the country (Walsh, 2011).

Although the American consumer society was proclaimed an ownership society in 2004, the following changes in the society, including the financial crisis and fast improvements of IT, have changed the current economic environment and led people to consider the concept of sharing (The Economist, 2013).
In the book, '*The Mesh, why the future business is sharing,*' the author Lisa Gansky (2010) asserts that 80% of Americans are inclined to buy less stuff. Such a transition of consumption has shifted from a 'just buying it' attitude to opting for a simpler life by reconsidering the value of owning, post-recession. Lisa Gansky describes the aftermath of the recession as a trauma that even forced many people to focus on the intrinsic values of their life, questioning whether ownership can really bring and bestow value on our lives.

Interestingly, home ownership, which has been reviewed as a representative example of how ownership has played a significant role in our society, has been criticized. Is pursuing ownership of a house really worth the investment of people's money, bearing in mind the financial burden and anxiety towards property. Lisa Gansky states that the feelings of security and happiness, which people used to experience by owning individual properties, are being uncoupled as the perception of consumption is shifting. The culture and psychology of ownership are in transition (Gansky, 2010).

It might be difficult to assert whether there is any one single factor that has enticed us or even forced us to consider the new mode of consumption. However, the diverse factors, including the wide spread of the internet and, as many researchers and experts have argued above, the financial crisis in 2008 together formed the decisive element that instigated the trend of access-based consumption among people.

In addition to those two aspects, Bardhi and Eckhardt (2012) point out that ownership and attachment to things could be a problematic in the current society, one which is changing into a form of liquid society, referring to the sociologist Zygmunt Bauman's 'liquid modernity' theory. The components in the society that have been regarded as solid during the last decades –people, objects, information, and places – have tended to dematerialise and liquidise (Ritzer 2010). Thus, the current society with its circumstance socially shaped by 'liquid modernity', comprises social structures and institutions that are increasingly unstable (Bauman, 2007). As a result, the characteristics of access-based consumption, which enables customers to use the assets with a degree of flexibility and adaptability in the platform of a relatively transient mode of consumption, have been considered a more suitable way to "manage the challenges of a liquid society" (Bardhi and Eckhardt, 2012).

Airbnb, which was mentioned as one of the rising business models based on collaborative consumption, is an interesting case in the context of 'liquid' society and shows the social characteristics possessed by this unique mode of consumption. From the perspective of liquid society, the boundaries between companies collapse and become unstable, hence engendering more competition with others who are even in different sectors. The sharp growth of Airbnb, sharing a privately owned house with others, has attracted the attention of the traditional hotel business market, which seeks to file a class action lawsuit against Airbnb (Samtani, 2013). Perhaps those in the hotel market could never have imagined that they would compete with private house owners.

Before the introduction of AirBnB, sharing one's house with others who were not members of the family or relatives could not be conceived. Although the sharing of houses was open to guests without any problem even in sixteenth-century France, it was restricted to friends, neighbours and kin (Davis, 2000), and strangers were less welcome. However, regarding the consumers of the current access-based market, the trust within the immediate family is now being extended to people we have never known, extended even to strangers.

But although the notion of sharing has existed for a long time, family radio, television and car at one point, are now shared less within the family, as such items are privatized. Therefore, the activity of sharing tangible assets could be an incentive when people extend their sense of self to embrace others outside of their immediate family (Belk, 1988).

In the journal of 'Why not share rather than own?' Belk (2007) asserts that the decline in sharing within the family made people seek others online and, "ironically, we are becoming to share our deepest secrets, information and loyalties with someone whom we only know by an online pseudonym than we are with our partners or with other members of our families" (Belk, 2007, 136). Walsh (2011) also points out that being social is one of the real benefits of collaborative consumption: sharing things with the stranger whom they have met online and establishing meaningful connections.

Even in peer-to-peer sharing, the trust issue is, of course, the most important element that enables consumers to keep having this consumption attitude. For example, in eBay or AirBnB, a peer-policed system is activated among the users as a form of protection. With the absence of 'command and control' of the market with layers of permission, decision making and middleman, who are sales assistants or shop managers, the peer-to-peer platform can be decentralized, and form transparent communities that enable the building of 'trust' between strangers (Botsman, Rogers, 2011).

Rachel Botsman, the co-author of What's Mine Is Yours: The Rise of Collaborative Consumption, says the re-emergence of community can be found from the peer-to-peer sharing platform, which necessitates a social aspect as Walsh (2011) and Belk (2007) both claimed.

It is worth noting that the sharing could be social, establishing the re-emergence of a community by bestowing the value of pro-social and altruism as there are positive elements that concern the environment by producing and wasting less stuff and those who participate in this mode of consumption believe that sharing is even good for one's image (Walsh, 2011; Botsman, 2011; Belk, 2007; Bardhi and Eckhardt, 2012).

2.3.2 The young motorist

Car ownership in the UK has risen rapidly since 1950 (Department for Transport, 2013). The traditional pattern of car ownership was normally one car per one household and there was an increasing sharing within the family. Although households today own more than one car, one main driver, the head of the family, drove these vehicles. However, with a sharp growth of economy and the increasing participation of women in various professions, it has become common to see households with two or more cars (Fergusson, 2014). Environmental expert Fergusson argues that the car has become one of the consumer durables of the 20th century and as a consequence, the usage of the car has reached a peak and now seems to be falling.

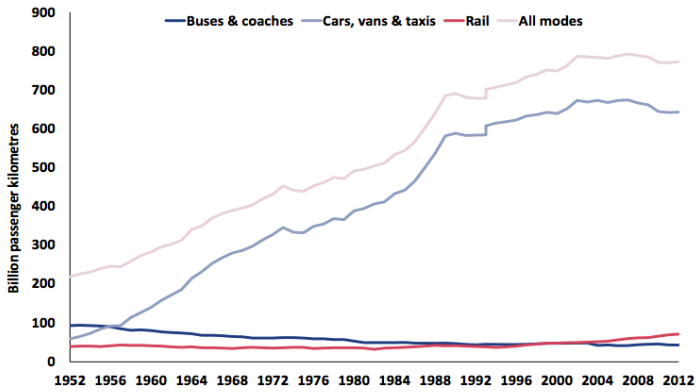


Figure 4: Passenger transport in the UK 2013 (Department for Transport, 2013)

David Metz states that the term 'Peak Car' is the idea that reflects the perspective that car use has already reached its peak level in developed economies. He argues that the recent trends, for instance, falling car ownership in the UK (Rayner, 2011) form the apparent evidence that supports this assertion. In short, the steady growth of car ownership and use we saw over the past century now shows the descendant trend in large and growing cities (Metz, 2014).

In the paper of 'Car lite London,' Fergusson (2014) asserts that the decline of car ownership had already begun before the financial recession, as part of a social trend of the younger generation. In particular, young men who reside in the cities have been changed by various social circumstances such as the improvement and expansion of public transport and the increased cost burden that puts them off buying a car. He points out four possible further causes that have affected the long-held car ownership:

- The phenomenon of the 'digital native' who is more likely to value his or her smartphone or tablet computer more than a car
- The increasing availability and ease of use of public transport
- The increase in the cost of car ownership and the hassle factor (parking, maintenance).
- The potential changes in travel patterns caused by changing behaviour, such as increased reliance on digital media.

Figure 5: The young people, digital media, public transport and car

Gansky (2010) also points to the shifting social trends that can be found among young people, who are opting for a more sustainable, flexible lifestyle. In terms of their mode of transport, they are not bound by conventional ways of moving around, but are adopting an active and flexible attitude to using various options, ranging from public transport, bike sharing and car sharing to ride sharing, in a shift parallel to choosing sustainable living, which has also emerged as a trend.

It is worth noting that in the US, a country known for its love of cars, there has been a decrease of car driving among the young people who place a strong value on connectivity with others and on real-time data via technology over car ownership (Dutzik, Inglis, Baxansdall, 2014).

Adolescent psychologist Michael Bradley states that the millennial generation, the so-called Gen Y places more value on having freedom and autonomy. Hence, they show the tendency of "not being as enslaved to material goals that they perceived their parents being caught up in" (Jayson, 2009).

Interestingly, as Fergusson stated above, these four distinctive characteristics show the changed attitudes of young motorists to how they place their value on mobility. In contrast to their parents' generation, who put the priority on having cars and a house, this young generation pursues flexibility of accessing mobility, as they are not restricted by private cars, but are able to choose diverse modes of transport thanks to the improvement of public transport and IT which enables them to find the fastest routes or, of course, access the car club car via the smartphone app very easily. Therefore, the author claims that those trends among young people will place car clubs at the centre of their mobility options, a shift that will be helpful in reducing the total number of cars in the mega city.

According to a survey conducted by Zipcar and KRC research, 16 percent of young people who are aged between 18 to 34 years old stated that they drive less because they are concerned about environmental issues. This is a percentage that is more than double that of the older generation aged 55 years or older, at approximately 7 percent (Zipcar, KRC research, 2010).

Although the survey was a part of research that discusses the recent trend of young people driving less, this could be understood as those young people, who form the larger proportion of car sharing, showing a social consciousness and environmental awareness by using shared mobility, whose benefits were mentioned above.

The growth of the sharing economy, which has shown a sharp increase in the aftermath of the global financial crisis and the improvement of IT (Cohen, Kietzmann, 2014) has also affected young people's attitude towards mobility, who are now driving less and seeking various kinds of transport access such as public transport or car sharing, rather than owning a vehicle (Davis, Dutzik, Baxandall, 2012).

The socio-economic trends that were attributed to the financial crisis, which showed an increased enrolment in higher education, sharing a house with others and increased residents in metropolitan areas have deterred people from buying cars. In fact, car ownership has reduced by two-thirds in Germany and by one-third among young people in the UK (Levine, Polak, Kuhnimhoff, 2013).

In the report, *'Transportation and the new generation: Why young people are driving less and what it means for transportation policy*,' the authors assert that such a changed attitude of young people will persist, regardless of economic recovery or not, as the improvements to and expanded accessibility of communication technology will continue to reduce car driving. The study found that young people, who value constant interconnectivity with their peers through websites and mobile phone applications, embrace with enthusiasm technological benefits such as real time transit data and various transport options such as car sharing, that did not exist 20 years ago (Davis, Dutzik, Baxandall, 2012).

It is worth noting that the changed attitude of young people towards cars along with the financial crisis and rapid improvement of ICT has led to the tendency discussed above. However, it is also interesting to note that such a changed

attitude among young people cannot simply be understood by circumstances such as the cost of driving, good public transport in the metropolis, and a digitally driven society, but by the fact of how difficult it is to drive a car (Westcott, 2016).

The actual cost of learning and getting a driving licence means the proportion of men holding a full car driving licence has been flat since the mid-1990s at 80 percent, while 43 percent of 17-20 year olds state that the cost of learning to drive and insurance are the main reasons that put them off learning how to drive a car (Department for Transport, *National Travel survey England 2014,* 2015).

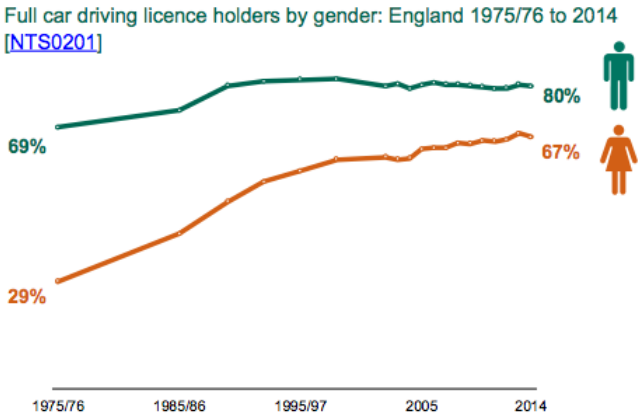


Figure 6: Full car driving licence holders by gender: England 1975/76 to 2014 (Department for Transport, 2015)

From a certain point of view, such a tendency for young people to drive less seems to be a critical problem to car club operators. Therefore, they need to consider this issue seriously: how could car clubs retain this mobility service under such a circumstance of some young people choosing not to drive?

2.3.3 The Downside of the sharing economy

Concerns over the recent growth of the sharing economy have emerged along with the changed behaviour of young people toward driving a car, as this new economic practice challenges regulations that address questions of insurance and legal liability, which might endanger the public health and safety of customers (Ranchordas 2015).

Among the various types of new business models that are based on the sharing economy, it is apparent that accommodation and car-based services are the most prominent markets in this sector. In terms of Airbnb, although this peer-to-peer accommodation rental business has reached more than 15 million stays since its service in 2008 (Trend, 2015), the concerns about safety and liability issues have also soared, including the news that reveals renters locked up by the host or trashed homes by renters of Airbnb (Lieber, Nerman, 2015).

In contrast to traditional accommodation such as bnb (bed and breakfast) or hotel stays, when the guest can make a reservation and check in if the rooms are available, most Airbnb hosts do not confirm the reservation immediately as they need to decide whether to proceed with the request based on the renter's rating, review or feedback from a previous record (Economist, Airbnb article 166, 2014). Therefore, in some cases, applicants may experience a sudden cancellation of their reservation, and may have to stay in a house or room that does not comply with standard safety rules or a common standard of hygiene, which would rarely happen in a hotel (Newcombe, 2014).

At the beginning of this sharing service, Airbnb staff visit each house, taking pictures and meeting the host to put them on their website. However, as the scale of this business has expanded enormously, it has become far from feasible to carry out such door-to-door visits, but lead both host and renter to become highly dependent on the peer-review system (Ranchordas, 2015).
In this regard, rating and review are the crucial characteristics of such a service, by which those with plenty of reviews will be highly regarded while others who have none or fewer reviews might be seen as less attractive. As a result, most 'first-time' listers tend to set the price at a more affordable level than others. However, once they receive a positive review, this uncertainty gives way to trust, and renters can duly raise the price even by tenfold (Economist, 2013).

It is certain that such feedback and a rating system is not new for a sharing service as this system has been widely used not only in the on-line markets such as eBay and Amazon but also in other sectors, for instance, holiday planning or

the restaurant field. This system has been recognised as a genuine recommendation tool by users. People now would not buy or sell products or services without referring to the peer review.

In a sharing service circumstance, the peer-review plays a crucial role in the absence of the command and control of the market middle man, the sales manager. In a sense, it might seem fair that people with many positive reviews receive a better service than those who are with low-rated or even with negative reviews. On the other hand, there is a view that such a system that relies so heavily on the rating and reviewing policy could cause a discrimination issue. There is in fact ample scholarly evidence that engenders critical opinion towards Airbnb's policy of posing a clear photo of the renter when that picture shows visual data of their gender and race (Woolley, 2015).

Several researchers have found that the gender, job status and ethnic group could affect obtaining rental accommodation in the housing market including rental properties advertised via on-line (Hanson, Hawley, 2011; Anderson, Jakobsson and Kotsadam, 2012; Wells 2013). Along with the research that found a difference between the on-line selling price by the advertisement photos, there is evidence that white sellers gain more advantages when selling items than black counterparts in the on-line market environment. So for instance, a used-ipod held on a white seller's hand sold for 11% higher than the same model held by a black seller's (Doleac, Stein, 2013). The economist, Frances Woolley, expresses concern that the unique characteristics of the sharing economy, in particular of peer-to-peer services which put power into the hands of the people, could also produce a downside to this new emerging market (Woolley, 2015).

Uber is another representative example of the sharing economy, with its soaring growth of 26 per cent of private hire vehicles, and an 850 per cent increase in users' signing up the Uber's smartphone app over the past two years, since its launch in London in 2012 (Davidson, 2015). However, like the Airbnb cases above, several concerns and questions have been raised about this peer-to-peer transport service.

One of the critical issues of Uber is the liability issue when incidents between driver and rider or road accident occur with this sharing practice. The question of whether Uber drivers are employees or independent contractors has been an important issue amid several assaults that raise the concern and dispute about whether using Uber could be reliable enough to protect its customers (Ranchordas, 2015).

In Oklahoma city, in a lawsuit where an Uber passenger was attacked by the driver during an altercation, the U.S. District court judge dismissed the whole of the rider's claim against Uber, ruling that the driver was not an employee but an independent contractor. As a result then, Uber was not liable: a verdict that supports Uber's claim that those drivers are contractors (Bailey, 2014).

However, in 2015, the California labor commission declared that drivers of this ride-sharing company are employees, not contractors. While Uber appealed against this ruling, the California labor commission said that the involvement of Uber in every aspect of this mobility service operation negated the company's longstanding claim that Uber drivers are contractors (Johnston, 2015). With regard to such a ruling by the commission, people who supported the ride sharing service argued that such a decision would have a negative impact on the sharing economy that had grown with those individual contractors. Berin Szoka, president of TechFreedom, argues that the independent contractor business model helped the growth of the sharing economy. However, the commission's ruling could lead to the scaling back of the service provision and might even lead to increased prices, which could limit the option and benefits of customers that were provided through the growth of the sharing economy (Boehm, 2015).

The fact that Uber is claiming that the drivers are contractors not employees might allow companies to be less liable in conducting their business than their employees. It might also mean avoiding extra financial expense that a company should provide, such as social security, worker's compensation and unemployment insurance (Huet, 2014; Johnston, 2015).

However, such a classification of Uber's driver as contractors are criticised as a misclassification, taking the view that Uber and Lyft's control of the drivers' behaviours exists to such a degree that they are employees, the fact of which could create a risk to this ride-sharing mobility market (Huet, 2014; Goldman, 2014).

Along with the liability issues of Uber drivers, which have raised the concern of the regulation and employment law, this company's business model has also been criticized, which could directly impact on safety. In particular, Uber's 20% fee that is taken from every fare makes drivers struggle to cover expenses and maintenance, such as petrol, insurance and a private hire licence. Under such a high fee structure, it might put Uber drivers in a complicated situation, for instance, when they needed to replace a new tyre or brake pad for their car, would they do the right thing? There is no rule or regulation that checks the vehicle's safety (Faiers, 2015).
Moreover, the recent surcharge of Uber's fare by tripling fares during the London's tube strike has also been criticised as a rip-off, though Uber is claiming that such a dynamic pricing model is effective at putting many people off the service hence suppressing demand, while people who really need a ride and are willing to pay more, could still have access (Spence, 2015; Betram, 2015).

At the beginning of the sharing economy when this kind of business was not profit-oriented, but focused on sharing goods or skills among neighbours or charity, regulation was not necessary. However, the motive of current fast rising sharing models, such as Airbnb and Uber, are opposite to the spirit of giving (Orsi, 2012).

In this regard, the most intrinsic issues around those rapid growth sharing economies are to do with regulation, which these new business models are challenging on a daily basis. In addition, another complicated barrier to regulators is to control the tension between encouraging people to conceive of an innovative business model while also needing to protect customers from problems such as fraud and liability (Cohen, Zehngebot, 2014). Professor

Ranchordas at Tilburg law school points out that implementing regulations within the sharing economy is complex: it is debated whether the new innovative practices can fit within the existing rules which have been applied to other equivalent areas or whether provide benefit by applying less demanding regulation in order to support those new kinds of businesses. However, this hesitation has left the users in a legal grey area with some uncertainty and a lack of transparency about the sharing economy (Ranchordas, 2015).

The sharp rise of the sharing economy in various sectors has been welcomed with some praise that people can access the service in a relatively cheaper and more convenient way than existing business models. However, economist Dean Barker claims that the downside of the sharing economy has received less attention than it should, despite the emerging issues of liability and safety problems that could endanger the customers and consequently cause a risk to the market. Both ensuring the new regulatory structures that could allow for real innovative business model and reviewing the existing regulations are urgently needed in order to create a field where those sharing platform-based services are still able to provide real value to customer and to economy (Baker, 2014).

2.4 The growth of car clubs, types of car club and prospects for the future

The sharp growth of the car sharing market could be understood within the social and economic trend of 'collaborative consumption,' which brought about the shifting perception of car ownership. In contrast to traditional car ownership, through which customers purchase tangible property but which entails the extra cost of maintenance, car sharing customers purchase access to a mobility service without the burden of caring for assets. The latter is undertaken by the service operators, although the car club users have to forego prompt access to the car as the shared car is heavily affected by availability: when and where a car can be accessed.

In general, the scale of car sharing has shown rapid growth over a decade. In terms of the total number of car sharing members, approximately 350,000

members in 2006 has increased to a conspicuous figure of an estimated 1.8 million members in six years, with schemes operating in 27 countries (Zeng, 2013).

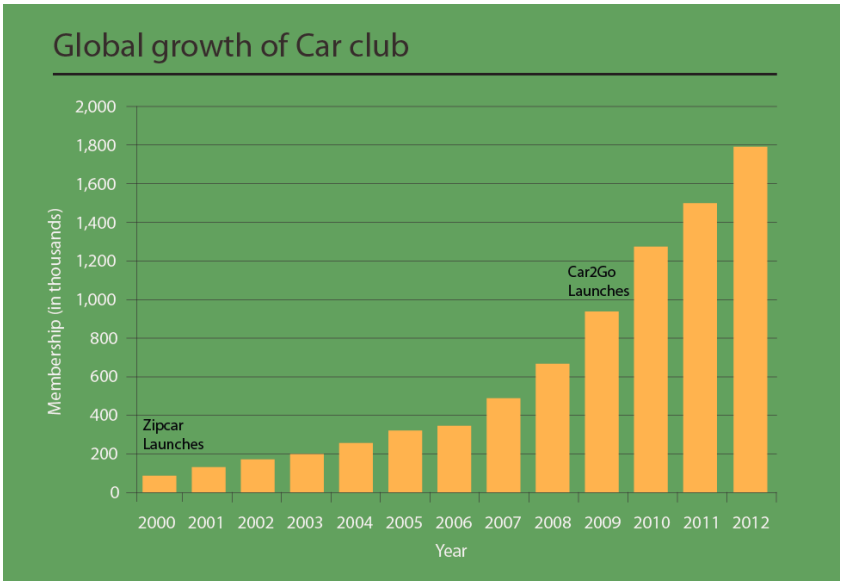


Figure 7: Global growth of car club from 2000-2012, (Shaheen, Cohen, 2009,2012)

The case of car sharing growth in the US showed a noticeable growth since early 2008, when the rise was propelled by the increase in fuel prices, and it continued after the recession with a surge of 30% in the total number of Zipcar memberships. According to the Bloomberg Business week report, the increase of Zipcar in the US brought attention to the market when the fuel price was relatively high in early 2008, however, after the decline of fuel prices, the number of Zipcar memberships still showed growth as well as other competitive car sharing brands in the states (Aston, 2009).

In the case of car sharing in the UK, despite the fact that Edinburgh was the place where the first formal car club commenced in 1999, London is the currently the biggest market in the country with over 85% of car club subscribers (Cairns, 2011; Carplus, 2011).

It seems that the growth of car clubs, in particular in London, is evident as the total number of round trip car club members, which was 137,000 in 2013, will increase to nearly double reaching approximately 264,000 in 2020. Moreover,

the anticipation of the total growth of car clubs in London, which includes one-way car clubs that will be introduced in London from 2015, shows a soaring number. In 2020, the total number of car club members will be around 640,000 though the forecast growth trajectories vary from between, 640,000 in pessimistic scenarios and 956,000 in optimistic scenarios (Frost & Sullivan, 2014).

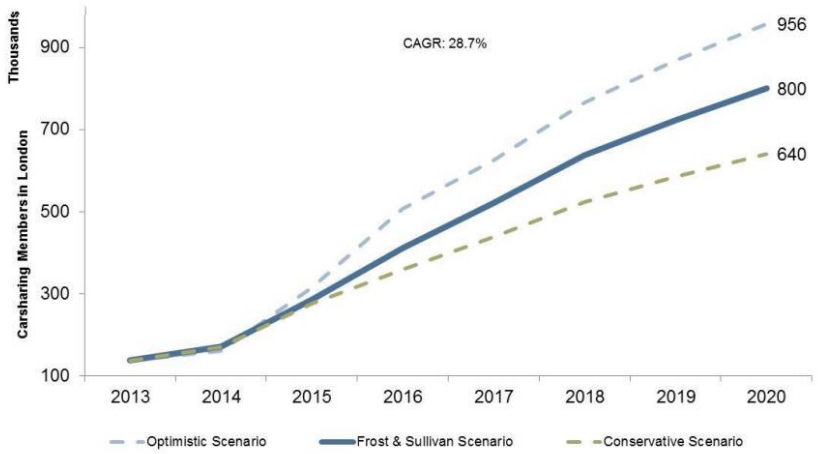


Figure 8: Car club membership in London 2013-2020 projection scenarios (Frost & Sullivan, 2014)

It is evident that the new business models based on the shared platform that emerged and gained popularity in the aftermath of global recession in 2008 (Economist, 2013) along with the improvement of IT have also enabled car club corporates to reach the current size of the car sharing market we see today. And the market still sees a huge potential to grow in the near future. In particular, it is clearly apparent that the attitudes of young people, who are placing more weight on freedom and a flexible life, have also aided this growth in sharing mobility schemes.

In addition, a reversal of urban sprawl is happening in many large cites in developed countries. Residents, including young people, who had resided outside urban areas while comminuting in private cars, are now coming back to inner cities (Newman, Kenworthy, 2011). These increased populations in urban areas aggravate congestion and make it difficult to secure parking spaces, which again favours the expansion of car sharing and other alternative transport options.

According to the report paper 'Car-sharing in London – vision 2020,' there were 2.66 million cars in London in 2011, while the total number of full driving license holders in the city is 4.98 million, which formed 61% of the total population in 2013. This reports sees London as an 'addressable' market of car sharing as the total number of full driving license holders is almost double the number of cars (Frost &Sullivan, 2014). This reports forecasts that owning a private car will be more difficult and complicated due to several barriers such as increasing expense of maintaining a car and circumstances such as insufficient parking space and chronic traffic congestion that deter people from buying a car. Instead, choosing a car sharing will become a positive alternative for when they really need private mobility.

2.5 Downside of car clubs -mainly issues of one-way and peer-2-peer (p2p) model

It is apparent that car sharing has been regarded as a positive mobility scheme that could mitigate the chronic issues of urban area, such as traffic congestion, insufficient parking space and air pollution along with the financial burden for people to buy and maintain cars. In particular, the one-way trip car club is anticipated to attract more customers and exceed the number of round-trip car club members by 2020, despite its relatively late introduction in London (Frost & Sullivan, 2014). In addition, peer-to-peer model car clubs are regarded as ones that could help to increase the awareness of such a mobility sharing scheme and access in lower-density areas where owning a car is essential due to insufficient networks of public transport (Buczynski, 2011).

Nonetheless, it is also important to take a serious attitude towards car sharing schemes and whether they could actually bring a positive aspect to metropolises while there are divergent claims of car club operators. On the one hand, there are benefits of operating such sharing mobility schemes such as taking cars off the roads and lowering the emission by car sharing companies (Jones, 2014), while on the other hand, there are barriers and issues that have led to the closure of

the car club models in London, such as Car2go's one-way trip and Whipcar's p2p model.

2.5.1 One-way model

According to the report 'Car-sharing in London – vision 2020,' the one-way car club could attract over 351,000 members in London by 2020 under the assumed circumstances of the parking agreement and related policies being in place to enable the operation of such one-way car club systems in London.
Despite the fact that the first one-way car club that was introduced by Daimler's car2go has failed to operate their mobility scheme and withdrew its service in London in spring 2014, two new one-way car clubs, Drive now by BMW and Paris's Autolib, look to play a significant role, bringing with them a dramatic increase of the total number of car club users in London.

Figure 9: Car club membership in London 2013-2020 projection (Frost & Sullivan, 2014)

However, as mentioned above, the main reason of the withdrawal of Car2go in London in Spring 2014 was caused by the difficulties of coordinating 32 separate local authorities across different boroughs in London along with financial problems derived from the total car2go customers being fewer than 10,000 (Taylor, 2014).

Figure 10: Car2go smart For Two in London

The system of one-way clubs is different from the round-trip clubs as the user of the former can drop-off the car wherever they want within the business (service) area. For this reason, it is critical for the one-way operator to coordinate with local boroughs to allow their one-way car club vehicles to be parked in other districts.

Therefore, those who are engaged in the existing round-trip car clubs express some suspicion about the implementation of the one-way car sharing system in London. Both James Finlayson, the managing director of City Car Club and Lyndsey Donald, senior brand manager of Zipcar UK, anticipate that coordinating 32 different boroughs in London to allow one-way car club parking would be a very complicated process, as each borough has their own rules for operating car clubs in their district. For instance, according to Donald, there is a certain number of car club cars that should be based in the Wimbledon area in the borough of Merton, thus, she says it would be quite complicated if the floating one-way system attempts to operate across certain boroughs in London (Donald, 2014).

In a conversation with Finlayson at the shared mobility conference in Bath, June 2014, he argued that the Barclay bicycle (now Santander Cycles), a point-to-point station based on the one-way bike sharing scheme, exemplifies the difficulties of implementing a one-way mobility system in London. This is because the re-distribution will be the most critical issue in such a one-way system, along with the coordinating share cars parking issue across the separate boroughs in London (Finlayson, 2014).

On the other hand, the author Fergusson expresses an alternative view about the floating point-to-point one-way car club could be another feasible and effective alternative mode of transport in London, where the public transport is good and congestion and parking issues are chronic problems. Yet, he also claims that such a one-way car usage pattern, through which the user could use a shared car for a short trip, might be less effective as there are good existing transport networks such as taxis, public transport and Barclay bicycles (Fergusson, 2014).

Therefore, the estimation of figures of new additional car club members when the one-way car sharing is introduced in London would cause other issues in transport policies that might demand the instigation of research about 'induced travel', wither the demand for it or the tendency as a result of the "improvements in ease-of-movement to lead to more overall mobility." Le Vine (2012) claims that there are two sides of car usage, the induced and suppressed types. For car club members who do not own a private car and use a vehicle only when they need to, the fact that they can access one leads to them driving more than they actually need. However, the usage of those who currently own a car, is suppressed rather than induced in kind. This is because drivers consider fixed costs and running costs such as fuel and maintenance expenses, which act as a deterrent for car owner to drive less frequently than car club subscribers (Le Vine, 2012).

From the perspective of rising concerns about such induced travel, in particular by introducing a one-way car sharing system in the metropolis, there has been a question of whether this new model could be complementary to public transport. Donald asserts that the role of Zipcar (a round-trip car club) is not to be a replacement for public transport, but as a complement to public transport as a whole (Donald, 2014). Le Vine also claims that the predicted usage pattern of one-way would be different as the travel behaviour would involve walking and using public transport while people would make more journeys by shared car. By contrast, the analysis of the London car sharing market shows that the members of round-trip car clubs use more public transport than private car owners (Ferguson, 2014).

It is a prevailing view that the combination of car club usage and public transport produces better alternatives to private car ownership than using either mode on its own (Le Vine, 2012). Therefore, from the economic perspective, the role of the car club should be a complement to public transport rather than a substitute for it, as claimed by existing round-trip car club operators. According to the paper, 'Car rental 2.0, car club innovations and why they matter,' the usage of round-trip car clubs has led to about 3.6% more public transport journeys as a result of people switching their travel pattern from driving a privately owned car to using an occasional car club car together with public transport.
In contrast, prospective one-way car clubs in London could even cause a modest decline (1%) in public transport. This is due to the different system of using shared cars, whereby the customer can access the car and drop it off without returning it to the original parking bay: this system is more similar to the public transport system (Le Vine, 2012) and as stressed, could lead to more induced travel than round-trip car clubs.

The issues about whether car club could be a complement to a public transport or could rather increase the overall number of cars on the street are also significant aspects we need to contemplate. After all, one of the benefits heralded by car club operators and advocates alike has always been the reduction of private cars from the roads.

Although there are variations in the figures of the actual number of private cars eliminated from the streets, according to Car-sharing in London –Vision 2020, round trip car sharing could lead to 17 cars off the street. This comprises a reduction of 7 cars due to car club members disposing of their private car and the deterrent of members from purchasing a car, bringing a further reduction of 10 private cars from the street (Frost &Sullivan, 2014).

In terms of the anticipated reduction by the implementation of one-way car clubs, it was revealed that the total reduction was relatively less than round-trip car sharing: figures from Paris's Autolib have shown that this system has led to 3 cars off the street and 6 deferrals of purchasing a private car as a consequence of

using the one-way service. Thus, a total of 9 private vehicles have been removed from the streets of Paris as a result of adopting Autolib (Frost & Sullivan, 2014).

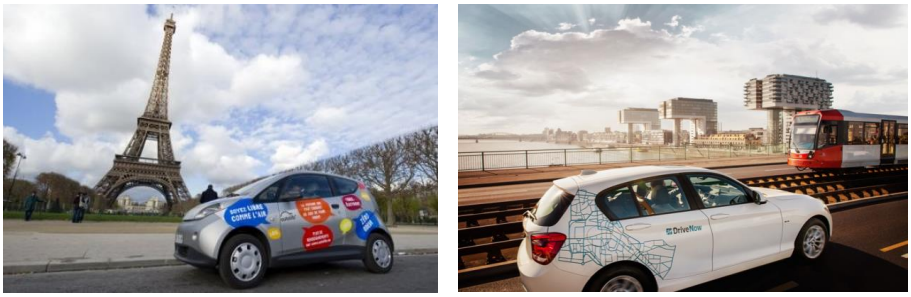


Figure 11: One-way car clubs Autolib and DriveNow

With the survey result that the total number of private car reduction by one-way is less than the round-trip car club, and the suspicions about the one-way car club with its pick-up and drop-off scheme leading to more induced travel, the Green Party in Paris expressed support for the traditional round-trip car club, while they opposed the Autolib one-way car clubs as it could "encourage unnecessary [car] journeys" (Le Parisien, 2009).

It seems that Le Vine's speculation (2012) that introducing a one-way car club in London would lead to a mere 1% decrease in using public transport might be quite accurate. Huggler (2014) claims that the German car sharing schemes contribute nothing to reducing traffic. According to the recent survey by the public service public services consultancy firm in 2014, Civity found that car club cars have rarely been used to replace traditional commuter journeys but compete with public transport and bicycle. The figures revealed that shared vehicles in Berlin cover an average of 5.8 km, which is a little more than the distance of the bicycles' 3.4km, while the distance covered by public transport and private cars was 10.1 km and 9.5km respectively. Moreover, the survey also found that shared cars are parked 23 hours per day as they are used for only 62 minutes per day in Berlin (Civity, Huggler, 2014).

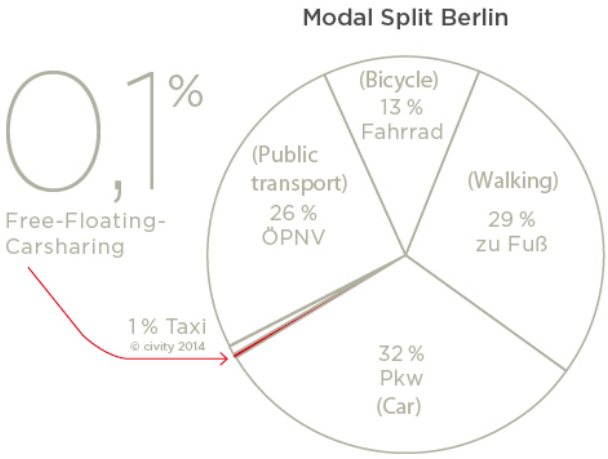


Figure 12: Modal split in Berlin (Civity, 2014)

Regarding the recent survey outcome of car sharing usage in Berlin, Andreas Leo, a spokesperson for Car2go, disagrees with the figure, claiming that Car2go's vehicles are used much more frequently as the average time of their car fleet usage is more than 150 minutes - with six to eight hirings - per day. Willi Loose, the president of the German Car Sharing Association, also asserts that the general usage pattern cannot be inferred from the statistics of minutes used solely (Harder, 2014).

2.5.2 Peer to Peer (P2P) Car sharing

The term 'peer-to-peer' might be quite familiar to people who have used file sharing via on-line sites, uploading and downloading the files of others. When it comes to the car club, the peer-to-peer (P2P) is a car club that shares a privately owned car with others when the owner does not use it.

This model is one of the most disruptive types of models in the sharing mobility market, as this model requires a system of intermediation, using web or mobile technology in order to connect car owners (private individuals) and renters (Cohen, Kietzmann, 2014).

In the UK, Whipcar was the most well-known p2p car clubs, launched in April 2010. However, less than three years after it began, Whipcar announced closure of the service (March 2013), as there were still significant hurdles to overcome in order to make Whipcar viable – and to grow its base outside of London. (Britton, Whipcar, 2013).

According to Whipcar's statement, one of the difficulties of managing the p2p car club was having limited resources to manage the car club with just a small team. In contrast to corporate managed car clubs such as Zipcar or City Car club in the UK, such a p2p company does not manage and take care of their car fleet as they do not own the fleet but are legally obliged to maintain the quality of the registered cars that could be rented via Whipcar's web site.

Figure 13: Peer-to-peer car club Whipcar and its advertisement

However, it seems that offering a decent quality of car to customers, not maintained by a car club company but by car owners, might be difficult. In the thesis of *P2P Carsharing Service Design: Informing User Experience Development*, authors Lewis and Simmons point out that the fleet of p2p cars have a potential environmental negative side as the cars are on average older cars in comparison to corporate car clubs. There are relatively new car fleets with a superior fuel economy, unlike for instance, Zipcar's fleet, in which cars are replaced every 18 months (Lewis, Simmons, 2012; Donald, 2014).

Regarding the adoption barriers mentioned in Whipcar's closure statement, Sheheen, Marlery and Kingsley (2012) argue that there are several notable barriers that deter people from sharing their personal vehicles with others. These are insurance costs and availability, fear of sharing and lack of trust, challenges around balancing revenue and pricing, the expense of technological solutions. Amongst these, vehicle availability, and assurance of vehicle reliability, liability and credence issues were the most critical aspects of enticing people to use the p2p car clubs. Since a personal vehicle's insurance policies are generally not valid for renting a car to others, and if a personal car is used for commercial usage such as taxi or transporting goods, these could lead to cancellation of insurance coverage in many states in the US (Shaheen et al., 2012).

Although this report concerns the issues of personal vehicle hire in North America, the insurance policy of Easy car club, the current p2p car club in the UK, also has to engage with hazards from mechanical damage caused by hirers (Brignall, 2014). Moreover, the authors also assert that exploiting one's personal vehicle for sharing purposes may be viewed as an act that could change the risk profile of the vehicle, which could lead to a potential risk of being unable to secure the insurance and nonrenewal of the insurance in the future (Armet et al, 2014, Lieber, 2012).

Establishing the trust between people is the most critical aspect regarding p2p. Some researchers, including Botsman (2011) claim that there is re-emergence of community among the peer-to-peer sharing platform users such as Airbnb. However, it seems that when it comes to car sharing, this trust issue is another notable barrier to adopting a p2p car club. According to the study of personal vehicle sharing services in North America (2012), more than half of survey respondents mentioned that they were reluctant to share their privately owned cars with others due to lack of trust (Shaheen et al., 2012).

In Frost & Sullivan's car sharing customer & potential users survey, conducted in the UK, France and Germany, it is argued that P2P car sharing is "still in its

nascent stage and is expected to co-exist with traditional car sharing." This survey has also found that the interest in providing a privately owner car to be shared with others among car owners in the UK was particularly lower than in other countries. Although there were a number of people who were willing to provide their cars to be shared with others, this number was even lower than the very moderate level who showed an interest in using others' cars (Leveque, Moosa, 2013).

The relatively poor quality of p2p's shared cars together with the management of the car fleet system compared to corporate owned traditional car club systems, were the main drawbacks of p2p car sharing model. So strengthening the user rating and feedback system, (car) operator screening and selection, and integration with social networks were proposed as key mechanisms by which to improve the trust issues in p2p car clubs (Armet et al, 2014). From the mid-term perspective, it might be possible to mitigate some issues between car owners and users in the p2p car club platform. However, from the long-term perspective, and according to Frost & Sullivan's predictions for p2p car clubs, they are expected to co-exist with traditional car clubs: this seems to be the more realistic and persuasive view.

2.6 Service design and car clubs

One of the distinctive aspects of car club services is that it is an unmanned service that requires users to go through all stages from locating and accessing the car to returning and finalising the rental process on their own. Therefore, a clear procedure for using the mobility service is critical for both operators and users. In this way, they can use the car club without facing complex barriers that might otherwise deter the spread of this flexible transport scheme in the city.

Ben Reason, a co-author of the book *'Service design –from insight to implementation,'* notes that interaction between people, their motivation and behaviour are the elements of service design. In terms of contemplating the nature of designing a product and designing a service, the latter is an entirely

different thing than a product; applying the same mindset to designing a service as to designing a product could fail to achieve a user-friendly result but could lead rather to customer hostility.

He also stresses that despite many designers often talking of products with personalities, actual things such as mobile phones or cars do not have 'real' emotions wherever they are or whoever the owner, but rather, people do appreciate the circumstance of using a service or system, which is why understanding the user is critical in service design, he argues (Reason., et al, 2013).

Figure 14: User-centred orientation diagram of service design (Stickdorn, 2011)

In terms of considering the unique circumstance of the car club, namely the fact that the customers go through all procedures by themselves, it seems apparent that delivering a good service experience is critical. The entire service experience from the users' perspective comprises several touchpoints, by which users interact or make contact with the service, product or brand in the loop of using the service (Lewis &Simmon, 2012).

Løvile (2008) notes that matching people's expectations so that they are consistent across all the touchpoints making up the entire service design model, is the key to managing the design quality in service sector (Løvile et al., 2008).

2.6.1 Co-producing the service with users

One of the fundamental characteristics of service design is co-producing the service design by users who are using or in the particular service system (Stickdorn, 2011).
Although the idea of 'Co-production' has become prevalent quite recently, it is not in itself a new term – as many politicians and researchers have used and referred to this notion in the past. However, it has re-emerged as a new tool that enables a reforming of public services.

The strength of co-production is that consumption and production take place simultaneously. However, this notion is not made feasible simply by introducing new service design models, but also requires behavioural changes from the public and private sector, with consideration as to how the customer could understand, use and eventually be encouraged to participate in the new service model: the latter could lead to generate positive outcomes for both service provider and users (Parker, Heapy 2006).

Løvlie (2013) argues that product-oriented organisations often fail to see the potential of their customers who could make their service more efficient.
If an organisation could realise the value of co-production and develop a circumstance that could maximise its efficiency by enabling customers to participate in the service, the overall level of service environment could be improved, providing mutual benefits to both parties.

It is critical to be aware of the value of co-production by users in delivering a good service. Product-oriented organisations miss the opportunity of developing their service if they still consider the users as anonymous consumers of products, rather than forming a valuable asset that could improve the service quality through co-producing (Løvile et al, 2013).

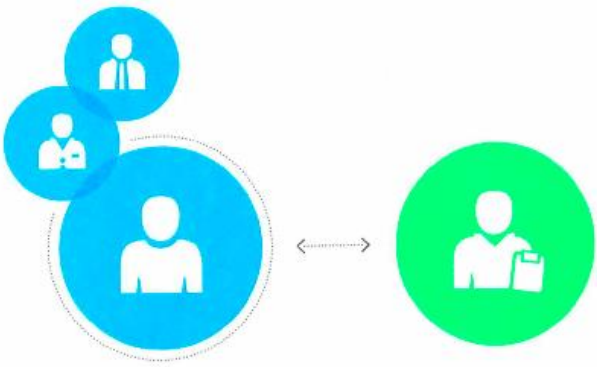


Figure 15: Co-production diagram of service design (Stickdorn, 2011)

Despite the fact that some organisations have failed to escape their product-oriented perspective, it is worth noting that an effort to establish more intimate relationship with customers by seeing the service as not a commodity but as support does generate a legitimate service design model through co-production (Parker, Heapy, 2006).

It is evident that co-production is one of the core principles in service design along with user-centred orientation in terms of the pursuit of conceiving and delivering an improved service model for users. In current sectors, it is quite common to find product-oriented direction, for instance through the purchase of tangible goods; however, it seems that the principle of co-production could potentially be more widely applied to more sectors, particularly emerging sharing economy markets such as peer-to-peer accommodation or the ride sharing market.

The service design expert Marc Stickdorn (2011) claims that the active participation of users in service provision could evoke a sense of co-ownership of the service they use, which would lead to loyalty and long-term engagement.

In this regard, it seems more crucial than ever for service providers to use a variety of tools and methods to obtain genuine insight from the users' perspective. Such a process would play a prominent role in understanding and analysing what users really want from the service and how to design a service model that could encourage users to participate and create a value of co-

production, which in turn would be able to generate positive outcomes for both users and service providers.

In this sense, the car club is a good example whereby co-producing the service quality by car club users can play a significant role in improving the overall experience of using mobility scheme.

In a paper released by the Journal of Advanced Management Science, 'Etiquette of co-production with customers: a study of car sharing in self-service,' it is claimed that the six rules of Zipcar, outlining key issues clearly and entitled 'six simple guide to successful car club' act as a prompt for customers to become active participants and thus to make a better shared mobility service (Masada, Siddike, Kohda, 2013).

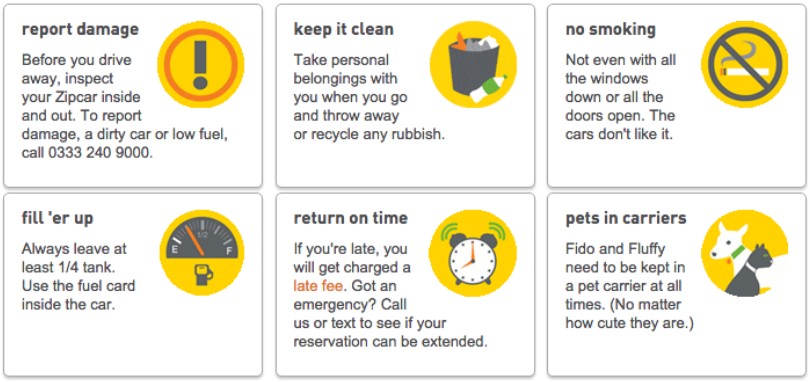


Figure 16: Zipcar's six simple rules

Those six rules, ranging from damage report to prohibiting carrying pets in the shared car, cover key areas which customers could perform easily without much extra labour which otherwise might deter them from co-producing the service. Instances of this supportive system are the free fuel card or damage report call. From the perspective of considering users not as anonymous people who purchase or use the product, but as a productive asset, those activities of car club users - refuelling the car, keeping the car clean, reporting damage - contribute immensely to car club operators, allowing them to save extra expenses of operating mobile maintenance teams to check every single car by themselves. Some acts of co-production might not be motivated by users' voluntary will as

seen, for example in the imposing of fines applied on certain issue such as late return of shared cars. However, it is clear that these six guide rules subsume key practical issues which the user might encounter, showing specific areas which can be co-produced while using the car club (Masada, Siddike, Kohda, 2013).

When it comes to considering the nature of the car club where cars are shared among members, the role of co-production by users is imperative in comparison to other service models we see. The users refuel the car, keep the car clean, report the damage to service operators and park the shared car at the designated car club parking spaces where other members can find the car and use it easily. Although all B2C (business to consumer) car clubs in London, such as Zipcar or City Car Club, have conducted regular maintenance of their car fleet (Donald, 2014), it is certain that users' active participation in such shared mobility schemes enables operators to provide a better service. This, then, is in part thanks to co-production by users on-site as and when it is needed; after all, the car club operator's maintenance team can hardly respond to every single shared car's reported damage or technical breakdown.

Service design experts Joe Heapy, co-director of Engine[1], a service design consultancy, and Sophia Parker claim that it is now widely accepted as fact that the co-producing of an outcome by empowering users and involving them generates a better outcome. In order to maximize the effect of this co-production, it is necessary to have a richer understanding of how the service relates to the users' everyday life from a practical perspective. This is because the user's level of trust and engagement of the service will be higher when the service model is approached from more detailed aspects rather than from a system as a whole (Parker, Heapy, 2006).

[1] Engine is a service design consultancy in London, founded in 2000.

2.6.2 Adoption curve of users of car clubs

Since the advent of the notion 'the age of access', which was termed by Jeremy Rifkin (2000), a variety of new services has entered the market. In terms of the shifting perception of customers towards material goods summed up in the formula 'using instead of owning', the recent growth of sharing economy, has been seen especially in the rise in popularity of Airbnb and car clubs: these are the most conspicuous examples in this context.

Nonetheless, it is worth noting that lower awareness of the service, in particular of which the service model is designed through the concept of the sharing platform is one of the critical issues for both users and organisations. According to TfL's report, '*Car club strategy*' in 2008, one of the biggest barriers was the lack of awareness of how schemes operated and what benefits were offered. Although the report was published in 2008, it seems that the issue of awareness is still the key issue of car clubs, hence it was one of the key topics at the technical training for London borough officers in November 2014 (TfL, 2008; Kubitz, 2014).

Although the total number of round-trip car club members in London is expected to reach approximately 264,000 in 2020 (Frost & Sullivan, 2014), the car club is still a new territory for which the effort of explaining the usage and benefits of shared mobility is required in order to expand the mobility service. When it comes to developing a service proposition for a new sector, it is imperative to consider several areas that convey the fundamental but essential characteristics of the specific service model. That is, customers need to understand the purpose, value and process of the new service model, and do so through diverse methods such as simplified process step info graphics, which is similar to Zipcar's six rules, or metaphors that enable users to understand the new service.

When Zopa, a peer-to-peer money lending service, was launched, they described their service as a 'marketplace' where people meet to lend and borrow money along with a simple step process which explains how the service works, using

the generic term as an analogy that most people could understand easily. Since the sector of this service is about dealing in financial transactions with a complete stranger, it was important for Zopa to provide a clear explanation of how the service works to potential customers. This would help them to understand the service and lead to establishing trust for it among users and service providers (Løvlie et al., 2013).

Figure 17: Zopa explains how the system works by referring to the concept of market place

Peer-to-peer car sharing brand, Whipcar, also used a metaphor of an existing service to explain and promote their new brand proposition to customers. The core concept of p2p car sharing is to hire a neighbour's privately owned car when it is not in use, which sees something in common with Airbnb, when a neighbour's spare room is rented out. This flexible accommodation service was already a well-known service at the time, hence Whipcar chose to describe themselves as 'the car sharing of Airbnb' which was an appropriate analogy that explained the core concept of using this new car club effectively.
Interestingly, customers also described this p2p car club in a similar way, calling it 'Airbnb for cars' and also mentioned it as one of various fine examples that represent the peer-to-peer market along with Airbnb, whose economy placed acute importance and value in trust and reputation among users who share their cars and rooms (Botsman, 2012).

It is interesting to note the users' tendency to adopt the new type of service model or product such as Airbnb or Whipcar. They are usually early adopters who have already had experience of using similar types of platform that are

based on collaborative consumption. Glind (2013) argues that most users who take part in collaborative consumption have the characteristics of early adopters or innovators. Since the growth of those types of consumption have been made possible thanks to on-line networks and social media that emphasize aspects of the environment, social and financial motives of using these platforms, they correspond well to characteristics of early adopters, as defined by Everett M. Rogers. In short, early adopters are more socially forward than late adopters and show opinion leadership (Glind, 2013, Rogers, 2003).

Thus the various services which are based on collaborative consumption have been introduced and have expanded their awareness among customers thanks to the rapid improvement of on-line networks and social media. These enable people to interact with the service more closely and also lessen people's concerns about making transaction with strangers by protecting users via peer-policed system. Moreover, positive reviews on the sharing economy and a declaration of support for this sector from the UK government show that it is a growing market with social and economic value.

Rachel Botsman (2011) claims that the sharing economy is transforming the existing business model, in particular the automotive industry by car sharing. Companies such as Zipcar or similar types of car clubs provide a mobility service by giving access to shared cars. On the other hand, manufacturers are also participating in this market by selling a service that offers personal mobility. She argues that collaborative consumption is still in its nascent stage but has shown a rapid growth in diverse sectors, and is now becoming a mainstream idea. However, this emerging market faces an immediate challenge in order to become a relevant and attractive platform for managing the business of the mass market (Weintrobe, 2011).

Nonetheless, the fact that early adopters are still the predominant users of this sharing economy raises the question about how this market could be broadened beyond those active customers. Reason (2014) asserts that the adoption of new customers is the key issue for current car club markets. He refers to Roger's bell

curve, which illustrates how new ideas and technologies are adopted and spread in five distinct groups from 'innovators' to 'laggards'.

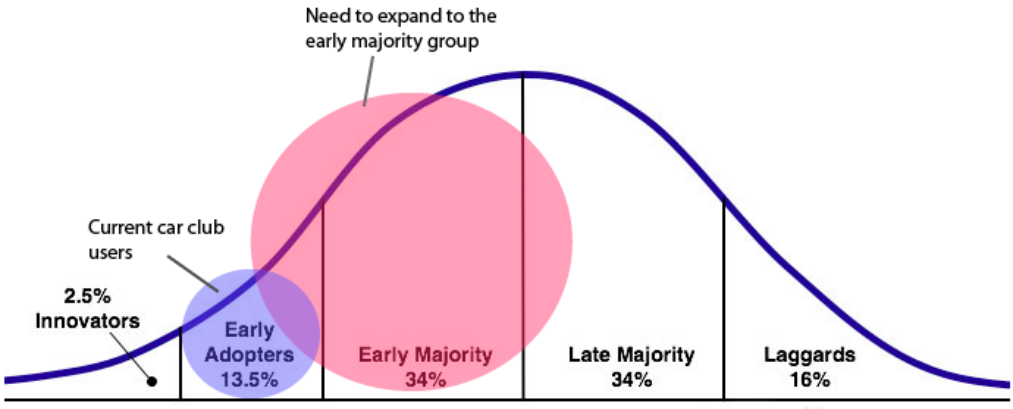


Figure 18: Position of car club and prospect of expansion in the adoption curve (2003)

According to this curve, the proportion of early adopters, which is the second group following the innovators, is 13.5% and the third group of the early majority represents 34% among the five groups of people who use a new product (Rogers, 2003). Since the main customers of car clubs still comprise early adopters, he emphasizes that the key issue of car clubs is how to expand their target customers from the current group to the early majority in order to broaden the existing car club market (Reason, 2014).

2.7 Touch points and channels of service design

It is not easy for service organizations to see and understand the product or usage of service from the users' perspective, as the main concern is not putting themselves in the viewpoint of customers but to deliver their product or service to customers. However, through the approach of service design, which considers various aspects that comprise the entire service design model, such as touchpoints, channels and journey, it is possible to illustrate how the service engages with users from the starting point (Parker, Heapy, 2006).

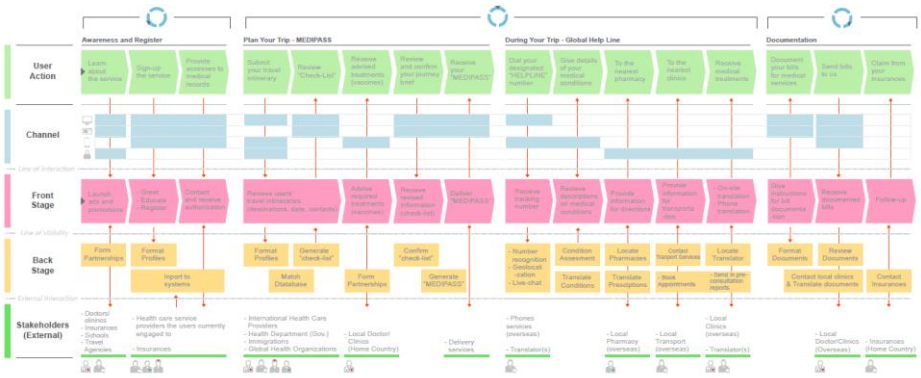


Figure 19: An example of customer journey mapping of service design

Customers' experience of the service happens through the various touchpoints and channels. Firstly, the touch point is the element of service that encompasses people (users) and tangible/intangible things that form the experience of the service. Through the touchpoints in the service, customers interact with diverse moments. When it comes to car club usage, each individual moment that happens around the circumstance of car clubs, such as visiting the on-line websites of car club operators, booking, driving, and returning the car, or communicating service operators in case of accident or damage reports, form the individual events with which users interact.

Heapy argues that touch points are the places and spaces where people experience the service. The satisfaction or dissatisfaction of the entire service experience of customers are also determined within the touchpoints as well. The service provider raises a level of expectation, created by rhetoric of the service provided. If the level of dissonance between what the customer expects and the actual service experience is high, an expectation gap arises and leads to the suspicion and disappointment with the entire service as a consequence (Parker, Heapy, 2006).

Secondly, channels are also key elements, and play a role as a medium, such as e-mail, smartphone apps or on-line web sites, which enable customers to access and interact with the product or service. Thus, from the perspective of using an entire service model, users interact with various touchpoints via single or multiple channels (Løvile et al, 2013).

In terms of clarifying the role of touchpoints and channels, Justin Kim, a service designer at Engine says touchpoints might play the role of channels which allow users to be aware of the service and join it, while channels could also be individual touchpoints, depending on the context of service models (Kim, 2015).

It is interesting to note that the rapid improvement of IT has enabled people to approach the service through diverse channels such as on-line social media or interfaces. In the past, there were not many channels but only a single or small numbers of channels available for customers to access a service. It was common to book a train ticket or flight ticket by visiting the station or travel agency. However, in recent years, these simple channels have been diversified and shifted ways of allowing access to a service, moving from an office-based system to various channels such as telephone, on-line websites and now to smartphones. In other words, a major channel migration is happening, which allows customers to use services by offering diverse channels, thus lowering the barrier of accessibility.
Under such a circumstance of the proliferation of channels, it is urgent for organisations to understand the needs of those diverse channel options and users' preference to those access points. Also, the interactions and relationships between channels should be considered, as users' needs and preferences should be considered before attempts to create an integrated channel strategy with the rhetoric of offering a better experience and efficiency of the service model (Parker, Heapy, 2006).

However, interestingly, there came a recent announcement from Car2go, Daimler Benz's floating based one-way car sharing scheme in March 2015. This stated that Car2go's shared cars could only be accessed by smartphone app, which involved introducing a 'smartphone only' system which integrates two different options of unlock/lock the car by membership card or smartphone app into a single channel (Car2go, 2015).

Figure 20: Car2go's smartphone only customer notice

This raises the question, as Heapy and Parker do above, of whether such a decision is a better solution to providing a more efficient and convenient way for customers or whether it neglects allowing users' diverse preferences to different channels. According to Alastair Budge, former Zipcar employee, the reason for eliminating Street car's on-board computer when the company was merged with Zipcar, was to reduce the layer of complexity.

From the perspective of providing a new or improved service model through various attempts to re-arrange the touchpoints and channels, such as an 'integrated channel strategy' or by implanting new technology, both authors of this book claim that a major 'channel migration' occurs, from a single channel to diverse channels due to many current societal reasons, mainly an improvement of IT in 2006. Interestingly, at the time of writing this thesis in 2015, it seems that another channel migration is happening, by which the service organisations try to integrate and simplify the channels into another single channel again from the diverse channels they had provided to users.

2.8 Summary

It seems evident that the growth of the sharing economy will continue its rapid increase along with the anticipation of the growth of potential of car sharing: opportunities for this sharing mobility appear certain. According to PWC analysis (Hawksworth, 2015), the five main sectors of the sharing economy, (including peer-to-peer lending and crowd funding, on-line staffing, peer-to-peer accommodation, media streaming and car sharing), generated $15bn in global revenue, taking a mere 5% of total revenue of the combined sharing economy

and traditional rental sector in 2013 (Hawksworth, 2015). In terms of the car sharing market compared to the traditional car rental market in the U.S, the total annual revenue for car sharing in the U.S was about $400 million while the traditional car rental generated $24bn in 2014 (Brown, 2015).

However, it is estimated that the global revenue of these five sectors in the sharing economy could increase up to $335bn by 2025, which would be over half of the overall sales of ten representative sectors in both the sharing economy and the traditional rental sector (Hawksworth, 2015).

In terms of the forecast for the growth of car sharing, it is anticipated that the global revenue of the car sharing service will increase from $1.1bn to $6.5bn by 2024 (Navigant research, 2015). Executive editor of Auto rental news, Chris Brown, claims that car sharing could discover new opportunities under the circumstance of various transport options and changing attitudes on mobility along with the shifting demographics and emergence of new technology (Brown, 2015).

Among the various types of car club model, it seems evident that the one-way model will play the role of boosting the growth of the car sharing market as discussed in this review of literature. It is anticipated that the one-way car model could attract three to four times more members than the round-trip model (Clark, 2015).

Interestingly, in a report, 'Mobility of future' in 2012, conclusions emerged that, despite the promising forecast of the expansion of car clubs, no model has shown a noticeable success so far, but that this could alter (Cornet et al., 2012). However, issues of implementing this model, such as concerns for substituting the public transport usage of customers due to its system, and also negotiations with local governments (boroughs) to allow accommodating not only for free-floating or stationing based but also existing round-trip car club models need to be thoroughly thought through. (Brown, 2015, Shaheen et al., 2010)

Throughout the contextual review of service design, it was possible to find that service design has played a prominent role in car clubs, enabling customers to understand mobility concepts, value and a user-centred process approach which focuses on interaction between people and behaviour applicable to the new service.

The role of service design is not limited to offering a positive user experience but also lies in generating co-production, which is the view that considers users not as anonymous consumers but as valuable assets. This is deemed to improve the overall level of mobility service precisely by such active participation of customers.

In contrast to other mobility services such as that of the bus or tube, the unique circumstances of car clubs mean that customers have to deal with all processes by themselves, and therefore, the role of service design is crucial in order to offer a positive experience of using shared mobility services.

Service design experts who design service models for car clubs emphasize a user-oriented direction, creating a better customer experience, which provides exciting, rewarding and irritation-free aspects. This is the key role of service design in car clubs whereby customers could become advocates of the service and regard it as a part of their lives (Løvile, Stulle, 2015).

In this regard, a major channel migration of accessing the service is becoming simplified by a single channel - the smartphone - through diverse options. This is due to the rapid improvement of technology in pursuit of offering convenience to users who want to be stay connected with media. It is also due to the concomitant tendency that users have become more dependent on smartphone usage than before. In particular, young people, depicted by a new generation of consumers and mobile communicators, put two key trends as their priorities: media integration and car sharing (Cornet, et al, 2012).

In this context, the recent introduction of mobile device platforms for cars - Apple Carplay, Android Auto - and Car2go's announcement of simplifying the access channel by a smartphone app, shows not only an evidence of channel migration in a tech driven society but also the role of the smartphone that has become more crucial than ever in the sharing mobility market. The latter then, enables users to enjoy a convenient service experience of managing their car club usage.

In this literature review, diverse and relevant issues for the main research topic, car sharing, have been covered. The rise of the sharing economy together with the shifting perception among people away from ownership to considering sharing have propelled the sharp growth of the car sharing market. Furthermore, it is apparent that the reversal of the urban sprawl that has led to increased population density, and chronic traffic issues with a rapid improvement of ICT are further factors that have made car sharing an alternative mode of transport in the metropolis.

However, the fact is that there is a changed attitude among young people towards cars, namely they place more value on network connectivity than on cars and do not drive as much as their parents: this is another important issue to which not only the car sharing market but the entire automotive industry must pay attention.

The role of service design in car clubs, specifically the two principles of service design thinking, user-centred orientation and co-production, play a significant role in delivering more convenient and efficient mobility. In this regard, it seems crucial for car club operators to focus more on gaining insights from the users' perspective in order to maximise the value of co-production in such a shared mobility service. The channel migration from diverse channels to a single channel – to the smartphone - is a significant issue, which is not only happening in the car club sector. Almost every service model is heavily relying on a smartphone app in pursuit of providing a convenient service to the customer.

Throughout this contextual review, it has become apparent that car clubs will continue to grow and will become more competitive than ever while expanding their scale in order to keep playing a role as an alternative mode of transport in the metropolis. In this context, it is evident that understanding and analysing current car club users form the most imperative part of this study, alongside case studies of different car club models in London. Both combine to allow exploration of the ideal car club design from the users' perspective.

The next chapter, Methodology, describes the research methods and how they were applied in order to define the car club user profile. It goes on to describe the process of conducting in-depth car club user interviews.

Chapter 3. Methodology

The primary research methodology employed in this research is the collation of diverse views and opinions of car club users. This is because it has become evident that understanding car club users, who form the core of the car sharing market, is crucial in order to conceive of the ideal car club model from their own perspective.

These are ascertained through the conducting of in-depth interviews. The results are supported further by interviews with experts, namely, car club operators and service designers who have designed this mobility scheme.

Vaus (2001) points out that the purpose of design research is to answer the primary research question as unambiguously as possible with the evidence that has been obtained through the full exploration of that question. In this sense, data collection methods such as questionnaires, observations and document analyses form the crucial research methodology that enables real world researchers to provide the necessary evidence they need. However, Vaus urges that designing questionnaires or commencing interviews at an early stage should be avoided because a hasty research undertaking could lead to the generation of weak outcomes and unconvincing answers to complex research questions, to which many researchers fall prey (Vaus, 2001).

Therefore, prior to commencing the interview stage, it was imperative for this researcher to establish a clear research means by which to understand the current circumstance of car clubs and users. This was achieved through the preliminary contextual research that encompassed various mobility schemes in urban areas; the perception of the sharing economy and car clubs, along with on-site case studies of existing car clubs in London (and Paris), whereby key insights were formed and have provided fundamental data with which to design in-depth user interview questionnaires and participant observation. All of these together form the methodology of this research.

3.1 Research objectives and questions

The original research objective of this research was to explore the specific interior design proposal for shared mobility schemes.

Through the on-site case study of the Autolib car sharing system in Paris in 2012, the research objective narrowed down to focus on the interior of the car where customers spend time accommodating their luggage; operating on-board computers; adjusting seats, and driving the shared car. It was felt that these areas were the ones where a car-sharing car could differ most from a privately owned car.

However, through the contextual research of car clubs, including annual car clubs and customer surveys by Car plus, experts' interviews of car club operators of City Car Club and Zipcar it became apparent that accessing diverse kinds of cars is one of the crucial advantages of using car clubs from the car club users' perspective.

As a result of such initial research, my research direction changed from designing an interior specifically for shared purposes to exploring an ideal car club model from the users' perspective through in-depth user observation and analysis. The latter provide understanding in what users really want from their existing car clubs.

Such research could further contribute to enhancing car club users' experience and provide guidelines to car club operators and researchers for conceiving improved car club models.

Along with the revised research objective, the following research questions were proposed to narrow down and to tackle the specific issues of users' car club usage and to propose a new car club design that could reflect car club users' thought and suggestions:

1. What are the users' perspectives towards existing car clubs?
2. What are their key suggestions as to how to improve the car club model?
3. What are the critical aspects of the proposed car club model, from the users' perspective?

3.2 Research process

The research process in this particular PhD is divided into five stages: the literature review, the case study and customer journey map, in-depth user interviews, participant observation and validation of proposed solution.

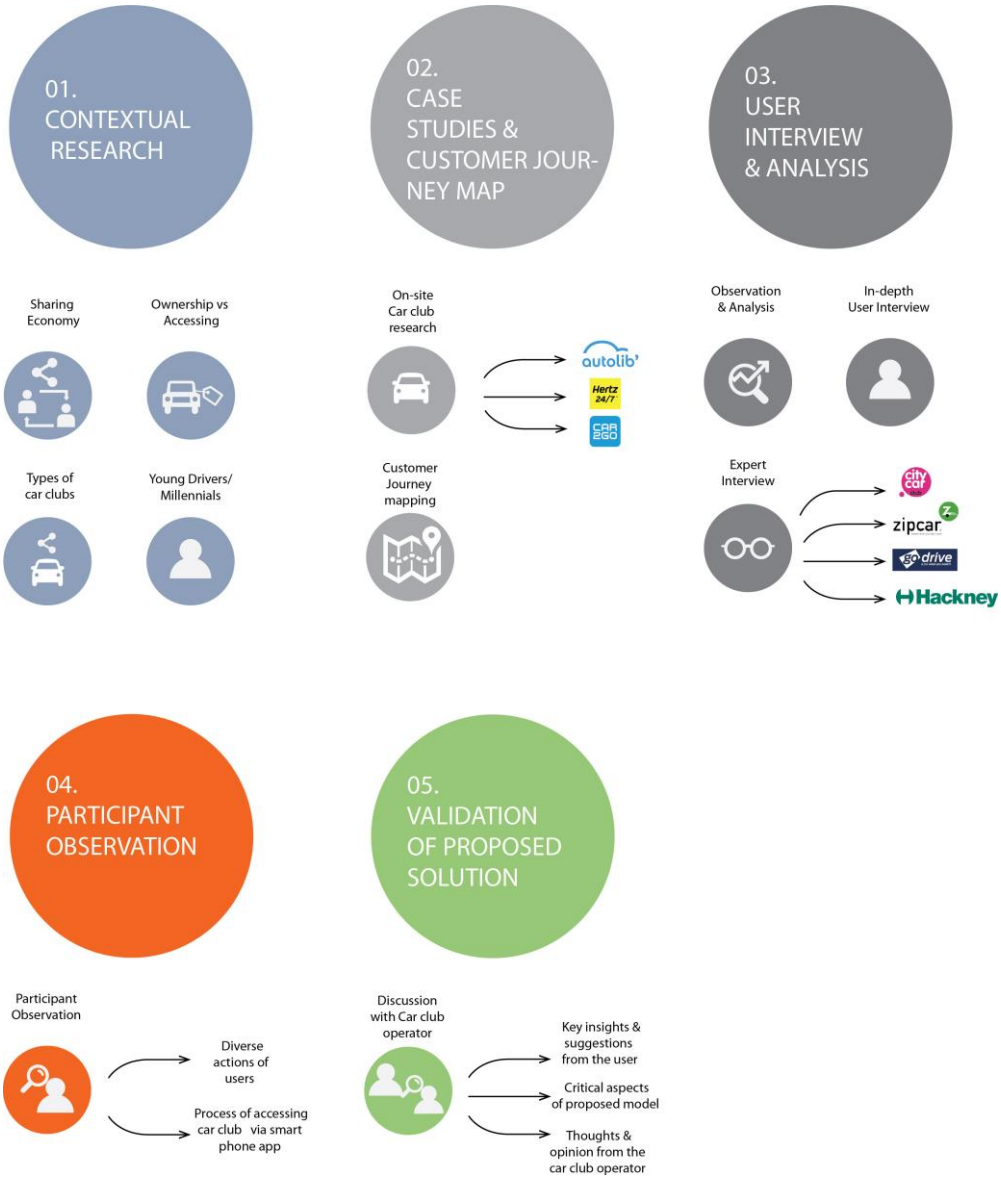


Figure 21: The research process map of this study

3.2.1 Literature review

For this research project, a contextual review was carried out in order to determine the relevant issues of this main research topic of car clubs. Firstly, in order to understand the current growth of the car club market, it was important to understand the background of the sharing economy, in other words, the background foundation that enabled such the sharp growth of car clubs that we see today.

Secondly, the growth of car clubs, types and prospects was covered to understand the differences, advantages and disadvantages of those models; further, to understand diverse aspects of each type of car clubs. In particular, the contextual reviews of one-way models and peer-to-peer (p2p) car clubs, those not so widely operated as round-trip car clubs, have provided in-depth scope to facilitate the understanding of the various issues of those two models. This includes concerns of increasing car use and practical issues such as insurance and liability when renting others' cars for shared purposes, which explains the relatively small number of one-way and p2p car clubs in most cities.

Lastly, the contextual review of service design in car clubs was explored. As the main topic of this research is 'exploring an ideal car club design from the users' perspective', and the car club is a mobility service to users, it was important to understand why service design is significant and how it plays a role in conceiving and delivering better mobility service to users. Several principles of service design such as user-centred direction and the value of co-production with users were covered and provided insights into why those principles in service design are imperative to design a better car club model for users.

In this literature review, certain topics such as EVs in car clubs, new typologies of cars for shared purpose and local car club brands were ignored as those topics are not so completely relevant to this research direction of designing an ideal car club from the users' perspective.

3.2.2 Case study & Customer journey map

The aim of on-site case studies of car clubs and secondly, making the customer journey maps of two types of car club (round and one-way trip models) was to have an in-depth understanding of the current car clubs in London and to visualise and narrow down the research outcomes.

The value of an on-site case study is that this research methodology enables the researcher to explore and understand the topic through diverse perspectives and to also reveal multiple aspects of the research objective (Baxter and Jack, 2008).

The main aim of the case study is to gain a better understanding of car clubs, from awareness of how to join and finalize this mobility service, to analysis of diverse facets, including process and advantages and disadvantages of each model.

Since the intrinsic goal of this research is to observe and understand the car club users, it was crucial to illustrate the flow of car club usage through the format of a customer journey map. According to Boag (2015), the strength of customer journey maps is that they enable researchers to understand the context of users, providing a clear picture of users engaging the service or products via diverse touchpoints and channels. Moreover, researchers gain an overview of users' experience because such a map shows how users move through the service flow, which in turn enables researchers to identify the problems of each touchpoint and propose solutions that enhance the users' experience (Boag, 2015).

The customer journey map of using a car club was created on the basis of case studies of two types of car clubs in London. The map was divided into four main stages, namely, awareness of the car club, accessing a shared car, driving, and finalization. All of these four main stages have provided a fundamental structure for designing an in-depth questionnaire for user interviews and observation stages. As Vaus (2001) mentioned above, prior to starting to design the questionnaire, those preliminary research processes of case studies and

mapping the customer journey map formed a critical stage: they yielded significant evidence necessary to plan and design an appropriate questionnaire, which has formed the most significant method of this research process.

3.2.3 User interviews: how do we hear their voices?

In order to collect the data from the car club users, two main research methods were chosen, namely in-depth interviews and participant observation. The strength of in-depth interviews is that the researcher is able to explore in detail the reasons for joining and using car clubs directly from the experience and opinions of interviewees. Most of all, they allow the scope to observe each user's perspective of using a specific mobility service, rather than relying on the researcher's own deductions.

In the book of 'Qualitative interviewing', Rubin (2012) explains the characteristics of in-depth interviews. Firstly, the researcher is looking for rich and detailed information, not for minimal 'yes-or–no', 'agree-or-disagree' responses. Also, the aim of this type of interview is to find out examples, experiences, narrative and stories. Secondly, the questions are open-ended, which means that the interviewee can respond any way he or she chooses, adding more relative stories or raising new issues. Lastly, the interviewer does not have to stick to a given set of questions or ask them in a given order as the researcher can change or skip the questions if they do not make sense at the time, or make up new questions on the spot to follow up new insights (Rubin, 2012).

The main purpose of interviews and observations is to be fully informed of the experience, opinions and users' perspectives towards car clubs. The in-depth interview method was considered the most appropriate to listen to and access users' voices and thoughts because during the interviews, the interviewees were able to participate without being concerned about certain orders or formats. They were able to talk about their experiences and thoughts of using car clubs, adding memorable moments and personal insights. The add depth and user-

specific insight to the research, which could not be collected from research activities such as car club case studies or the customer journey map.

In terms of the interview structure, the combination of self-completed questionnaire and semi-structured interview was used in a multi-methods approach. Robson (1993) claims that it takes more time to use more than one method, however multiple methods can provide noticeable advantages in an investigative process that reduces inaccuracies and provides cross-referencing.

It is clear that one of the reasons for conducting in-depth interviews is to collect more rich and detailed data from the participants than that obtainable through self-completed on-line surveys, which is the most common method among corporates. Despite the fact that there are a few advantages of this latter method, such as the fact that the researcher saves time and effort as respondents fill the survey in for themselves and relatively less time is needed to analyse responses, Robson (1993) explains that the problem of this type of method is that it is impossible to check on the seriousness or honesty of responses, as the participants just tick the questionnaire boxes.

As a result, for this car club user interview, the self-completed questionnaire method was used as a screener of interview respondents to understand basic information such as age, the frequency of using car clubs and whether they would recommend the car club to others (which then asked respondents to write down one simple reason for their answer).

After the self-completed questionnaire, the entire one-to-one interviews were video-recorded. According to Jewitt (2012), the key advantage of using video is that it can support an exploratory research design with extending data discovery as the recorded data remains open longer than other methods of data collection and also enables the researcher to find things during the analysis process that might not have been noticed at the time of conducting the interviews.

Also, this research tool enables the researcher to access various aspects of the interviewee's world view because the medium of 'video recording' is suitable for re-awakening the memories and experience of interviewees during discussion of the topic during the interviews. As a result, the video-recording was a valid tool that not only enticed respondents to share their rich and diverse experience, their world view, and thoughts while using the car club but also enabled me to access and analyse the collected data effectively in order to draw out the key insights from this user interview.

In conducting the main interviews, I selected a semi-structured interview as the main form because this car club user interview stage had one clear objective: to determine the actual perspective of car club users towards the proposal of their ideal car club.

As Robson (1993) and Rubin (2012) insisted, the semi-structured interview forms a suitable method for research interviews with a clearly defined purpose and aim to learn about a specific topic, while the researcher also expects to collect more ideas from the interviewees through flexibility in the order of questions.

The anticipated risks of such a one-to-one in-depth interview are that interviewees might feel pressured to answer in a certain way or give the answers that respondents think correct or required. In order to mitigate such happenings, the interviews took place at each respondent's house or work place where the interviewee could talk about their experience and thoughts about the car club in an environment where they felt comfortable and were familiar with. Also I explained the order of the sections of interviews, based on the Customer Journey map from the case study, to help respondents to re-awake their memories of the process of using the car club.

Several mock-interview sessions were conducted to adjust myself to the circumstance of such one-to-one interviews. These were achieved by creating situations where specific questions on unexpected but highly relevant stories

were asked of interviewees. The recorded video data during the mock interviews were then reviewed to see whether I understood the answers and asked relevant questions appropriately. At the actual interview sessions, the understanding and transcribing after the interviews were not revealed as a barrier thanks to those mock interview preparations.

3.2.4 Designing the interview questionnaire

The questionnaire comprised six sections, largely on the basis of the customer journey map. The customer journey map used to visualise the overall flow of car club usage, provided four of those sections from awareness of the car club to returning the car. Those four parts are: awareness and registering; reservation and finding the car; inside the shared car, and leaving the shared car. These four sections show the usage of the car club in the order of typical flow as based on the case studies of car clubs in London.

In the process of designing the in-depth questionnaire, two more sections were conceived and added in order to listen to and fully incorporate the users' general perspectives about their car clubs. These added sections cover the reasons why they have decided to join the car club and what they think about this service, including positive and negative moments while using the scheme. The other section was designed to ask more specific and critical issues to each interviewee addressing the one-way service or a change of attitude after using the particular car club.

In addition to those two additional new sections, a few refinements were made which were not able to be covered by the customer journey map outcomes. There is no doubt that the customer journey map has provided fundamental ideas for conceiving the main questions. Those extra questions included, for instance, addressing the living conditions of interviewees; whether they had a parking space; whether children affected their consideration of joining a particular car club; paying issues, and the joining process which might put

people off. Through this further probing, clearer and richer reasons and thoughts were revealed.

The final structure of the in-depth interview is as follows;

A. General user experience of using the car club

This section covers the overall thoughts about the car club experience including the period of using the car club, the reason why users decided to join it and the best and worst aspects of using this mobility service.

B. Joining the car club

The interviewees talk about how they became aware of the car club and whether the joining process was easy or not. The added question, 'Is there anything about that joining process which you think might put other people off?', was added with a view to seeking out potential barriers for others joining the car club.

C. Reservation & finding the reserved car

Reserving and finding the shared car form one of the important steps of using car clubs. How do users reserve and find their car? The two distinctive ways of reserving the car, which are by using smartphone app or by personal computer, form, the first question of this section. Interestingly, this section asks each interviewee about the appearance of their reserved car (namely, whether they are concerned about specific branding or logos) as well as damage checking issues which also form critical but interesting issues among car club users who are using shared mobility with others.

D. Inside the car

The car clubs' car fleet comprises the kinds of cars we can easily find on the street, although those shared cars are equipped with extra features such as

membership card readers, the ignition key holder, and so forth, depending on the car club operators' system. How would those slight differences affect car club users? This section focuses on the users' process of getting inside the shared car; unlocking/locking the car in a more unconventional way through membership card or smart phone app, and retrieving the ignition key not from their pocket but from someplace else. Since one of the distinct features of using the car club is the potential to use a different car depending on purpose or price, the adaptability of users in those different car interiors needs to be ascertained. This implies adaptation to controlling the Heating, Ventilation, Air Conditioning (HVAC), the windscreen wipers and in some cases, reverse gear, as some cars employ different systems.

E. Leaving the shared car

What do users do before they finish (many car clubs refer to it as 'finalise') their rental? How do users retrieve their belongings if they accidently leave them behind? Every shared car should be returned after a certain period of rental duration in order to be on time for the next customer. In this section, the interviewees talk about their experience and behaviour at this last stage of using shared mobility, including emptying the rubbish or checking the residual quantity of fuel (most car clubs say you have to leave the tank more than one quarter full), and other checks they usually need to perform before locking up the car. The paying issue, which was added after the first interview draft, can reveal users' thoughts about whether they are confident with the payment deduction from the company.

F. Miscellaneous questions (Users' suggestions)

This last section of the interview covers users' perspectives on extra issues about using their car clubs, and moves its focal point from actual usage to other issues such as the comparison of the car club with the traditional car rental and the changing mentality towards using shared cars along with the critical issue of the one-way service. The last question of this section 'what could be the most

important aspect to become a perfect/ideal car clubs from user perspective? was also added in order to seek interviewees' unique thoughts, ideas and proposals for user-centred car clubs.

Before commencing the interview, a couple of test runs were held with hypothetical interviewees in order to simulate the responses to each question, as well as the order of presenting the questions and the wording.

As stated above, one of the strengths of adopting in-depth interviews is to collect rich and detailed information from the interviewees, not to end up with 'yes-or-no' answers. Although the context of each question was designed and revised in order to avoid such a situation, some responses to questions were short answers. But using a 'laddering' research technique – by asking 'why' after those short answers – the conversation could be continued through explanations and detailed reasons subsequent to yes-or-no responses.

3.3 Recruiting car club users

The procedure of recruiting participants for in-depth interviews commenced on the basis of a 'site-based' approach to participant recruitment, as described and set out by the anthropologists Thomas Arcury and Sara Quandt (1999).

According to the paper 'Participant recruitment for qualitative research' (1999), the authors insist on the importance of choosing research participants in ethnographic and qualitative research: they insist on the fact that selected specific participants should reflect the purpose or aim of the research. Through the process of finding specific participants based on the rationale that emphasizes the goal of the research, the researcher finds selected representative participants who are able to offer data which contains the characteristics of the community that the researcher is focusing on.

Arcury and Quandt (1999) point out the difficulties of recruiting participants in complex urban areas or rural counties because the space is too big to observe

fully and it is difficult likewise to find discernible, relevant patterns of participant behaviour. Hence, the researcher should have clear guidelines by which to locate, choose and find participants who have some knowledge of the intended topic. Although random-sampling could be considered as another option, the collected data through such a random approach fails to deliver translatable data for qualitative research. With the latter, the aim of representativeness with fewer participants form the critical aspect because the researcher needs more detailed insights from the participants than 'yes-or-no' answers.

The authors claim that the 'site-based' approach is effective in complex societies where the area is based on a large community, because this generates a representative sample for qualitative research.

Firstly, the researcher specifies the characteristics of potential participants by setting the boundaries of the sample, such as demographic characteristics and sociocultural factors or employment factors. Secondly, once the site (car club in this case) is decided, the researcher can estimate the composition of the people of the site through contact with the 'gate keeper'. This gatekeeper could be, for example, an administrator of the office and organisation or a manager of the social club of which s/he has a deep knowledge and understanding.

In particular, the contact with the gatekeeper is significant part as the researcher can obtain precise statistics such as in the annual report and related resources, which form a significant help in setting up the initial selection guidelines for potential candidates.

Once the overall data of the specific site is collected, the researcher begins the participant recruitment.

Through this procedure of site-based sampling, the researcher is able to learn about and understand the characteristics and basic insights about the community.

The recruiting procedure for car club user interviews commenced by establishing contact with two main gatekeepers, which are Car plus, the environmental transport NGO that promotes car clubs in the UK and secondly, car club operators that provide the service in London. Since the 'site' of the research - the car club and car sharing - was already decided at an early stage of this research, it was crucial to understand the characteristic of this community and set the boundaries for finding appropriate interviewees.

3.3.1 Car club user profile

Firstly, as far as specifying the profile of participants is concerned, Car plus' annual survey of car clubs has provided precise statistics which show aspects about car club users' profiles, including their ages and other related issues such as the purpose of using the shared car or the number of car hires per user at any one period. Along with the gathering of such primary information about the overall circumstances of car clubs, the typical user profile was also collected through the meeting with the former Zipcar employee.

The annual survey of car clubs in London from 2010/11 to 2014/15 was carried out by Steer Davies Gleave for Carplus with surveys of over 2600 car club members and car club operators. (Carplus annual survey, 2010/11 – 2014/15), From this survey, it was ascertained that the age profile of 25~34 years old forms the biggest proportion of car club users, while the age group of under 21 years old and age 60+ forms the smallest proportion. This 25-34 age range has formed the majority group of car clubs and this trend has remained consistent since 2010 when the first survey started.

This report also reveals that the total percentage of males was 67%, which is approximately two times higher than the percentage of female car club users. Interestingly, the figures for both male and female car club users have rarely changed with figures for males and females at 69% and 31% respectively in 2010 (Car plus, 2014).

In the process of recruiting the car club users, the sex of interviewees was not a condition of limitation, however, interestingly, among the eleven interviewees, nine respondents were men and two were women, which means that males and females corresponded respectively to 81% and 19% of the total in the actual interviews.

The survey also categorizes car club users in the UK into five distinctive types by using Mosaic, a geo-demographic profiling tool which classifies all survey respondent home postcodes into one of 67 types on the basis of the information of various factors such as house price data from land registries, local levels of council tax, etc. Among those five profiles, the top two user types are 'Urban cool' and 'Bright young things'. The report explains some of the key aspects of these two types of car club users as follows:

• Urban cool
They are well educated professionals aged between 26- 45 years old, with relatively high incomes often working in the creative industries and living mainly in inner London.

• Bright young things
They are young professionals with good salaries aged between 26-35 years old, with high outgoings, and living in an environment within easy reach of entertainment, shops and services. They predominantly live in smart purpose-built apartments in inner London.

These two user types reveal some of common features in age profile, occupational cluster and residential area, namely, the majority of car club users are relatively young professionals in their mid 20s-late 30s, living in London. Interestingly, during the conversation with the former employee of Zipcar, he mentioned that a 35-year old, male living with his partner in a flat with no parking space, is the typical profile that the company defines.

This procedure of first, collating the statistics and survey results from the car club organisations and second, identifying the key characteristics form an imperative stage. It enables the defined profile to reflect the aim of the study and maximizes accurate representation of the recruited car club users, namely, the interview participants.

On the basis of the precise statistics of the car club annual survey report in London, and from conversation with the person who had worked at the car club operator as mentioned just above, the common features of the car club users' profile have been selected: this creates the main profile of the participants for car club user interview. As a result, the key profile of car club user interviewees is as follows:

- Males or females who have used or currently use car club for more than two years.

- Residents in London.

- Young working professionals aged between 25-45.

Although the specific profile for recruiting the research participants has been defined, finding the actual car club users was much more difficult than expected, and not anticipated at the stage of identifying the profile of potential candidates due to the nature of using car clubs.

In contrast to the circumstance of finding people at a certain site, for instance, patients in a clinic or members of a church, who form a stable community where the research participants are recruited through a gatekeeper (Arcury and Quandt, 1999), finding candidates for car club user interviews was difficult. Actually meeting them was almost impossible as it would have been impractical to wait at a car club parking bay for hours until the user turned up to use a vehicle, and a single car/space is not representative of the wider picture in

London. Furthermore, it would not be feasible to request that user to participate in an interview on the spot.

Recruiting appropriate people in co-operation with car club operators in the UK such as Zipcar or City Car Club was also not possible due to the Data Protection Act (1998).

Although one of the car club operators said they could contact customers who might be interested in participating in this research work, the response meant contacting them via the social network service due to those reasons of data protection, and this approach did not yield any research participants.

As recruiting participants in cooperation with car clubs was not a viable solution, an alternative method was devised. Through a brainstorming session, various solutions were suggested: posting the participant recruitment poster on social network services such as Facebook or Twitter. Posting a recruitment poster via the RCA internal email server was also considered. Along with these recruitment processes via an on-line network, putting leaflets on car club vehicles' windscreens and through doors of houses near car club parking bays area were also considered.

Since the potential participants of this interview should be a current or past member of a car club with experience of using a car sharing mobility scheme, such specific requirements made the recruitment process slower than expected. The figures for car club surveys or analysis reports indicate that the scale of car clubs is growing rapidly and spotting car club cars with their own dedicated parking bays on London streets is quite common: therefore, it was an unexpected challenge that the recruitment of participants was difficult.

Although more than 40 posters were distributed, there was no contact or response from them, however, more than 18 people responded from on-line recruitment and five people were selected who met the user profile for this in-depth interview. Six more participants were recommended and selected and

added during the first interview round of five. The total number of recruited participants was eleven. The age of participants ranged from 25 to 34 years old, and included nine males and two females. All participants were working professionals living in inner London.

At the car club user interview, I incentivised participants by providing a (£25) Amazon voucher. Such financial incentives have been known to help motivate interviewees to participate (Signer, Couper, 2008). Incentivisation not only increases the response rate but also provides better quality of data from the participants (Beedell, 2012; Bonek Fallesen, 2008). The fund of incentivisation was made possible by the Vehicle Design department at the RCA.

In terms of the total number of interviewees, eleven people might be seen as a small sample group. However in such independent research, it was not viable to recruit a vast amount of people; eleven people were chosen as I had to consider the practicality of time for arranging dates and conducting each interview, transcribing and analysing data within the entire schedule of this research time frame. One recommendation that this would clearly lead to is that any further research would be conducted with a larger sample group of car clubs users.

Participant	Sex	Age group	Living Arrangements	Access to private vehicle	Parking space	Recruitment method
1. User interviewee A	M	25-34	House share	No	Yes	RCA email
2. User interviewee B	M	25-34	Flat share	Yes	Yes	RCA email
3. User interviewee C	M	25-34	Flat share	No	No	RCA email
4. User interviewee D	M	25-34	Flat share	No	No	Facebook
5. User interviewee E	M	45-54	Flat share	Yes	No	RCA email
6. User interviewee F	M	25-34	Flat share	No	Yes	RCA email

7. User interviewee G	M	25-34	Flat share	No	Yes	Facebook
8. User interviewee H	F	25-34	House share	No	Yes	Facebook
9. User interviewee I	M	25-34	Flat share	No	No	Facebook
10. User interviewee J	F	25-34	Flat share	No	No	Facebook
11. User interviewee K	M	25-34	Flat share	No	No	Facebook

Figure 22: Car club user interviewees basic profile

3.4 Participant observation and expert interview

The aim of conducting participant observation is to understand the users' actual ordinary activity of using a car club. Rubin (2012) states that the procedure of participant observation is to extend the general level of observation activity, when the researcher just participates in a specific group or organisations while stepping back and watching the diverse actions of the people. This is achieved through the meticulous recording of participants' ordinary activity that is subsequently analysed in terms of patterns of action and behaviour. He also urges that during the process of this method, the role of the researcher is required to be low-key as it might otherwise affect the participants' activity, which in turn could cause difficulties in observing and figuring out behaviour which would have not occurred except for the outside interference.
The collated research evidence through in-depth user interview, yielded from the interviews and participant observation, was analysed and condensed to several key insights.

3.5 Expert interviews

These key insights were presented to one of the car club operators, the researcher in turn listening to the mobility service provider's perspective on those key insights. This discussion was a way of enriching the research process,

as both perspectives from users and operators could be compared, and various aspects of using the car club - convenience or availability of use - could be analysed. Along with the discussion about car club operators, interviews with service designers and city authorities have also been carried out in expert interview sessions. These discussions have formed a way of understanding how the service design principle has been applied in the process of conceiving and providing a more convenient car club for users. The interview with the city authority was conducted in order to understand the role of supporting car club operations on-site as well to appreciate the city authority's view and prospects of the car club as a new mobility scheme in urban areas.

3.6 Validation of Proposed Solution

After the research process of defining and collating the key insights, the new car club customer journey map from user's perspective was proposed. The overall format was derived from the case study customer journey map. As Boag (2015) mentioned, the aim of creating the car club customer journey map from the users' perspective is not only an attempt to implement the key insights and suggestions, emergent from the previous research process, onto the new map, but also to see how the changed customer journey map could enhance the overall experience of using car club. For example, this might imply revising touchpoints and channels of mobility service flow, such as removing on-board computer and introducing advanced smartphone app that manages customer's entire car club usage.

In the final part of the research process, the research outcomes, key insights with suggestions and proposed customer journey map were reviewed, together with car club operators' feedback and thoughts: all of these formed the basis of the conclusion and recommendations for this research project and more broadly, for the car sharing industry.

Chapter 4. Existing Car Club models and operators

4.1 Types of car club

It is important to understand the different structures of car sharing models in the market. Currently there are three types of car sharing model, which can each be clearly distinguished, in terms of the operation of the car fleet and the usage of the shared car in each case. Understanding the unique feature of each model is helpful for consumers who are currently using or considering participation in this kind of flexible mobility. However, it is particularly significant for those who are working in the public sector, such as city councils. They require a clear understanding about car sharing because an intimate cooperation between car clubs and the public sector is expected to be crucial in the implementation of infrastructures and systems that could boost the usage of car sharing in the metropolis.

Moreover, for this research, it is also valuable for me to understand the diverse aspects of current types of car club models and operators. The research process (contextual review, participatory interviews, observations) enables me to focus and build on the positive sides while removing the negative aspects of the existing model. As a result, conceiving a car club model from the users' perspective becomes viable.

	Who owns the shared car fleets?	Reservation	Return car to original parking space?	Service charge	Vehicle access	Key operators
Round-trip Car club	Car club Operators	Required: On-line, Smartphone app	Yes	By the hour or distance	Membership card/ Smartphone app	Zipcar CityCarClub Hertz 24/7 GoDrive
One-way Car club (Free floating)	Car club Operators	Required/ On demand: On-line, Smartphone app	No (Drop-off anywhere in the service area)	By the minute	Membership card/ Smartphone app	Car2go DriveNow
One-way Car club (Station based)	Car club Operators	Required/ On demand: On-line, Smartphone app	No (Drop-off at the designated parking bay)	By the minute	Membership card/ Smartphone app	Autolib

Figure 23: Existing car club operators summary (Zeng, 2013)

4.1.1 Round trip car club

First, to be clear about terms, it needs to be pointed out that 'car sharing' is a wide-spread term that means sharing mobility, in particular in the U.S, while this mode of mobility scheme is called 'car club' in the UK (Le Vine et al., 2014).
In the first instance, the Business- to-Consumer (B2C) car club is referred to as 'traditional car club' for which the corporates, that are usually private companies, own (or lease) a relatively large car fleet and provide the mobility service to subscribed members. In general, this type of car club is the best-established model in terms of its operating system and commercial aspects.

In order to use the car club, customers must subscribe, paying a fixed annual or one-off subscription fee, which varies depending on the car club brands they choose. Meanwhile, the car club operators carry out driving record checks with DVLA. Thanks to the improvement of IT, customers could manage their car club usage via a dedicated web-site or smartphone app, specifying both the time of beginning and finalising their rental period. The fleet is dispersed throughout the city in dedicated 'car club only' parking spaces whose location could be on-street or off-street parking, depending on the circumstantial situation of the dedicated parking space.

The most obvious difference of this round-trip car club model is that customers must return the car to the same place from which they accessed it. Zipcar is the largest round-trip car club operator worldwide (Le Vine et al., 2014).

Figure 24: Round-trip car clubs, Zipcar and City Car Club

4.1.2 One-way car club (Point-to-point free floating car club)

In contrast to a round-trip car club, in a one-way car club, users can drop their shared vehicle at any place within the service (business) area.
Daimler AG 's free floating one-way car club, Car2go is an example of this type of car club and was introduced in 2012 in Birmingham and in London respectively. However, this Smart For-two based car club ceased in the UK in March 2014, as co-ordinating 32 different boroughs in London in the attempt to expand its business area proved to be more difficult than anticipated (Taylor, 2014). Nevertheless, it is worth noting that the one-way car club model is expected to attract over 351,000 members by 2020 (Frost & Sullivan, 2014), at which point the two one-way service car clubs (Autolib, Drive now) will be launched (Henley, 2014; Sharman, 2014). In December 2014, BMW introduced their free floating one-way car club Drive now, whose car fleet comprised BMW and MINI cars and which saw an operating service area in the boroughs of Islington and Camden in London (Tovey, 2014).

Figure 25: DriveNow and Car2go, point-to-point free floating one-way car club

The usage of the one-way car club is mostly spontaneous (Fergusson, 2014; LeVine et al., 2014), by which is meant that customers access the shared car when they need it, or, if they do need to reserve it, the system allows the reservation to be in place only several minutes in advance, compared to a round trip car club's one-day - or even 6 months in advance - reservation system.

The different reservation system and operation type requires behavioural changes of users. For instance, round-trip car club users tend to plan their journey in advance, considering whether they really need a car or whether the planned journey requires a round-trip, such as buying a heavy item and returning home. However, in the case of the one-way car club, the users tend to use it without planning as they do not need to return this car to the same parking spot but drive it and drop-off wherever they want (within the service area).

Such a level of flexibility means that using the one-way car club is like having a privately-owned car without carrying the burden of ownership such as maintenance, fuel costs or even insurance. Therefore, the one-way car club could be seen as an ideal model for the next generation of mobility services.
However, this model also potentially creates issues, as for example, when there is no available car to use nearby or when there is a struggle to find a parking space on arrival at the journey's destination.

4.1.3 Point-to-point station-based car club

This model also offers a one-way journey, meaning users do not need to return the car to the original parking space. However, in contrast to a free floating one-way car club, users can only access and finalize the shared car rental from a fixed rental point or station, which could be a charging station in the case of the EV car club or a kiosk for customer service. France's Autolib is the most well-known station-based car club in the world.

Figure 26: Autolib in Paris, point-to-point station based car club

Interestingly, Zipcar, the world's largest round-trip car club service provider, piloted a station based one-way service in Boston in 2014, a service which allowed users to drop their car in a selected few places such as an airport or downtown area, and in the light of this, Zipcar have recently expanded their service region to Los Angeles, Denver and Philadelphia (Newsham, 2015). Currently, the one-way service is in beta mode in Boston as is the offer of this service in between airports, downtown and select universities in Los Angeles, Denver and Philadelphia (Zipcar, 2016).

Figure 27: Zipcar's one-way pilot programme in beta phase with distinctive orange arrow logo to emphasise one-way operating system

According to Zipcar's one-way webpage, the users could choose a drop-off point across town, providing reserved parking at both the start and end of the car usage. In terms of a reservation system, like the Car2go's reservation system, Zipcar's one-way cars are available for reservation up to 30minutes in advance.

This prevents a hold up by one user for too long in one place, since this model is a one-way model and as a result, cars need to be constantly moving around the city to enhance the availability. So, judging by its operation type, it seems to be another station based one-way model, like Autolib. Such a one-way model, though still in beta mode, is an interesting attempt from the world's largest round-trip car club operators. In the paper 'Car-Lite London (Fergusson, 2014) by Zipcar, the author claims that the one-way model is interesting and there is a level of demand for this model in particular in cities where the public transport

network is inadequate and where there is sufficient space for managing additional car journeys and on-street parking.

However, he expressed a skeptical view on the one-way model as it is questionable whether this model contributes to reducing traffic congestion and emission issues in the metropolis; there are concerns about the one-way model competing with public transport, taxi, bicycle and about how it could increase car use in the city as a consequence (Fergusson, 2014). In this context, it is interesting and also important to question whether Zipcar think that the one-way model is the future of the car club and therefore that it should be adopted and expanded above the currently existing round-trip car club.

In comparison to the free-floating one-way car club, this model is less challenging to manage as users have to park their shared vehicle at a dedicated parking station. However, the trade-off of this station-based one-way model is that it offers a lower degree of flexibility than the free floating one-way car club through which the users can access the car more easily. In the case of this type of station-based model, Autolib, also provides a parking space reservation option, which could mitigate the concerns of securing a parking space when using a one-way car club model. However, when the user accesses the car in a rush without reserving the parking space, then this could still be a critical issue from the user's perspective, affecting convenient usage of car clubs in cities.

Despite the positive aspect of the one-way car club model that allows users to plan a more flexible car journey than the round-trip car club, the redistribution of those shared cars is the most crucial issue within both free floating and station-based car clubs. The availability of those one-way car club cars can be affected by tidal flows.[2] Autolib, the largest station-based car club, addresses this issue by their staff, so-called ambassadors, redistributing their cars between the dedicated parking spaces and the charging stations (Henley, 2014), along with

[2] Tidal flow is the water current caused by tides. In terms of the one-way car club, this term means that availability of cars is affected by certain time periods, such as commuting time in the morning and evening when cars stack up at some point at a train station, for instance.

offering the option of free-rentals to users who are willing to re-position shared cars (Le Vine et al., 2014).

4.1.4 How does each car club model affect the users' experience and perspective?

It is apparent that the car club has been considered an option that could substitute actual private ownership of a car. In this regard, the structure of using the car club, which enables users to access the car-based mobility scheme at a relatively low cost, has attracted many consumers to opt for car sharing as an alternative. Nonetheless, it is essential to understand how this sharing mobility scheme, which differs from owning a car in many ways such as damage responsibility or availability, affects the car club user experience.

Availability is the common issue shared by both round-trip and one-way car clubs, and one that affects users' usage of sharing mobility. Car club operators cannot guarantee the definite access of a car when and where the mobility is needed, whereas a private car is always available to its owners.

According to a report of Cambio car sharing in Germany, 93% of reservation requests are provided to the customer's satisfaction (Cambio web article, 2014). However, this statistic means that one in every 15 requests is not satisfactorily accommodated (Le Vine et al., 2014).

Damage liability of a car club car is another critical issue when using a car club as it is difficult to determine the responsibility for the damage to a car club car. This damage might range, for instance, from minor body dents to mechanical faults that from the aggressive driving of certain users. However, car club operators should strike a balance between allocating damage liability to a specific user and risking the incorrect charging of damage to a user that s/he did not cause.

Therefore, checking the rented vehicle for damage prior to starting to drive the car is the obligation of users, as failing to report any damage that has not been

reported to the car club operator or recorded in the damage log book, could mean that the current user of the shared car is liable for the damage caused by a previous user. It is reported that some car club users even arrive earlier than their reservation start time in order to conduct a meticulous visual inspection of the car so as to avoid being charged for damage caused previously (Levine, 2012).

Managing the rental duration is also a new issue whereby the users have to indicate the duration of their rental in advance. In order to maximise the car club cars' availability for other members, it is crucial for users to return the shared car at the agreed end of the reservation or otherwise, users should extend the rental duration before the end of the rental. If a user does not return the vehicle until after the reservation end time without having correctly extended their rental, they may risk paying a large penalty, and this also affects the next user's reservation, should they have booked the car immediately afterwards. In most cases, when a user needs to extend the rental due to an unexpected circumstance (for instance, traffic congestion), the extension can be managed via a text message, smartphone app or calling the car club operators. However, if the vehicle is already reserved right after the current reservation, the rental duration extension request might be denied. In order to deal with this issue, car clubs advise to reserve a rental duration of more (Zipcar, Norfolk car club, City Car Club) than the actual period they need, in order to avoid the hassle of returning a shared vehicle late: a further issue that car club users contend with while using shared mobility.

When it comes to the one-way type car club, the outcome of this model has not been fully researched yet as this is a relatively new scheme compared to the round-trip model whose system has been analysed with the support of sufficient data and evidence (Frost & Sullivan, 2014). However, as mentioned in the literature review of Chapter 2, the estimated number of car club members for a one-way model is predicted to exceed the total number of round trip model members by the year 2020.

In terms of using the one-way car club from the users' perspective, parking is most likely to be the most critical issue as the car does not return to its original parking space but may be dropped off at a different location, even though a user could return it to the same place should they wish. Interestingly, the most notable advantage of this one-way car club model, where the user does not need to return the shared vehicle to the same parking space, could simultaneously cause a complicated issue, namely if the user struggles to find a parking space at the agreed end reservation period. In the report 'Car-sharing in London –vision 2002' by Frost & Sullivan, it is pointed out that one solution for mitigating the parking issue of the one-way model is a London wide parking permit' and it is this that is thought will facilitate the growth of this model (Frost & Sullivan, 2014).

In addition, the redistribution of the shared car fleet will be an important issue that could directly affect the availability of the one-way shared car access. Since this model is subject to tidal flow, a definite plan for redistributing the car fleet is vital in order to avoid a situation whereby shared cars stack up at some point, such as a train station during commuting time, which would decrease the overall vehicle availability rate. This might also put other potential users off considering this model as a consequence.

4.2 One-way car clubs – are they more convenient and flexible for the user?

Since the introduction of the car club, most car clubs operate a round-trip model, thus customers must return the vehicle to the same place as they accessed it, which is inconvenient if the journey is one-way (Nourinejad, Roorda, 2015). Granted, many people still use a car for round-trip journey, for instance, driving to the shops to buy and transport heavy items such as furniture or lots of food and coming back home. However, in the case of using a round-trip car club for such a journey, users usually reserve a car in advance, considering not only the period of driving a car to the destination and coming back, but also needing to

prepay blocks of time for shopping when they do not actually use the car, factors that limit the attractiveness of using a car club (McGrane, 2013).

In this context, from a customer perspective, the one-way, or so-called A-to-B service, which allows customers to pick up a car at one parking bay and return it to another parking location, provides a more convenient and practical transport service than the current identical parking bay system in the case of specific journey types, as customers could use this service to reach a train station or airport whilst carrying a large amount of luggage, without being concerned of returning the car, for instance.

Figure 28: Diagram of one-way car club usage, returning of the car club car does not need to be original parking space but could be wherever user want within the service area

Furthermore, one of the core notions of a car sharing service is that it provides mobility, which interfaces with public transport and bicycle usage, and which allows people to reach their destination conveniently without being concerned about carrying heavy luggage, parking and fuel expenses in urban areas.

As a result, a few recent car sharing services including Paris's Autolib, Germany's Car2go and Drive now, subsidiaries of Daimler AG and BMW, have also adopted a one-way operation, which differentiates them from existing car sharing services such as Zipcar and Hertz24/7.

In order to tackle the parking issue, Autolib ambassador Lim Ban Kim explained that Autolib offers a parking space reservation system whereby users can book a parking space by calling an Autolib call centre or using a smartphone app in

advance (Kim, 2012). According to the survey by 6t –bureau de recherché, 67% of Autolib users think that this car club is more practical than using a private car thanks to its reserved parking place service (Louvet, 2014). BMW's one-way car club DriveNow provides a similar parking space reservation service in cooperation with ParkNow, which enables users to find and choose all nearby on-street and off-street parking spaces relative to the final destination.

Daimler AG's Car2go is the one-way car club with its Smart Fortwo cars designed for sharing, also offers the convenience of dropping-off the car without returning it to the identical parking location from which it started. Moreover, in contrast to Autolib, which is a station based one-way model, Car2go is a free floating one-way model whereby users do not need to park at the designated station but in any parking bay within the service area of Car2go.

Unfortunately however, in the case of Car2go in London, its service area was found to be considerably smaller than those of its competitors, the borough of Islington being the only service area in London. Although there is no restriction on driving a Car2go vehicle in London, the vehicle must be picked up and returned to this Car2go service area. Such a small service area overshadows the noticeable strengths of Car2go, such as the one-way service and the free parking in pay and display bays including resident permit holder bays.

It is certain that the scale of the service area is crucial to a one-way car club, particularly those free floating one-way car clubs that restrict customers to accessing and dropping-off the shared car within the service area only. In the case of closing the one-way car club Car2go, the main reason was the failure of negotiating the parking permits across the 32 boroughs in London.
This has led to the difficulty of Car2go expanding the service area in this metropolis as it limits one of key convenient aspects of using a one-way car club, i.e. that it enables users to drop-off wherever they want.

In this regard, operating such a car club in a small service area affects the most notable strength of the one-way journey, and might put people off considering the use of this kind of car club.

At the time of writing this in 2015, Car2go had already withdrawn its service in London and Birmingham (in March 2014). However, another free floating one-way car club, 'Drive now,' introduced by BMW in December 2014, offered a larger service area covering 84 square kilometres of London, in the boroughs of Islington, Hackney, Haringey and the lower half of Waltham Forest (DriveNow London, 2015). In contrast, Car2go had only covered the borough of Islington.

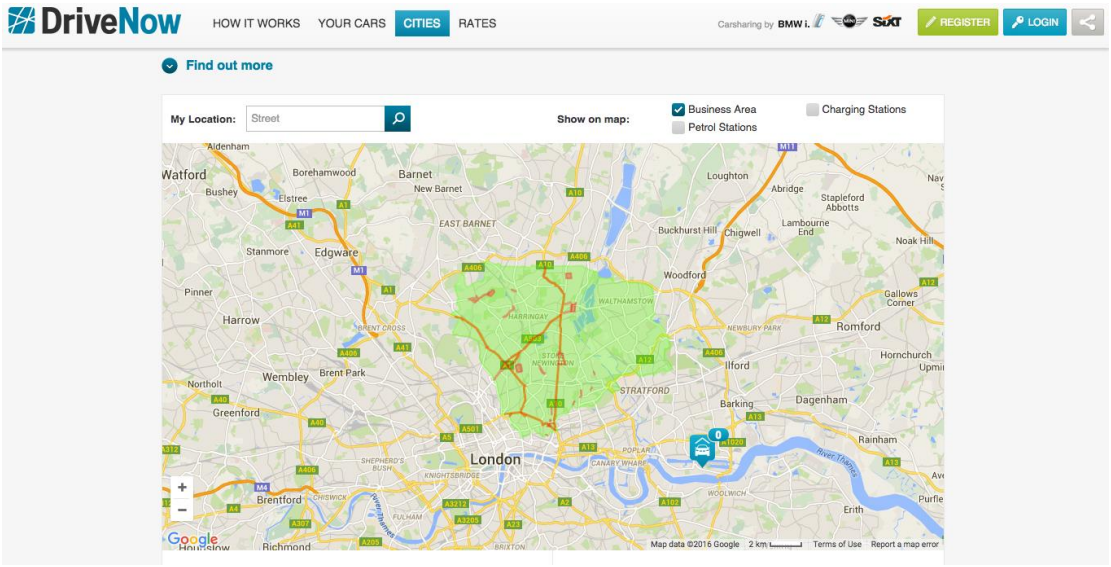


Figure 29: DriveNow's London business area (in lime green coloured)

In the case of Autolib, this station-based one-way car club boasted over 2,000 Bolloré Bluecar[3] and over 4,000 charging points in Paris as of 2014. It now offers five stations and eleven vehicles per square kilometre in Paris. With the participation of 63 town councils in and around Paris (Henley, 2014), the services area of Autolib covers almost every street in Paris and its adjacent regions. The report 'One-way car sharing: which alternative to private cars?'

[3] Bolloré Bluecar is a small four seater, three-door electric car and is deployed in Paris for the Autolib car sharing scheme.

found that the density of the dedicated parking stations and vehicles is closely related to users' sense of the convenience of one-way car clubs (Louvet, 2014).

4.3 Extra processes create barriers for new car club users

Throughout the exploration of the three different types of car clubs, a common objective has been to find out the stages that users have to go through before accessing the car. Since the car is being shared with others, those extra processes such as carrying and swiping a membership card and operating the on-board computer to identify the correct user seem to form an essential stage.
However, it is necessary to analyse the current steps to accessing a shared car and to conceive of an improved access model, as there are evidently extra steps that are not user-friendly and cause time-wasting, which is significant when we consider the loan of the car sharing is undertaken by the hour, sometimes less.

	Membership card needed to access car?	Create membership card at station	Conference call with driving license agency	Instant access to cars on day user signs up?
Autolib	✓	✓	✓	✓
Car2go	✓	×	✓	×
Hertz24-7	✓	×	✓	×

Figure 30: Accessing process table of three car clubs

4.3.1 Accessing car clubs and barriers for new registering users

In order to use the car clubs, users must subscribe and obtain membership. At the application stage, car club operators check the applicant's details such as the eligibility of the driving license (checking penalty points) for driving a shared car, bank details and the resident's address. One of the key purposes of this application procedure is to make a membership card (which is a Radio frequency

identification -RFID card key that un unlocks/locks the vehicle and an electric charging pole in the case of Autolib).

Figure 31: RFID car club membership card of Car2go and City Car Club

Although the current smartphone app also provides the same function of allowing access to the car club cars, such a card key is still important for users when they cannot use smartphone app due to a weak signal or a battery drain issue.

In three types (round-trip, station based one-way and free floating one-way) car clubs, namely, Hertz 24/7, Autolib and Car2go the customer is required to create a membership card at the rental station or on-line. In terms of the application process, there is no noticeable difference between three car club models. However, each model has revealed some barriers that would put off users or confuse them at a first stage even before experiencing the car club.

In the case of Autolib, users could make the membership card on day user signs up at the subscription kiosk that connects the customer to one of the Autolib staff in order to process the procedure in the rental station. The staff member then asks customers to scan their ID and driving license remotely and the card comes out instantly from the kiosk. Once a card is made, the customer does not need to repeat the same process to use the service again. There is an alternative option of applying for the service on-line if they do not need an immediate access on the same day of application.

Figure 32: Autolib's subscription kiosk and staff explains the process via face-to-face communication

Such an advantage, that the user could gain a membership card on the same day of application, is one of the convenient aspects of Autolib, enabling access to the shared car immediately. This is in comparison to other car clubs whereby users have to wait several days to receive the membership card.

In order to access Autolib's Bluecar, the customer goes to the rental kiosk and swipes the card over the reader and inputs the pin number to receive the number of available electric charging poles where the Bluecar is being charged.

The customer needs to swipe the card again over the reader of the charging pole to open the cover and retract the charging cable that has been pulled off from the Bluecar. The cover closes automatically for safety and security reasons of the facility. During this accessing process, if there are any problems, the customer needs to report the issues to the call centre by pressing Autolib's blue button in the Bluecar or via the rental kiosk before returning the vehicle to the parking space.

However, from the perspective of the system interface, the process of applying for the scheme and accessing the Autolib Bluecar needs more attention paid to the interaction with customers. This procedure takes too much time or could be a cumbersome process that could even contradict the slogan 'Autolib for all ages' - one of the commitments of Autolib.

In particular, the process of accessing the Bluecar seems to be a critical barrier to customers who are experiencing Autolib for the first time, as users had to go through several stages before actually sitting behind the steering wheel of their electric car. Users also need to check the safety features of closing covers of charging pole to prevent an electric-related accident or driving off while the charging cable is connected. The whole process was complicated and sometimes confusing for those who were using the electric car for the first time. Therefore, it was difficult to follow and complete the process of accessing the car without being assisted by on-site Autolib staff.

Since accessing the electric car is unfamiliar and requires several extra steps compared to other car clubs cars driven by internal combustion engines, such a critical barrier could be mitigated by providing info graphics that explain the process of accessing electric cars for the shared mobility scheme. This could be accompanied by an alarm messenger at the end of the rental to remind users to charge the electric car after use for the next users.

In comparison to Autolib's process, both Hertz 24/7 and Car2go's subscription process is similar in many ways. Users need to fill out an application form on-line or visit a Hertz or Car2go branch that participates in the off-line membership service. Once the customer has completed the form and submitted it, car club operators will check the applicant's eligibility by checking their driving license and bank details and then the applicant can visit the rental offices to collect the membership card (or key fob for Hertz 24/7) or wait to be delivered via post.

Figure 33: The subscription process of car clubs in UK

However, a barrier to the service occurred at the very first stage when I tried to join Hertz 24/7 myself. The process of collecting the key fob from the nearest

Hertz office did not work as advised because some of the Hertz offices, in particular the B&Q Hertz office which is dedicated to commercial van vehicle hire office, did not have any information or knowledge about Hertz24/7.

As a result, I had to call the customer centre and visit another Hertz branch to collect the key fob. It seems that such time-wasting at the very early stage of the service may deliver a negative impression to customers who have just become members.
Turning to the Car2go, a similar issue occurred during the application process of Car2go when I visited office. Customers can also visit the Europcar Car2go membership branch, which is located near Kings Cross station, to complete the registration process and collect their membership card on the same day. However, it seems that the experience of being able to join by visiting the only physical Car2go branch is not enough to support Car2go's confident slogans, such as 'The urban mobility revolution', as there is no sign or logo of Car2go at the Europcar Car2go Kings Cross branch. It just looks like one of Europcar's other rental branches. Moreover, the staff member in charge of managing the Car2go membership was not in the office, so I had to wait half an hour to be served. Moreover, the process of managing the membership was not smooth as it took a while to find the membership card registration machine.

Perhaps most customers join the car club service on-line and only the few who need to collect their membership card on the same day actually visit the car club's office. However, my impression of processing the application by visiting the both Hertz 24/7Car2go office was that the procedure was insufficient to live up to the message of the brand promotion. Together with the inconvenient registration for the service and incorrect information, the office experience failed to give a positive impression of a car club which is in pursuit of becoming a truly practical alternative urban mobility service in the cites.

Figure 34: Images of Hertz 24/7 and Car2go's office

Thus, this imperfect practice should be revised and the correct information should be provided on the website in order to reduce such inconvenience. Otherwise, such confusion will not end up as just a waste of time but will put people off considering car club membership and they will keep using their current travel mode of using public transport; seek out another car club, or even lead them to buy a car instead.

4.4 The growing importance of smartphone app in car clubs

Along with the growth of the sharing economy, the rapid improvement of ICT has effected the sharp increase of the car club we see today. In particular, the role of the smartphone app is becoming more significant than before, and is expected to play a key role in not only managing their shared car fleet more efficiently but also allowing car club operators to attract more members (ITS international, 2015). From the users' perspective, the distinct benefits of managing car club usage via a smartphone app include the factors such as first, it is quick and easy; second, it allows users to manage their reservation, find and access the car club car via a smartphone app; and third, it provides extra features for driving, using a sat-nav or listening to music.

Figure 35: Car clubs smartphone app, offering functions such as locating and accessing the reserved car

Moreover, providing such a smartphone app-based user accessing system also offers benefits to car club operators (Fillenberg, Pflug, 2012) in terms of the reduction in costs as they do not need to install in-car computers for each car club car in their fleet. In addition, the device is equipped to manage several other functions such as identifying the driver or processing a damage report.

On the other hand, there are several inherent security issues with a broader expansion of the smartphone app in car club usage, such as the risk of hacking, data corruption and viruses, along with practical difficulties which users might experience, for instance, the weak signal that disables access to the car in underground parking bays, and the battery drain issue that also disables access and use of the car club car. Nonetheless, the advantages of expanding the smartphone app-based car sharing system outweighs such problems and is estimated to be mitigated through technological improvements such as enhancing the level of security.

According to the research analysis 'Vehicle-sharing technologies market ripe for growth' by Frost & Sullivan in 2015, the current RFID membership card-based access system is still prevalent in most car clubs in the short to medium term. However, this report forecasts that the majority of the car club operators will move toward 'Near field communication' (NFC) and Bluetooth low energy (BLE) based technology in the medium to long term. In this context, there were two major consolidations between car club operators (Zipcar and LocalMotion, Enterprise carshare and Metavera) in 2015 and it is expected that there will be

more consolidations among car club operators and technology-providing companies while more and more OEMSs will participate with their own car club brands (Frost & Sullivan, 2015). Such consolidation will allow existing car club operators to improve and strengthen their existing smartphone app and enable them to attract more people to join the service by enhancing the user experience via the wide adoption of a smartphone app-based car club usage management system.

4.5 Summary

In this chapter, diverse aspects of car clubs, including three different types of car clubs and key issues and barriers from the users' perspective, have been explored. Regarding the key aspects of each type of car club, first of all, the round trip car club is still the best established model in terms of operational and commercial aspects. In the case of London, most car clubs operate round-trip models, while BMW's DriveNow is the one and only free floating one-way car club model while the station-based Paris Autolib is about to commence its service to the London public in summer, 2016 (Source London, 2016).

In comparison to the current round-trip model, whereby the users need to return the car to the identical parking bay, the flexibility of the one-way model is that the car does not need to be returned to the same place but could be drop-off wherever required. This is one of the distinct advantages of this one-way model and as a result, it is anticipated to attract more users than a round-trip model in future.

However, in order to maximise the strength of operating a one-way car club, the imperative task of car club operators is to expand the service areas that allow users to drop off the car club car. In this context, Ca2go's failure to expand its parking network for free floating car clubs, due to the difficulties of liaising with 32 separate boroughs, was the main reason for the withdrawal of DaimlerAG,'s one-way car clubs from London in 2014, which was less then two years after its introduction.

When it comes to use the car club car, availability, damage liability and managing rental duration were the key issues from the users' perspective. In particular, the availability and management of the rental duration are co-related as late return affects the overall availability of the car club cars and car club operators cannot guarantee the availability to the users as it further affects demand rates of users. In this regard, when more and more one-way car clubs are introduced into London in the near future, it is anticipated that several related issues will arise such as the redistribution of cars across the city and securing parking space upon arrival at the destination. This issue will be a critical aspect from the users' perspective because car clubs are joined for a more convenient and efficient mobility service than that of driving a private car in London.

Turning to the growth of the smartphone app-based car club managing system, it is apparent that its role will become more significant than ever under the current circumstances of rapid improvement of ICT and the competitive car club market in which more OEMs are anticipated to participate with their own brands. Thanks to the smartphone apps that makes car club usage quick and easy to use, more people will join car clubs. This kind of shared mobility service could provide enhanced user experience while lowering the barriers for new users by offering detailed information such as accessing and driving a car club car as well as a swift and precise damage report to avoid incorrect damage liability. Although there remains the inherent issue of security risk, the advantages of such a smartphone app-based system outweigh those concerns and this technology is expected to expand significantly in the medium-to long term in the car club market.

Having completed the theoretical reviews and studies that have covered the major types of car clubs and the key issues of this sector, the next important stage of research is to experience three different types of car clubs for myself, adopting a participatory approach and analysing each car club in turn. This will be carried out in the next chapter – Chapter 5 Case studies.

Chapter 5. Case Studies

In this chapter, three forms of car club are presented in order to illustrate an in-depth understanding of the current status of car club schemes. This will be undertaken through empirical observation and analysis.

The aim of this chapter is to have an in-depth understanding of the car club schemes that focus on each model's operation system from the users' perspective from the awareness stage to joining and finalising the car club usage. How exactly do users access the mobility scheme and use it? In terms of selecting the existing car club models, this research focused on B2C, a 'business to consumer' model that is operated by corporates with a relatively large number of their own car fleets and service coverage area, in contrast to a 'p2p' (peer-to-peer) model.

Therefore, two main types of car club models, the one-way model and the round trip car club model, were reviewed. In terms of the one-way model, there are two specific types of model: the point-to-point station-based car club (Autolib) and the point-to-point free-floating car club (Car2go). Turning to the round trip model, Hertz 24/7 was reviewed in order to understand this type of car club.

5.1 On-site case studies of three different types of car club

5.1.1 Car2go (free floating one-way car club)

It is clear that the decision of Daimler AG to participate in the car sharing market by launching its own brand shows that this market has a future and is growing. Car2go, a subsidiary of Daimler AG, was the first car sharing brand from a major car manufacturer and began its service with a car fleet which included Smart For Two in 2008. Although there may not be a direct correlation, it could be argued that the introduction of Car2go under the management of Daimler AG instigated the involvement of two other German car manufacturers in the car sharing

market with their brands, namely DriveNow by BMW and Quicar by VW in the same year, 2011.

Figure 36: Three car clubs from German OEMs, Car2go, DriveNow and Quicar

The Car2go car sharing system has distinguishing aspects from other car sharing services on offer in London. In particular, it delivers the impression that its vehicles are specifically designed for shared use, more than other car sharing companies that use normal passenger vehicles. For instance, it operates a car fleet of Smart For Two of which each car is equipped with a touch-screen interface integrated into the IP and a membership card reader that is not just a reader with blinking signal lamps but which also displays detailed information such as parking dates and times, and the vehicle's rental availability.

In addition, the one-way service, for which the pick-up point and drop-off parking bay do not need to be identical, and the free parking within the Car2go service area ("home area" according to Car2go), were praised by the media (McGran, 2013; Gardiner, 2013), as being the specific advantages of this new mobility scheme.

However, the car fleet of Smart For Two is relatively small and although this can be seen as suitable for urban commuting, it can only offer relatively small luggage space, and only small service areas in London. These three limits have aroused concern about the practicality of the scheme.

Figure 37: Car2go's car fleet with one kind of model and small luggage space

Finding a Car2go vehicle around the service area is quite easy thanks to Car2go's distinctive brands – every Smart For Two is painted in the colours of metallic blue and white with large 'Car2go' logos. Like other car sharing vehicles, after checking the vehicle's number plate against the reservation, the first step in accessing the car involves swiping the membership card over the card reader in the front windscreen. However, unlike the other cars' card readers, which just blink a couple of times, Car2go's card reader has a small screen, displaying the current status of the vehicle –whether it is reserved or not. This feature is one of the unique aspects of the Car2go vehicle, asserting that this is designed for shared use. After swiping the membership card, a welcome sign is displayed on the card reader screen.

Figure 38: Locating and accessing Car2go's car

At first glance, the interior of the Smart ForTwo Car2go looks exactly the same as a normal Smart For Two. However, a large touch screen, integrated into the centre fascia, asks the customer to input a PIN number, revealing that this car is specifically designed for car sharing use.

The car sharing vehicle's in-car computer (telematics system) is a really interesting aspect that defines the purpose of the vehicle, as this device plays a significant role in enabling customers to commence and finalize the rental. Extra functions such as extending the rental duration, emergency calls and sat-nav depend on the service provider.

The fact that Car2go is operated by Daimler AG allows the Car2go vehicle to be equipped with an integrated touch-screen interface in-car computer which brings a new quality to the shared vehicle interior, delivering a neat environment without having an after-market cheap looking device in the IP.

A specifically designed touch-screen interface has other advantages. It asks the customer to report visible damage to the car by providing not just a yes/no question but also by allowing the customer to rate the cleanliness of the vehicle's exterior/ interior by clicking on a happy/unhappy smile icon.

Figure 39: Car2go's interface of its built-in touchscreen in-car computer

It shows a still image cut induction animation, which explains the position of the ignition key and that the ignition is situated behind the gear lever. Since the position of the ignition of the Smart For Two is quite different from other passenger vehicles, this animation is very useful to first time Car2go users.

The sat-nav is a most useful feature among the Car2go's in-car computer functions. Since no other London based car clubs' vehicles provide a built in sat-nav feature, customers have to rely on smart phone navigation apps or on carrying their privately owned sat-nav. A built in sat-nav and touchscreen might not be the most cutting- edge technology (it also potentially introduces the issue of how up-to-date maps and interfaces compare to the latest sat-navs from other companies), but the on-board system nonetheless gives Car2Go a unique selling point compared to other car clubs, and means the user isn't reliant on their own technologies - sat-nav or smartphone - to navigate on their own.

According to author Scott Le Vine in the report of Car rental 2.0, investments and evaluating design solutions for the shared-use market can lead to further improvements, which will allow customers to use shared purpose items without much difficulty.

In this regard, the fact that Car2go vehicles are equipped with a built-in touch-screen interface system shows one advantage of a car sharing scheme being owned and operated by an automotive Original Equipment Manufacturer (car brand), as it becomes feasible to develop bespoke design solutions to suit the car's shared usage, and adapt the car fleet for its shared purpose, in a way which goes beyond mere 'add ons' that we could find from other car clubs. As more OEMs are anticipated to participate in the car club market with their own business model (Frost & Sullivan, 2015), those car club cars might possess the advantage of providing a car that has been designed for car-shared purposes.

Figure 40: Sat-nav screen of Car2go Smart For Two

In many ways, it is true that Car2go shows distinctive aspects, such as the one-way service, free parking and the built-in integrated touch-screen interface for the sharing mobility scheme, which none of its competitors based in London have. However, the relatively expensive hourly rate cost (£14.90/1h), and option of only a 2-seater car that does not have much luggage space could limit its market appeal. Furthermore, the small service area of Car2go – limited to the borough of Islington - potentially outweighs all of the distinguishing features that Car2go offers.

Nevertheless, there is no doubt that Car2go, the first car sharing concept from the major car manufacturer with a car fleet of Smart For Two for shared usage, shows that a new mobility scheme does not require radical changes in the vehicle architecture or systems. In addition, it is certain that operating the specifically decorated Daimler AG's Car2go vehicle delivers a clear image to the community and customers.

Surprisingly, just after my on-site research on Car2go, Car2go London announced that they would stop their service in the borough of Islington at the end of February 2014. This was the second time that the company had stopped its scheme; their service in Sutton ceased in November 2013. According to Car2go London, they are trying to relocate the service area to central London in order to provide a central London operating area.

Figure 41: Car2go's service area in London during its operation until March 2014

This information, suggests that Car2go's limitation to a single borough of London has been a serious limiting factor to the company's success in London. This does not mean that the former Car2go service area is not suitable for car sharing, but the unique advantages of Car2go will stand a much greater chance of appealing if Car2go can negotiate complicated issues such as using a parking bay free of charge or managing extra parking spaces for Car2go vehicles within other boroughs in central London.

However after the case study, Car2go withdrew its service in UK in 2014 due to challenges such as the difficulties of negotiating separate boroughs in London to expand its service area. In this context, the introduction of other one-way car clubs, DriveNow and Autolib, in London, is interesting. It enables us to observe how they would tackle such a challenge that led to the closure of Car2go, namely, maximising the unique advantage of allowing users to drop-off the car whenever they want: a core strength of using a one-way car club.

5.1.2 Autolib (Station based one-way car club)

In October 2011, Autolib commenced a pilot programme with 66 Bluecars and 33 rental stations in order to test and evaluate a car sharing scheme in Paris. After two-months of the test period in which 100 users participated, the official service of Autolib was inaugurated in December 2011 with 250 Bluecars and 250 rental stations.

In terms of the overall structure of the sharing concept, Autolib's car club service is similar to most car sharing companies' offers to users: flexible hiring hours, inclusive insurance, fuel cost in tariff, and the autonomous pickup and return of the vehicle.

One of the distinguished services that Autolib provides is an ambassador who helps customers adapt to the scheme and ensures the service operates without any difficulties. During the on-site case study of Autolib in Paris, ambassador (staff) Lim ban Kim explained the tariff of the scheme that offers 5 different

options. The costs involved are various from €10 to €165 per rental transaction of up to 4hours, depending on the tariff that the customer chooses. Each tariff comes with a 20 minutes minimum hour and the extra rental period from the original agreed duration is charged by the offer rate of the tariff.

Figure 42: Autolib rates

The rental station, subscription kiosk, rental kiosk and electric charging pole, which form the infrastructure of Autolib service, have added another dimension to the Paris streetscape in the form of unifying colour schemes and unique design. The hemisphere shape of the rental station looks futuristic and sustainable, being constructed in a light grey colour with a transparent glass wall on each side, and providing shelter to customers when they are making their Autolib badge or communicating with staff via the rental kiosk.
The IER[4], a subsidiary of the Bolloré Group has designed and provided the salient kiosks of Autolib - subscription, rental and electric charging pole.
All of these facilities also have a colour composition of light grey and medium grey conveying the characteristic shape of the company through the sharing unifying design languages.

[4] IER is a manufacturer of terminals and kiosk for controlling and tickets for transport system. This company is a subsidiary of the Bolloré Group.

Figure 43: The station and kiosks of the Autolib service show a unifying design language

5.1.2.1 Autolib Blue car

When Autolib commenced service in 2011, the specifically designed vehicle for the scheme, along with the innovative service that Autolib provided to customers, drew much attention from the media (Willsher, 2011). The Bolloré Bluecar plays a vital role in the scheme that enables customers to move on to their destination while experiencing the extra degree of flexibility such as 'one-way driving' service. Currently, 2500 Bluecars are being operated in Paris and the vehicle fleet is being extended until it reaches 3000 cars by the end of 2015 (Henley, 2015).
These Bluecars are manufactured and supplied by Cecomp in Bairo, Italy under a joint venture by Bolloré and Pininfarina called Vehicule Électriques Pininfarina Bolloré (VEPB).

The Bluecar is a 4seater 3door hatchback adapting electric-driven power train. The propulsion system can generate 50kW with 130km/h maximum speed on the motorway. Since this vehicle is a 100% electric-driven car it does not generate local emissions nor noise. In terms of its driving range, the Blue car has a range of up to 250km in urban areas and 150km on the motorway. According to Autolib Communications & PR *Vanessa Colombier,* 90% of car drivers travel less than 100km; hence this is enough capacity to cover most of the driving

range. However, the time required to recharge the vehicle still creates an issue, as a full recharge takes about four hours.

Figure 44: The Bolloré Bluecar

The first design of the Bluecar was conceived and developed with the help of the former Renault designer Philippe Guédon who designed Renault Espace, and was unveiled at the 2006 Geneva auto show. At the 2008 Paris motor show, Pininfarina introduced the concept electric car, Bo, a design led by Lowie Vermeersch, a former Design Director of Pinininfarina, and was created in collaboration with battery company, Bolloré

The current Bolloré Bluecar for Autolib has been developed along the lines of the Pininfarina Bo concept in terms of the layout for accommodating the LMP (lithium metal polymer) battery.
When it comes to the styling, the current Autolib Bluecar delivers the aesthetic value of Pinninfarina Bo concept as shown to the media apart from a few changes made in the numbers of doors. The Autolib version has adopted a three-door body compared to the five-door body of Bo; additionally, some details such as front/rear lights and roof have been redesigned.

Figure 45: Bolloré Bluecar 2006, Pinninfarina Bo and Bolloré Bluecar for the Autolib scheme

The first thing that creates an impression is the unpainted aluminium body with the triangular shape on the side surface, which has been derived from the Bo concept, and which defines the distinctive character lines of the car.

There are several reasons why the vehicle has used an aluminium body panel. Adapting an aluminum material might be able to reduce the overall weight of the vehicle that leads in turn to an increase in energy consumption and to the driving range of the Bluecar. In particular, the unpainted body of Autolib's Bluecar seemed an effort to reduce the weight of the electric driven car as much as possible.

However, when Autolib introduced their car club service in Indianapolis, U.S and in London in 2014 and 2015 (Voelcker, 2014; Prynn, 2015), all cars were painted in white and red respectively. This created the assumption that whether this electric driven car was painted or unpainted does not seem to be a critical problem in terms of operating in cities.

Figure 46: Autolib service in Indianapolis, U.S and London, U.K

The overall proportion is similar to the size of A-segments vehicles category that encompasses small city commuter cars like Smart For Two or Volkswagen UP. The latter possess an ideal length for driving and parking in crowded urban areas.

	Autolib Bluecar	VW Up
Wheelbase	2,500 mm	2,420 mm
Length	3,300 mm	3,540 mm
Width	1,720 mm	1,641 mm
Height	1,610 mm	1,489 mm
Kerb weight	1,070 kg	929 kg

Figure 47: Autolib Bluecar retail version and VW Up with dimensions

From the front quarter view, the cab forward design defines the appearance of the car, which looks more spacious and bulky than its actual proportion as the A-pillar has moved substantially forward.
The impressive large glass window of the rear door offers good visibility for driving and reversing although the absence of a rear window wiper might cause road accidents such as reversing into something or even someone - due for example, to low visibility when driving in wet weather. An electric charging socket is located on the right hand side of the vehicle. The socket cover locks automatically while driving and being charged.

Other interesting features of the exterior of the Bluecar are firstly, the livery decoration on which slogans of Autolib and its logo have been placed. The livery of the current Bluecar has been simplified more and is less colourful compared to its flamboyant livery, which consists of a blue, yellow and red speech bubble, promoting slogans of Autolib, as at the official opening of the service in December 2011. On each door side, Autolib's slogans have been adhered with a friendly font: LIBRE COMME L'AIR ('Free like the air') ZERO BRUIT ZERO POLLUTION (No noise No pollution).

However the awkwardly large decal of the Pininfarina logo on the front bonnet and rear door spoils the balance of the graphic composition.
In terms of the details of the design parts, the front and rear lights have been simplified too much and have failed to convey any design values but are rather recognised as mere signal lights for traffic regulation reasons. In particular, the awkward non-covered front lights, that show a huge gap between Pininfarina Bo and Autolib versions, spoil the first impression of the car although the compromise of design for mass production is inevitable.

Figure 48: Exterior of the Autolib Bluecar

The interior of the Bluecar is the epitome of simplicity for the public car sharing service that requires not only an easy interface to maneuver and to drive the vehicle but also a simple shape of the interior that allows easy cleaning and maintenance by the company.

The specific consideration of developing the interior of the vehicle was to deliver the impression that this car's interior is similar to a normal car.

"When developing the interior of the car, we thought it ought to be like a car. The other few specific aspects were to use easy to be cleaned materials, be as safe as possible and technically fitted to welcome the embedded PC.

From the customer's perspective, the car in a car-sharing service is becoming a commodity. Hence it has to be comfortable, simple and easy to drive and clean." *Vanessa Colombier,* Autolib Communications & PR (2012).

Figure 49: The interior of Autolib Blue car

The interior is simple and rather austere without any architecture or features that draw attention except for the central monitor that displays the gear position, driving speed and battery status on the dashboard. The onboard information screen that is embedded in the IP surface is big enough for customers to use various functions, including sat-nav, radios, nearest kiosks and induction videos for the initial driving of the Bluecar.

It seems that the conventional layout of gear shifter and trio of HVAC dials conveys the intention that 'it ought to be like a car'. However, other switches placed below the HVAC dials reveal massive gaps between buttons with a poor tactile feel, degrading the perceived quality. Even the ignition key was hung with a plastic string.

Figure 50: Details of Interior of the Bluecar

As Colombier explained above, the aim of developing the interior is comfortable, simple and easy to drive with easily cleaned material. It is certain that the Bluecar's interior is intuitive in that it enables users to understand and maneuver the vehicle easily. However, a couple of detailed aspects reveal substandard quality that could degrade the cabin ambience and hinder the delivery of a positive impression to customers of Autolib.

On the driver's seat, the position of the H-point is similar to other A-segment vehicles, which gives good visibility thanks to the cab forward design allowing a large front windshield. However, according to Autolib, some customers have complained of poor visibility as the driver's seat cannot be adjusted in various ways but only can move forward and backward with the pedals adjusting the position. When I drove around the city in the crowded streets of Paris, the Bluecar was comfortable and agile, showing fast enough acceleration with no difficulties in following the traffic flow in the city. One of the most noticeable features is that it was a very quiet car.

Since the Bluecar uses an electric drivetrain, it hardly generates any noise whilst being driven, hence there is an extra horn switch located behind the steering wheel to warn pedestrians or bicycle riders as a safety measure. The central monitor on the dashboard displays the current balance of the battery and gives a warning signal if the residual balance goes below 45%. Driving on the road, following the direction of a sat-nav was a unique experience that has completely

changed my perspective of the electric vehicle. The ride was fun with nimble steering for changing lanes and direction.

The on-site case study of Autolib showed the convenience of using a one-way model in the metropolis. In contrast to Car2go, which is a free floating one-way model, Autolib's Bluecar could only be dropped at a designated parking station. Moreover, the fact that this car is EV means that the range could cause anxiety and be another critical issue to Autolib users.

However with the solutions of the reserved parking service and the increase in the number of charging poles, whose numbers were approximately 14,000 in 2014 (Electrive, 2014), Autolib is forecast to increase up to seven million in France by 2030 (Todd, 2014). It is anticipated that this station-based one-way model could be as flexible and convenient as the free-floating one-way model. Moreover, investment to support the infrastructure and car fleets with a better service in the mid-term geared at offering a seamless mobility scheme in Paris, means Autolib could provide almost the same degree of convenience as driving a private car without carrying the chronic concerns of owning a car that is used once a week or even less in the city.

Most of all, it is certain that the considerably wide service areas of Autolib in Paris, an area comparable to inner London, compared to Car2go's small service area when operating in London, is the most noticeable advantage from the users' perspective. This could provide the utmost level of convenience of using one-way car club to its users. However, like Car2go, the fact that this car club has only one-kind of model limits the option of enabling users to access diverse car types such as vans, when they need to transport heavy luggage. On this matter, Lyndsey Donald, senior brand marketing manager of Zipcar, mentioned that Zipcar's range, from small city car to van, was a unique selling point and appealed to users when competing with Car2go in Vienna, Austria when Zipcar launched. This shows that providing diverse models in the car club fleet is not only a crucial issue to car club users but also to car club operators in their drive to be more competitive than ever in the market.

5.1.3 Hertz 24/7 (Round-trip car club)

The rapid growth of the car sharing industry has led traditional car rental companies to participate in this industry through various types of business models, such as by launching joint venture companies between traditional car rental companies and major car manufacturers' own car sharing brands, namely Europcar+Car2go (Mercedes-Benz), and Sixt+Drive now (BMW). In contrast to the cases above, Avis acquired Zipcar, the biggest car sharing company, in 2012.

Interestingly, Hertz, which is one of the major car rental companies, introduced its own car sharing brand, Hertz 24/7, to the UK car sharing market in 2013. Instead of launching a joint venture company or merging with an existing car sharing company, Hertz entered the car sharing market with its own brand, which is a renowned brand in the traditional car rental market.

Prior to mentioning the system and service aspects of Hertz 24/7, the branding itself deserves a mention: Hertz added the numeric title '24/7', which conveys the notion that the service can be accessed whenever customers want and wherever they are. In fact, this car sharing service was introduced previously with the brand 'Connect by Hertz' and before that as 'Hertz on Demand'. However, there is no doubt that the current branding, which is a combination of Hertz and 24/7, delivers the image of swift and convenient access to the service for customers more than the two previously used brands.

Figure 51: Hertz's car club brand, Hertz 24/7

I joined and experienced the Hertz 24/7 car sharing service to observe and understand the car sharing service, which was launched by a traditional car rental company.

The vehicle was parked at the 'car club only' parking space at Imperial College. Opening the door was the same as with any other car sharing vehicle, i.e. by swiping the key fob (card) on the card reader. The signal that the car was open was a blinking green indicator on the card reader along with the signal lamps of the car. The similarity continues to the inside of the car as the customer is faced with a small in-car computer device attached to the HVAC control panel.

Figure 52: Hertz24/7 keyfob and accessing the reserved car

Except for Zipcar vehicles, every car sharing vehicle is equipped with its own 'in-car' computer device (telematics system) which enables the customer to begin / end the rental and report damages or other issues directly to the customer service centre. Above all, its most significant function is to provide the total duration and mileage at the end of the rental. Since Hertz 24/7 does not provide a certain distance of free mileage as Zipcar does, it is critical for the customer to be aware of this information as they need to pay extra for the mileage they have done and they also need to pay an extra charge if the total rental duration exceeds the originally reserved period.

It is important for designers to pay attention to the design of the in-car computer device as this will be the first and last touch point for customers who use the car sharing vehicle. Thus the HMI issue of this device, which considers the overall aspects of it, for instance, the position of the device, its tactile quality, controllability and other aspects, should be explored further.

Moreover, most car sharing services such as City Car Club or Hertz 24/7, whose car fleet comprises existing mass production vehicles with additional in-car

computer devices provide quite limited information compared to other car sharing services such as Car2go, DriveNow or Quicar, which are operated by major car manufacturers.

Although the car sharing brands from major OEM companies also use mass production vehicles, which are not specifically designed for the purpose of car sharing, those cars' in-car computer devices are operated with an integrated touch screen in the IP, providing various information and functions, including sat-nav and induction video for first time users.

It is true that most cars in the car sharing company's fleet have not been developed with consideration of them being used as shared cars, hence the adding of an extra device that might be the most efficient and feasible way for most car sharing service operators. Therefore, through this on-site research, I think that a cheap looking in-car computer interface system such as the one used by Hertz 24/7 reveals the problems that urge car manufacturers and designers to consider a better solution for developing purpose-engineered vehicles or ones designed for shared use.

Turning to the Hertz 24/7 car-sharing vehicle's in-car computer device, it is relatively small and has a simple but intuitive layout with green and red buttons, and an imprinted telephone icon. The device operates automatically, with a welcome message and the customer's name when the vehicle is opened with the key fob.

Figure 53: Hertz 24/7' in-car computer

In contrast to City Car Club or Car2go, Hertz 24/7's in-car computer does not require the input of a PIN number. It asks several questions which require YES/ NO answers regarding a valid driving licence and the damage status of the vehicle before starting the engine. This in-car computer device (called the screen pad by Hertz 24/7), is reminiscent of a beeper. It also has a central button in case of an emergency situation and for extending / ending the rental service.
During this on-site user experience research on Hertz 24/7, the most embarrassing moment was when trying to find the ignition key. My reserved vehicle was a Ford Focus 13' and when I tried to find a key, it was neither placed in the glove box nor hung by a plastic string. Instead it was placed in a hidden side pocket, which only the Ford focus has. Since this rental was not booked for one or two days but by the hour, such unexpected confusion led to a waste of my rental time, and I was really frustrated and annoyed for a moment as a shared vehicle user.

Figure 54: The ignition key in the side pocket, Hertz 24/7 fuel card is only acceptable at the Shell fuel station

The overall interior architecture of the car is exactly the same as a normal vehicle except for the screen pad. There is no sat-nav as most car sharing vehicles' trim level is the basic grade. However, the £30 limit Fuel card placed in the sun visor shows the purpose of this car, a vehicle to be shared.
At the end of the rental service, the car should be returned to the same parking bay, which is a reserved parking location only for car club cars.

After driving a car around London and returning it to the same parking location, finalising the rental requires two more procedures in order to conclude the

journey properly and in time: pressing the 'Yes' button in reply to the question of whether customer wants to end the rental; and swiping the key fob over the card reader in the front windscreen.

The screen pad displays the total duration and mileage that the customer has driven and provides clear figures about whether or not the usage of the rental service has exceeded the original booking period. A text message is received showing the total fare, which is a combination of the hourly rate (£6.00/1h) and the distance rate (£0.20/mi), and then the whole journey of using Hertz24/7 is concluded.

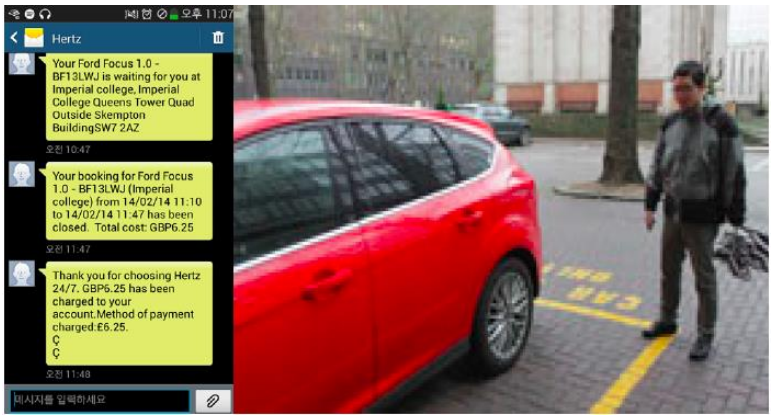


Figure 55: Finishing the Hertz 24/7 rental

It is fair to say that there was not much difference between the Hertz 24/7 car sharing service and other round-trip car clubs such as Zipcar or City Car Club. The reason for this similarity is that the existing round-trip process is well known among the users. It could be argued that Hertz 24/7 might not need to offer a different or distinctive service compared to the others, as delivering a user experience that is similar to the other existing services will avoid any unnecessary confusion.

Moreover, it is evident that the fact that users could access diverse kinds of cars from small city car to Van is one of the unique merits of the Hertz 24/7, despite its smaller number of cars in the Hertz 24/7 fleet, compared to other round-trip car clubs in London. According to Hertz 24/7, there are around 40 cars in the

Hertz 24/7 car fleet in London as of 2016, the total number of which is considerably smaller than Zipcar's and City Car Clubs who boast approximately 1700 and 750 cars in London respectively.

Another distinguished aspect of the Hertz 24/7 is the fact that users do not need to be concerned about the parking space due to is round-trip type of operation. This is an interesting issue, because from a certain point of view, the fact that the user must return the car to the identical parking space could be seen as a factor that has limited the car club's attractiveness.

However, let us refocus on the current circumstances of car clubs in London: more and more one-way car clubs are expected to be launched; the factor of unsecured parking space on arrival, and the redistribution issue of one-way car club cars across the city to increase the availability of car club cars. These circumstances mean the unique selling points of the round-trip car club will not be just about providing diverse cars in the fleet, but also be about the fact that users do not need to be concerned about a parking space when they finish their rental duration. These factors together might well turn into other unique selling points of this model.

5.2 Smartphone apps of each car club model

As mentioned in Chapter 4, the importance of the smartphone app in a car club is growing and anticipated to play a key role in providing enhanced user experience. It enables car club operators to become more competitive and successful in the car club market. Therefore, in this sub chapter, I will discuss smartphone apps of three car clubs from the on-site case study.

5.2.1 Smartphone apps of three car clubs

To a greater or lesser extent, it is widely accepted that the rapid improvement of IT and mobile technology has paved the road for the growth of the car sharing industry. This is because customers are able to check up-to-date information

regarding their car hire issues, such as vehicle availability or reservations, confirmation and invoices after the rental.

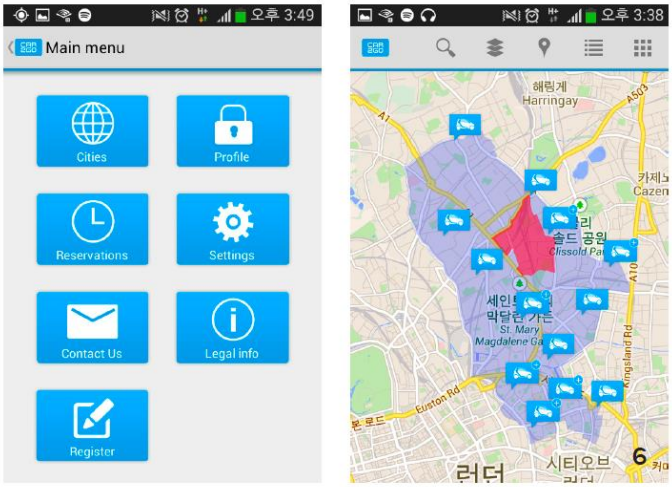


Figure 56: Car2go's smartphone app screen

Car2go smartphone apps provide various kinds of information including the nearest available vehicles from the current location of the user, other participating cities, and contacts for customer services and reservations. Above all, reservation is the most significant part of this app, enabling customers to reserve a car via the app or on-line up to 30 minutes prior to the usage. In contrast to Hertz24/7, where the customer can reserve a car up to six months in advance, there is no function for setting the pick-up and return date and time on the Car2go smartphone app.

However, once the customer chooses the nearest vehicle, either on-line or via the smartphone app, it is reserved for 30minutes and then returns to available status if the customer who has reserved it does not use it. In addition to this new rental system, customers can also use any available Car2go vehicle parked in the service area, as long as it is not reserved. Moreover, one of the distinctive features of the Car2go app is the detailed status of available cars that is displayed, such as the number plate, residual quantity of fuel (%), and the postcode of the car's location with the distance from the customer's location.

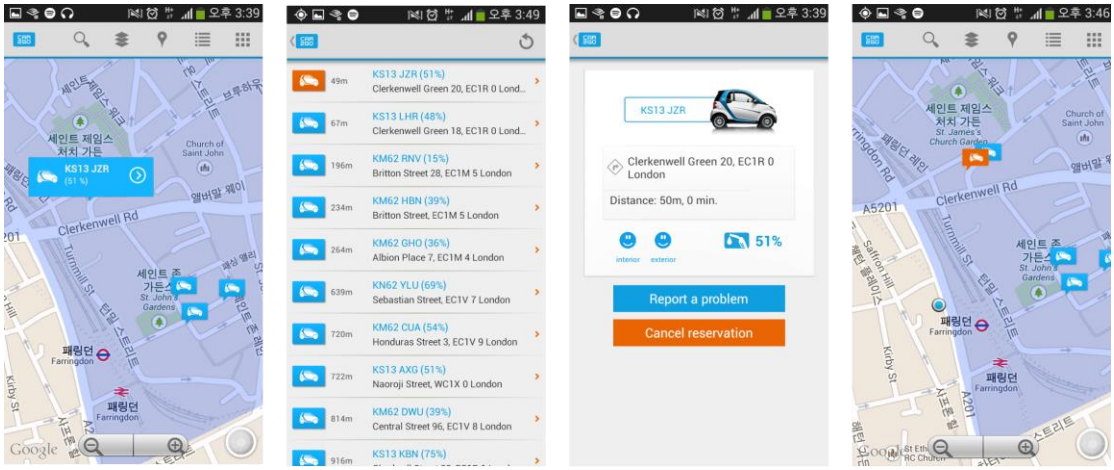


Figure 57: Car2go's smartphone app provides diverse information of available cars

This is a highly useful function, which provides clear information about the available cars. Through the smartphone app, a customer is able to understand not only the exact location of the vehicle but can also avoid booking a car with a low fuel supply, which would cause unexpected time consuming due to the need to head to the fuel station before using it for their original intention.

The process of reserving the Car2go vehicle is relatively simple as it does not require a set pick-up and return time and date; it can be done by just pressing the reservation button via the Car2go App. Since there is no extra message, confirming the customer's reservation (by contrast, Hertz 24/7 sends a confirmation text), the customer might feel less certain about whether the vehicle is reserved or not. However, instead of sending a text message to the customer, a reserved vehicle icon changes from blue to orange on the Car2go service area map in the smartphone app, giving assurance that your car is booked and waiting for you.

In terms of Hertz 24/7's smartphone app, Customers can check vehicle availability and reserve a vehicle through the map that displays basic details of the car such as number plate, colour, and the number of passenger seats. Once the user sets the preferred date and time and confirms the reservation, a confirmation text is sent to the user's mobile phone to inform them of the

reservation detail of time and date, the vehicle model and the number plate, and a detailed description of the vehicle's location with the postcode.

In comparison to Car2go's smartphone app, which provides more detailed information of available cars, such as the residual quantity of fuel and the level of cleanliness of the car's interior, the information on Hertz 24/7's smartphone app is relatively limited and such insufficient information could cause unanticipated time wasting or give a negative impression of using car a club car as when the reserved car's residual fuel is too low to drive or the interior is too dirty.

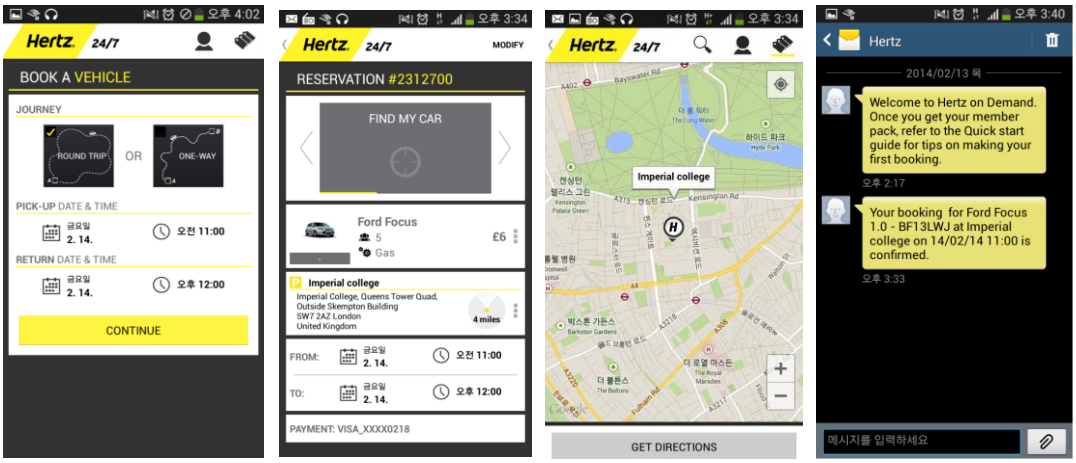


Figure 58: Hertz 24/7's smartphone app screen

Nonetheless, the fact that Hertz 24/7 sends the confirmation text with driven mileage and calculated fees after finalising the rental and locking the car is a positive factor that give assurance and clear information to users about how much s/he has used the car club car without the necessity of logging into the car club website or checking the email to see the invoice.

Turning to the Autolib's smartphone app, the overall layout and menus are just the same as the previous two car club apps, displaying available cars through the Google maps. It provides not only information of available cars across the city of Paris but also key information such as available parking space and electric charging points, which is crucial information for users who use electric-driven one-way vehicles.

The main screen of Autolib's app displays available cars in green while occupied cars are in red: this offers intuitive visual data to users, several extra menus such as available parking space, subscription kiosk, public charging display locations and availability on the map once those buttons are tapped, which allows the user to see specific information, for instance, the location of a charging point at one-click.

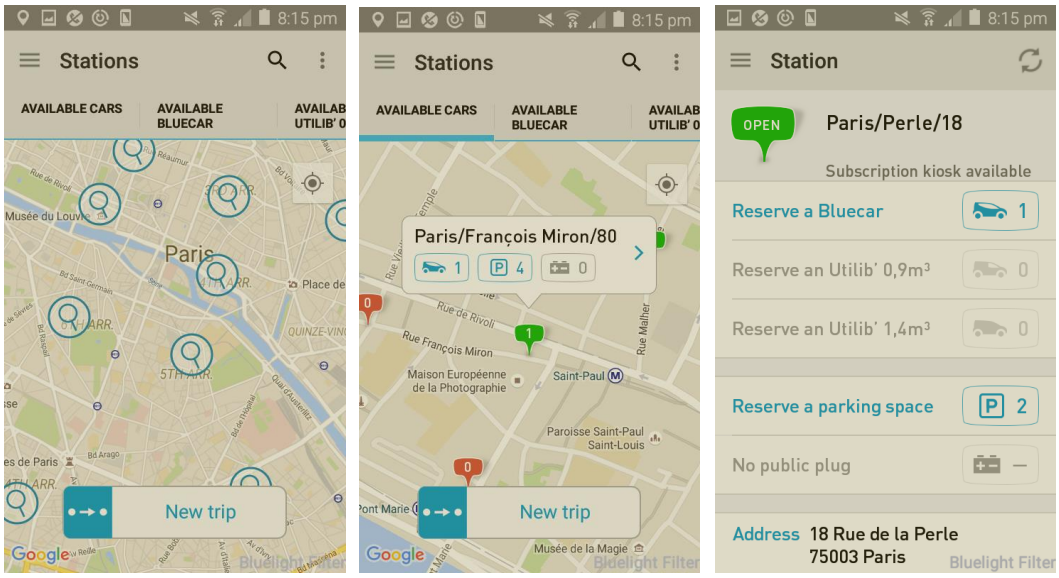


Figure 59: Autolib's smartphones app screen

When the user chooses the nearest available car, the app also provides the menu of how to reserve a parking space during the reservation stage, which is a highly useful function for one-way car club users to avoid the hassle of finding a parking space on their arrival at the destination. The address of the car's location and the itinerary menu, synching with Google map or Citymapper app, is another useful function that helps users to plan their journey to a car's location by using those additional apps.

One of the noticeable functions of this app is the 'Instruction' menu that explains the process of using Autolib in four stages from subscribing, renting, driving and sharing. Each stage provides a step-by-step process with bullet points and simple illustration to help users to understand accessing and driving an electric-driven car. This stage was discussed in Chapter 4 as one of barriers for new users of Autolib, therefore, such an explanation, together with simple illustration and

bullet points, not only forms a highly useful function but also shows how to mitigate such a barrier by providing key information to users via a smartphone app.

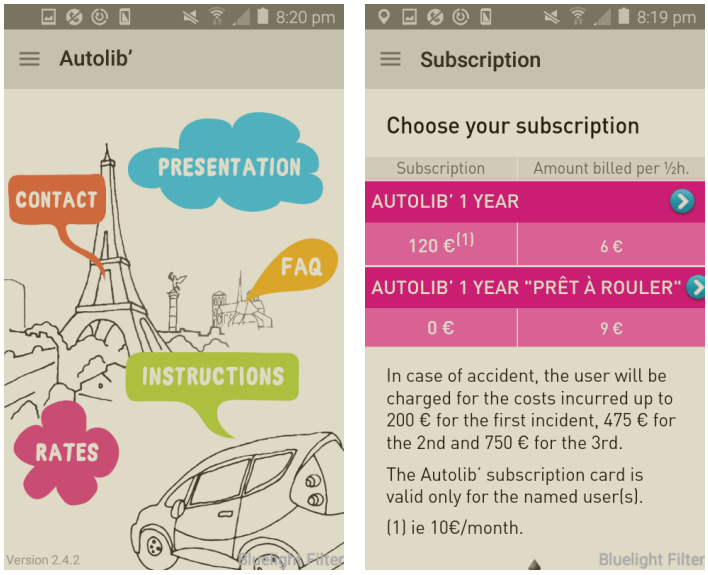


Figure 60: Autolib's rates introduction screen

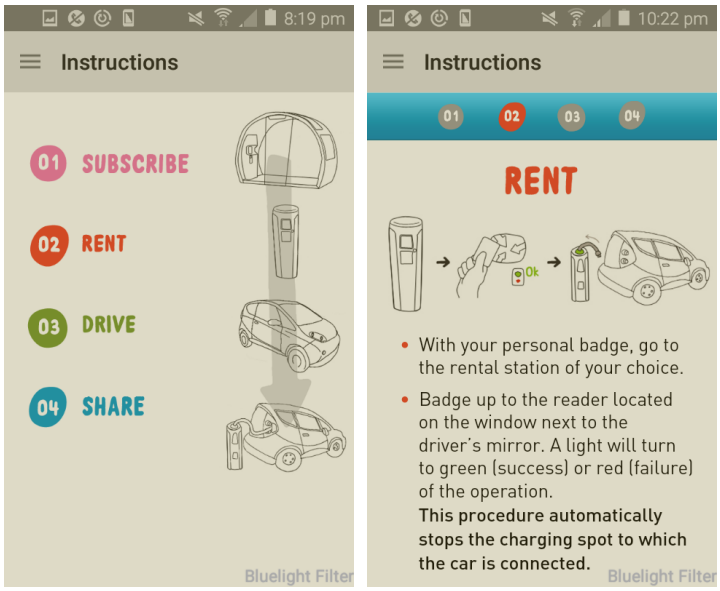


Figure 61: Autolib's rates introduction screen, instruction menu of the smartphone app explains the process of accessing the Bluecar with simple illustration and bullet points

It is fair to say that there are lots of similarities of the smartphone apps of the three car clubs. The fact that each smartphone app displays the car fleet via a Google map forms a common aspect, one which is the most intuitive way to provide key information, such as the nearest car's availability and location and the facility to book a car if needed.

In terms of functions, menu layouts and others, there were slight differences depending on the characteristics of the car club model. For instance, Autolib's extra menus such as available parking spaces and charging points were a crucial addition for users who use such a one-way car club where the car fleet comprises 100% electric vehicles.

In this regard, providing parking space information for a round-trip car club smartphone app might be seen as a useful addition but will not be seen as an essential function because parking space is not a top priority concern for round-trip car users. Instead, providing more detailed information of reserved cars via apps, such as an electric parking brake or a safety engine start function would be more helpful for round-trip car club users as most of those clubs offer diverse kinds of cars in their car fleets and the user could be confused when they reserve a different car if s/he has not driven before.

However, most of all, it is evident that the absence of a swift damage report function is the drawback of the smartphone apps of those three car clubs. Perhaps this is not just an issue of these three car club operators but all car clubs: an issue that they should contemplate. From the user's perspective, such damage liability is one of the critical issues when using a car club car, as users might take the risk of accepting responsibility for the damage caused by a previous user.

As a result, users have an obligation to conduct a visual inspection before driving a car club car. However, in the case of finding damage by a previous user and reporting it, the process is not swift, but users need to go through the process of filling in the damage log or calling the call centre to report the damage, which takes more than 5 minutes when renting a car by the hour or even by the minute hire. Therefore, providing a means of a quick and easy damage report function must be introduced soon and could contribute significantly to enhancing the user's experience of using a car club and car club operators as well because they could also prevent the mistake of incorrect charging a user for damage that s/he did not cause.

It is anticipated that the more car club users use a smartphone app for managing their car club usage for reservations and accessing the car by unlocking and locking, there will be an expansion of diverse functions of their own smartphone such as using the sat-nav or listening to their favorite music while driving. In this regard, simple but practical technical support such as a charging cable or docking station for a smartphone seems to be needed to allow users to keep using the smartphone without being concerned about battery drain. Otherwise, users may face a situation of failure to lock the car after the rental period due to smartphone battery drain - a predictable situation under current circumstances of constant and heavy use of the smartphone every hour.

5.3 Summary

Three types of car clubs - point-to-point station based (Autolib), Round-trip (Hertz 24/7) and point-to-point free floating (Car2go) - were analysed in order to understand the process of using car club, one that that covers joining and member ship, accessing the shared car to finalising the rental of each type of car club.

Autolib has shown several distinguishing features in comparison to other car clubs with its unique car fleet comprising electric driven Bluecars and supporting infrastructure such as the membership subscription kiosk and electric charging points. In particular, such widespread electric charging points could entice more and more people to drive EV in Paris, which would relieve the EV driver's range anxiety of recharging the car's battery.

The design of the kiosk and charging points herald a unified colour scheme, expressing the brand identity as a new mobility scheme in the metropolis. In terms of the Bluecar, at the outset of this research, it appears that a specifically designed car for shared purpose would be a positive solution when creating an ideal car sharing company. However, the case study found that this was not the case, as Autolib's Bluecar revealed inferior interior quality with huge gaps between switches and unsophisticated design that could lead to a less user-

friendly and more degrading overall user experience than that of using other vehicles in the same segment such as the Fiat Panda.

Hertz 24/7 was analysed in order to understand the roundtrip car club, which is the most common car sharing operating system in many cities. Through the case study, it was proved that the process of using the shared car was swifter and easier than using a traditional rental car, as customers could access the shared car without being limited by rental office opening hours nor the hassle of paper work. However, less detailed information of the shared car's status or finding a car via a smartphone app and the poor interface of the on-board computer with tactile quality proved the negative issues of using the car club. Moreover, since this model was a car club from an established car rental company, Hertz, it was expected to boast unique aspects and bestow a positive value on their car sharing brand. Yet, this car club didn't show any distinguishing aspects or brand value, even though the car club is operated by an experienced car rental company.

As mentioned above, perhaps this similarity reduces customer confusion. Car2go was the first car sharing scheme from the major car manufacturer, Daimler AG, and also the first point-to-point free floating type car club in London. The fact that this car club was planned and operated by a major car company able to produce a shared-purpose car based on a mass production vehicle. In terms of Car2go's car, Smart For Two, it is interesting to note that this model is positioned between vehicles specifically designed for car sharing (Autolib's Bluecar) and normal cars (Heartz24/7).

It has telematics for tracking and accessing because originally, this model was not intended for shared purpose. Nonetheless, the built-in touch screen, that offers the most advanced level of on-board computers with sat-nav, was equipped to enhance the level of convenience of using a shared car with a unified colour scheme for promoting the car club brand identity.

Moreover, this car club model also possessed an advanced smartphone app, displaying the detailed status of the car, for instance, residual quantity of fuel or battery status and distance of the reserved car from the current location, which helps to avoid inconvenience such as refueling the car before driving. Above all, the free floating one-way model and free parking at the pay-and-display bay are the most notable advantages of Car2go.

However, the advantages and distinguishing features of cars and smartphone apps have been overshadowed by the disadvantage of a significantly small service area, the borough of Islington, and the fact that the service operated for less than two years. In addition, the possession of only one kind of shared car fleet, though it was a specifically designed for the car club, revealed a negative side, one that limited the option of users to choose diverse models according to their specific demand.

Throughout the case studies of three different types of car club, I was able to experience diverse aspects of each model. It was apparent these car clubs could be an alternative solution to dealing with chronic traffic issues, reducing the number of cars and reducing the insufficient parking space issue: this was thanks to the flexible process of accessing a car with an hourly rental tariff, which allows customers to plan their journey in advance and use it when they really need a car.

The reason for conducting a Car2go (one-way model) case study was to see whether it could actually increase car use, more than the model of public transport, due to its core characteristic of a customer being picked up and dropped off wherever they wanted without returning to the same parking place. However, it was not possible to complete such research as this model was withdrawn.

However, the recent introduction of BMW's DriveNow and the announcement of the launch of the Autolib scheme in London drew attention to how those one-way based car clubs could operate their car club even while they have to solve

the issues of the need for an expanding service area; negotiating parking permits with other boroughs, and installing infrastructure in order to maximise the distinguishing aspect of one-way car sharing.

It appears that introducing specifically designed cars for car clubs could be an ideal solution for both users and car club operators, creating an advanced car sharing company. However, the case study found that those specifically designed cars for Autolib and Car2go proved to be rather less user friendly and convenient with inferior overall quality overall, compared to other car club vehicles that offered diverse models, from small cars to vans that could meet the users' demands.

Instead, it seems that focusing on delivering the value of using a mobility service and the attempt to obtain an in-depth understanding of the users' perspective are more crucial for car club companies than investing in improving on-board computers or even developing another shared purpose car in order to create an ideal car club and to be a company successful in the more competitive car sharing market than ever.

The next chapter explores how service design plays a role in the car club service in conceiving and delivering a convenient shared mobility service to car club users.

Chapter 6. Service design in car clubs and the clubs' prospects as mobility services in the city

In this chapter the role of service design in car clubs is explored in order to understand how service design plays a part in developing and delivering a better shared mobility solution to car club users. This chapter also discusses insight-gathering methods in service design such as a user journey maps to observe and analyse the users' behavioural patterns of using shared mobility services through various touch points and channels.

It should be emphasised that the aim of this chapter is not limited to understanding the role of service design in car clubs but rather extends to exploring how service design has been applied in car club models. It does this through the interviews with experts of service design projects for car clubs and interviews with experts at Livework and Edenspiekermann, which are service design consultancies in London and Berlin that provide service design models for Streetcar and Quicar respectively.

Through the car club customer journey maps and interviews with service design experts who conducted service design projects for car club operators, I was able to understand why service design is critical for designing and providing improved mobility system for users. In this chapter, the prospects of car clubs were also explored by covering several issues such as the integration of car clubs into the wider network of public transport in cities along with the discussion about the current circumstances of an automotive industry in which car manufacturers are re-branding themselves from being mere metal mover sellers to mobility service providers.

6.1 The role and purpose of Touch point maps (users' journey maps) of service design

The complicated factors of designing a service for a system means that the satisfaction of users can be affected dramatically from one touch point to another, the problem being that the customer does not care about individual touchpoints but recognises the service as an entire system. However, this does not mean that each touchpoint is less important than the overall service design. A lack of harmonising with other touch points can be serious. So for example, the technical failure of synchronising a smartphone app with a car club cars' telematics system can cause a loss of access to the car when no membership card exists, and this could be an embarrassing and disappointing experience for a user.

Colin Shaw (2007) defines the customer experience as an interaction between an organisation and a customer. It is a blend of an organisation's physical performance, with the senses stimulated and emotions evoked, each intuitively measured against customer expectations across all moments of contact.

Shaw notes that a customer experience encompasses a number of things from physical customer experience, such as price, products, location and opening times, through to the channels of the service, which are stores, online networks, telephones, and so on (Shaw, 2007).

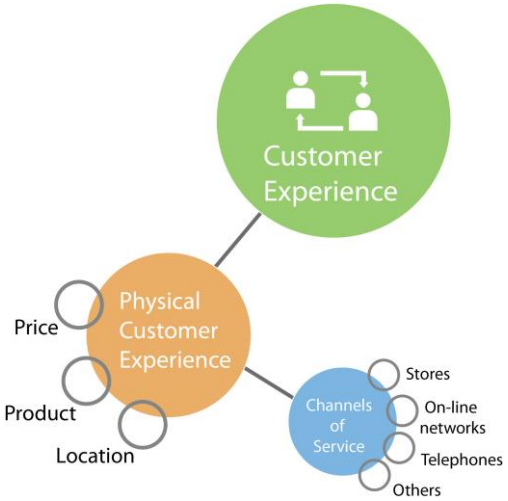


Figure 62: Customer experience diagram

Interestingly, Shaw's definition of customer experience and its elements show the characteristics of the touchpoints of service design. In terms of car club users' perspectives, both physical aspects and channels, for instance, shared cars, location, availability and the online network system accessed through the web-site and smartphone apps, become individual touchpoints in the car club users' journey map.

The realm of service design in the design industry has emerged during the last decade. When someone heard the term 'service' it was quite natural to summon the image of a hotel or serving food in a restaurant. However, the advent of IT and the rapid growth of the digital industry have brought new circumstances of business, where the role of the digital has become more prominent than ever, regardless of the scale of the business. As a result, such a digital information-based landscape has created an environment where new types of service delivery are feasible to be introduced to the market (Polaine et al., 2013). When considering the unique circumstance of the car club system, it is evident that the reliance on ICT is increasing over the years.

Such a reliance is seen from the very early stage of the user's experience, i.e. awareness through advertising via on-line media, to the finalising of the service via their smartphone app or Radio Frequency identification (RFID) communication system that locks the shared car. In addition, the environment of using a car club means the customer has to manage all procedures without being assisted by other staff as in a traditional car rental process. It is the customer's experience, gauged through each touchpoint from booking to returning the car, that should be carefully considered and designed, therefore, in order to deliver a positive user experience.

6.1.1 Service design projects in car clubs

London service design consultancy, Live work, conducted a design project for Streetcar[5], focusing on improving the user experience of the shared car to the point where it was as good as in the click of closing the privately owned car. Focusing on such a small aspect might sound insignificant but the consultancy thought that designers and engineers of car manufacturers would understand the attention to detail as they themselves spend thousands of hours on improving product quality.

In theory, using the car club allows users to incur less expense than owning a private car but also offers access to diverse models in shared car fleets such as seven seater cars or vans. However, it was also important for users to feel that the whole service experience is consistent and pleasant, thus delivering a positive impression of car sharing usage.
Although it has been almost two decades since the introduction of the formal car club in UK in 1999 (Cairns, 2011), when Livework initiated the design process, lack of comprehension was one of the key barriers to growth, along with access and usability.

During the early research stage of the existing service flow of Streetcar, Livework found that the key task to focus on for the benefit of customers was to make the system easy to understand as the lack of comprehension was one of the critical barriers for Streetcar. Since the hourly rental based car club system was unfamiliar to most potential customers, offering the process in simply defined terms was essential. As a result, they developed four simple stages that show how the car club works,
1) Book *-reserve over the phone.*
2) Unlock - *unlock the car with membership card.*
3) PIN -*enter 4 digit PIN code.*
4) Drive -*drive car club car.*

[5] Streetcar was established in 2004 and the largest car club in the UK. This company was purchased by Zipcar in 2010.

With these four simple steps, Livework encouraged streetcar to interact with customers, as the condensed and simplified process could lower the barrier to understanding the car sharing system (Livework, 2011, Reason et al., 2013).

Figure 63: Streetcar's on-line web page with four steps of using car club service

In 2010, Streetcar was merged with Zipcar (Kavanagh, 2010) but the four steps still play a significant role in explaining in a simple way the use of the shared car. Interestingly, after the acquisition, Zipcar removed the on-board computer that was installed on every Streetcar car, into which each customer entered a PIN, as remembering this PIN was another complicated layer for customers.

Figure 64: Zipcar's four steps of using car club

Nonetheless, this four-step rule is still the most imperative of tools to show the simple process of using Zipcar, even with the minor modification of 'Join' being added instead of entering a PIN. Other car clubs, such as DriveNow, a one-way

car club by BMW, which was launched in London in 2014 (Tovey, 2014), has now followed suit and have also adopted this same process.
Four more steps - rate it, start it, park it and drop it - have been added to the DriveNow, due to the floating based one-way car club's on-board computer, which requires customers to rate the car's damage or cleanliness and to give information that users can park the car free of charge and drop off within the DriveNow's service area. It is evident that explaining the process of using the mobility service through eight key points shows the difficulty of delivering a simple step-by-step process such as Street car and currently, Zipcar's own four steps when dealing with the new type of one-way car club.

When customers join Zipcar, they receive a leaflet with the membership card, one containing infographics that is entitled 'six simple rules' for using Zipcar. Those six rules, ranging from damage report to prohibiting carrying pets in the shared car, show customers clear guidelines for using car clubs together with information on supportive systems such as the free fuel card or the damage report call.

Figure 65: DriveNow's eight steps in the welcome booklet

We have now overviewed Livework's service design works that condensed the unfamiliar procedure of using a shared car into four steps; the DriveNow's eight steps, and Zipcar's six simple rules. It is evident that the main purpose of those examples can be understood as an effort to lower the first barrier of lack of comprehension about car sharing and educate customers to use the service properly, allowing other customers to enjoy a certain level of convenience of using shared mobility as a consequence.

From the perspective of considering users not as an anonymous people who purchase or use the product, but as a productive asset, those activities of car club users, who refuel the car, keep the car clean and report damage, contribute immensely to car club operators, saving them the extra expense of operating a mobile maintenance team to check every car by themselves. Although some effects of co-production might not be realized entirely in a voluntary manner, as there are fines applied on certain issues such as late return of the shared car, it is clear that the six guide rules are a result of considering the practical issues which users might encounter. The guidelines show specific areas that can be co-managed by users while they are using a car club.

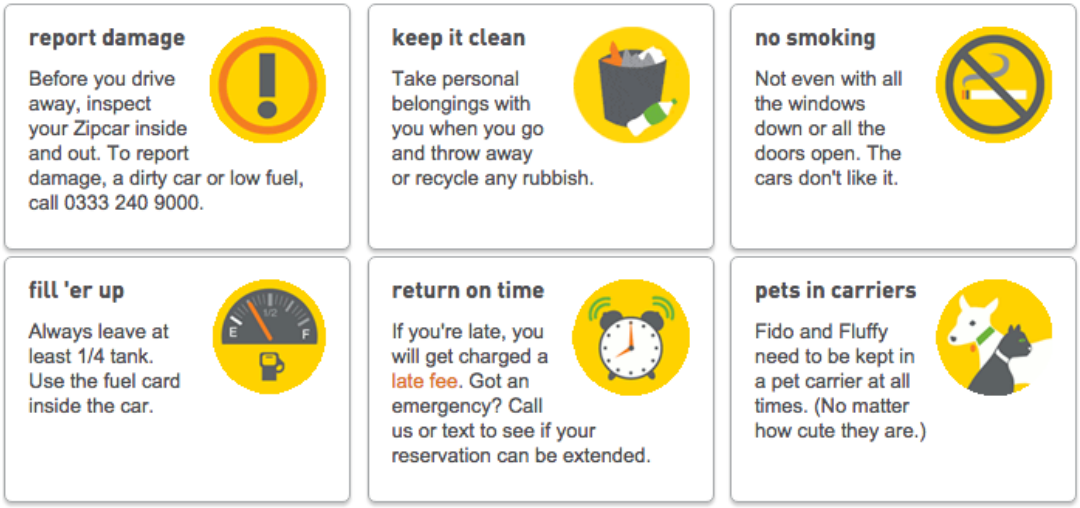


Figure 66: Zipcar's six simple rules

Lyndsey Donald, senior brand manager of Zipcar, emphasizes the value of educating new members. She operates her own education team to inform

members about the six rules of using Zipcar. This also includes safety aspects that, for example, prevent non-members driving the car. She says the main reason for focusing on educating new members is to place the focus back on them and their role as a part of car club community, as such a car club could work more efficiently by users who abide by these rules, ultimately providing a pleasant mobility experience. Such an orientation to community is similar to the early days of eBay – encouraging users to treat others the way they want to be treated, which was one of five values of the eBay (Ebay community hall of fame, 2008), the intention being to provide honest and trustworthy on-line market.

Through the weekly mailing and on-line SNS, those key rules are addressed regularly to members along with other information. However, Lyndsey Donald admits that it is sometimes quite difficult to communicate with users as they are not always massively engaged and regard Zipcar as just a utility (Donald, 2014).

It might be a truism to say that Zipcar sees members as a top priority for delivering a better service, as many companies promote their visions and values in this manner. However, it is interesting to see the mindset of this organisation, which is aware of the value of the users and regards them as a community of their organization. Zipcar tries to apply diverse methods, such as sending newsletters of promotional offers, new tariff, while providing fundamental information and rules of using Zipcar via email, to promote interaction with them. This could generate the effect of co-production at the actual site where the service model is being engaged with users and the service provider.

6.1.2 A customer journey map of two car clubs

As we have seen, customers interact with and experience the entire service through various touchpoints and channels. The aim of a customer journey map is to illustrate the journey of a user through the different touchpoints and channels with the service. This map identifies key interactions of users with the service. In terms of representing the customer journey map, various types could be applied but typically, it is visualised as a form of info graphic (Boag, 2016).

Service providers are then able to see the effectiveness and relationship with customers through the journey map which shows the users' overall service experience, not from the point of using the service, but from the awareness moment where the potential customer begins to recognise the service (Parker, Heapy, 2006).

The former marketing director of Eurostar, Greg Nugent, says that the customer journey map shows the correlation between service, products and experience, and is the only way that a service provider can see how those elements interact. This in turn enables the provider to then decide which parts could be rearranged or modified to make a one-service model rather than just operating parts of the service discretely. By mapping the customer journey, organisations can expose inappropriate points of the service as the customer journey map shows the overall flow of the service (Parker, Heapy, 2006).

On the basis of case studies and operating car clubs in London at the time of on-site researches in February 2014 of two types of car clubs, round-trip and one-way, customer journey maps were generated. Each journey map has four main stages organized in a sequential timeline of the service, from the point where the customer begins to recognise the car club service to the return of the shared car. As described, the four main stages are awareness and register, reservation and finding the car, inside the shared car and leaving the shared car. The customer journey maps also provide a key foundation for designing the questionnaire for the in-depth car club user interview. This is because the questionnaire is based on the process of using the car club and, together with reference to the time-line, it is therefore more effective for interviewees to recall memories of their car club usage during the in-depth interview, enabling them to provide more diverse and rich experiences.

In the process of visualising the customer journey map, I conducted a workshop with the Service Design department at the Royal College of Art. Through this, it was possible to design a journey map which showed diverse user activities and

interactions through the various touchpoints and channels, based on the main four stages of car club service flow.

There are four sections of each four channels in common, which are, user action, physical point, user device and pros and cons at each sub stage of using car club.

Firstly, 'user action' forms a section that shows the customer's interaction with each sub section, made up of related questions and anticipated answers from the user. For example, in the awareness and register section of Hertz 24/7 customer journey map, one of the sub sections is 'awareness of Heart24/7' and the related questions, which is 'how did you hear or know about this mobility service?' is answered with three possible answers such as 'by online media (facebook, company webpage), by offline office poster or, by other Heart24/7 cars on the street.

Secondly, physical points and user devices form the other two sections which show the various touchpoints and channels that customer might encounter and engage while using the car club. At the awareness stage, customers begin to be aware of the car club from physical pointers such as posters or other car club vehicles on the street.

For instance, in the initial Awareness and Register stage, 'applying for membership', is the third action of car club user in order to use the car club service and car club's offline office or on-line webpages are the physical points. At this stage, a PC or smartphone form the channels that enable the user to apply for the membership.
Lastly, the 'pros and cons' sections were added to evaluate the advantages and disadvantages of each sub section. The context of these positive and negative aspect of sections were generated on the basis of experience and impression during the on-site car club research, which permitted the finding of several good touchpoints or channels that made the usage of car club smoother - without any notable difficulties. However, the recording of negative aspects is not just a reflection of inappropriately positioned or less-functional touchpoints or

channels in the car club service flow, but is rather viewed as a source of recommendations which can be used as references for revising and improving the overall car club user experience.

Figure 67: Customer journey map of Hertz 24/7 and Car2go

Through the customer journey map, it was possible to see the overall car club usage service flow from the user's perspective, with diverse touchpoints and channels that aid customers to use the service more effectively, particularly via

smartphone apps, which provide detailed information and functions of car2go's app and Hertz24/7's finalization message, the latter assuring users they have completed the service properly.

However, these customer journey maps also revealed some barriers that might deter people from feeling this mobility service is convenient. For instance, there was a relatively small amount of information about Hertz24/7 cars, for instance no information about how much the electric car battery is currently charged (Mitsubishi-iMiev). There was poor tactile quality and a poor interface of telematics that formed noticeable barriers to this round-trip car sharing.

Turning to car2go's customer journey map, in contrast to Hertz24/7, there was detailed information available: such as the smartphone app displaying the residual fuel of the available cars, or providing an on-board computer that enables customer to check the cleanliness and damage of the car, and providing a sat-nav. All these proved positive touchpoints, providing a better experience of using the mobility service.

However, there were three recorded disadvantages of using the car2go service. One derived from a touchpoint that involved accessing the shared car by adding an on-board computer which then required the users to put in a PIN. The second was the considerably expensive price of using a one-way car club, and the third was the relatively small business area to which users could return their cars.

In conclusion, those customer journey maps of two different car club models revealed the fact that the role of the smartphone and on-line media such as a company's web page or social network service play a prominent role in terms of allowing customers to be aware of the existence of the service and of using the shared car more conveniently. In particular, the smartphone was a key channel in the overall car club service, enabling users to manage their car club usage, and including key features such as booking, accessing the car without carrying a membership card and providing diverse information via the car club operator's

own app. It is clear that strengthening the role of smartphone app in using car clubs also reflects the current transition of channel migration.
It is apparent that managing the diverse procedures via a smartphone app could provide the most convenient user experience. Nonetheless, it seems that car club operators also need to contemplate the issues of related problems of simplifying a channel to smartphone app excessively, as such an issue of a weak signal of a network connection or a low battery of a smartphone could affect or even block users' access to a shared car. This might affect the degree of convenience of using a certain car club and consequently be detrimental to user experience.

6.2 Service design expert interviews

The main aim of this section is to discuss how service design could be applied to car club models and fix related problems such as providing an induction to first time users. In this regard, I have conducted the service design expert interviews in two different design consultancies, which are Livework in London, U.K and Edenspiekermann in Berlin, Germany respectively.

Figure 68: Livework and Edenspiekermann's car club service design projects, streetcar and Quicar

Livework is a service design consultancy. It was established in 2001 and carried out service design project in various sectors, ranging from automotive, energy to media and public sector. In particular, Livework conducted car club service design projects for Streetcar (now Zipcar) and Whipcar.

Edenspiekermann is an agency for strategy, design and communication, founded in 2009. This agency carried out service design project for VW's car club 'Quicar'.

These service design expert interviews provided valuable insights into how they conducted service design works in order to develop convenient car club models and tackled the problems that could be barriers for car club users. They also put forward their own views on the role of service design in car clubs and the prospects of mobility services.

6.2.1 Designing a service design for a car club

Robert Stulle, who is a partner of Edenspiekermann that carried out a project for Quicar, explained briefly the process of VW's car sharing service design. He said that the service innovation team of VW asked Edenspiekerman to develop a service design for VW's car sharing scheme and that they worked together to create an outlook on illustrating a car sharing model operated by VW. Through the preliminary research, they found that it was essential to gain a user centric view in order to deliver a car sharing model that the user can be connected to this shared mobility service. Therefore, Edenspiekerman established personas, which are hypothetical archetypes of potential users that aim at representing them throughout the design process, and made a customer journey map to understand the most important touchpoints as well as customers' diverse behaviours.

"We worked together to create an outlook on how the car sharing would look like and it was essential to get user centric view. So we looked at who are using car sharing, establishing persona and made the daily life journeys (customer journey) to understand what are the most important touchpoints and how can we get more useful, valuable and easy way to across those touchpoints."

With the customer journey map, they generated prototype service design model with a low threshold in order to observe and test various reactions and interactions of customers. On the basis of insights from the customer journey map and prototype model testing, they made a mock-up such as magazine advertisements and a membership card key design. Those service design ideas were tested with users and feedback and reactions were recorded to gain key

insights for developing the final service design blueprint. This final prototype service model was presented to the VW Quicar team.
However, Stulle revealed that several ideas were declined by VW as there were some issues such as company politics and technical issues. One of the proposals from Edenspiekermann was a touch screen in-car computer for every Qui-car model. However, this idea was not accepted due to the budget limitation and the technical complexities of installing new built-in screens to VW Quicar shared cars. Instead, the current Quicar has a different type of in-car computer which displays a few lines in black and white, and is controlled with a knob, which is not as sophisticated as Stulle's service design team had originally proposed, as the interviewee pointed out.

When it comes to designing a service model for Quicar and mapping the car club usage journey, Stulle emphasised that the most imperative aspect was connecting the 'end-user to service', which enables target customer groups to perceive the service as designed for users and easy to use. As a result, customers are fond of this service and regard it as a part of their life. Stulle asserted that there is huge value to considering the end user as part of the design process, which could be understood as co-production with users.

"The essential thing is that the end-user can be connected to the service, which makes target groups think that this service is for me. I can use this and I like it. It connects with my life. So the most important thing we consider is to how to add value to end-user." - Robert Stulle, partner of Edenspiekermann

Livework, the London based service design consultancy carried out a service design project for Streetcar (merged with Zipcar in 2010). As introduced above, Livework's service design model has played a prominent role in lowering the barrier of awareness for those who were not familiar with this new hourly car sharing scheme in urban areas. It did so by introducing various service design models, notably designing the four simple stages and welcome package for Streetcar, which we could now see from other car clubs such as Zipcar or DriveNow. Thus, the interview with LavransLøvlie, co-founder of Livework was

another valuable reference for me to see their application of service design to a shared mobility scheme.
First of all, Løvlie briefly introduced their initial service design approach for car clubs. He said that Livework approached the subject of 'car sharing' from the sustainable perspective that the car needs to be shared instead of owned. Hence, the main goal was to design a service model whereby the customer could recognise a car as a central medium for delivering a mobility service, not just a product. Like Stulle's view, which emphasised user-centric values, Løvlie stressed the importance of customer experience as a key factor of a successful service design model, as this perspective is crucial for not only retaining customers but also allowing other customers to adopt this new mobility service.

"When we started the project for streetcar, we thought that customer experience would be more important for success of this business than any other services, because the reason of providing good customer experience is not just about retaining the customers but also about adoption of new type of service."

Moreover, since the fact that the car club was still an unfamiliar service to most people, he described it as being a 'long leap' for customers to switch from owning a car to sharing a car. In contrast to the users' experience of dealing with issues such as changing a new handset at mobile phone shop, when users could anticipate what kind of service or experience they would be offered, users could hardly expect the experience or level of service they would have by using this new mobility service; a huge leap for first time users particularly.
Thus, Livework wanted to deliver a service that could even compete with the experience of owning a car, with which the leap customer could identify and make comparisons.

"If you change your mobile phone to another one, you could expect what the service would be. But if you change your owning a car to sharing a car, that is a very long leap. So we tried to create a service design experience which could compete with owning a car." -Lavrans Løvlie, co-founder of Livework.

6.2.2 Barriers while developing the service design for car club

Another question to both experts was about barriers that they had to tackle during the development stage. First of all, Løvlie introduced two barriers: technical issues and the accessing of the shared car.

The current process of joining Zipcar, which had acquired Streetcar in 2010, is filling out an on-line membership application form and then the Zipcar registration team calls back the potential customer to check the validity of the applicant's driving licence via a three-way conference call with DVLA. They check specifically whether the applicant's details, including penalty points, prevents them from being eligible to apply for membership.

However, before Livework undertook a project for Streetcar, the process used to involve a sequence of calls with paperwork involved, therefore, such a process was one of the technical barriers, even while being an essential stage for the safety of other users and road safety.

Thus, Livework introduced the three-way conversation call between applicant, car club application team staff and DVLA that enables them to cross check the applicant's driving licence and proceed the application process swiftly.

The other barrier at the early stage of the Streetcar project was accessing the shared car. The way of accessing the car by swiping the membership card, putting in the PIN and collecting the ignition key from the glove compartment was, of course, a very unusual procedure for every new customer. Therefore, Livework proposed an idea of a customer call centre and designed a script for the call centre staff to respond to calls subsequently with a welcome package, which consists of a paper instruction that explains how to use the shared car.

However, at the prototype testing stage, they found that a paper instruction provided enough information for customers so they did not call the Streetcar call

centre. This then became a huge financial saving for Streetcar as they did not need to setup a call centre but instead provided a simple foldable instruction.

"We proposed a phone service that customers could call to Streetcar and get help. So we made a script for the call centre with new introduction materials and also a new welcome package which explains how to use the shared car. With these new ideas, we followed many new Streetcar members to see their reaction of this prototype and found that customers didn't call the call centre as the instruction of the welcome package was good enough so they didn't need the feeling of calling to call centre." -Lavrans Løvlie

In the process of developing the service design for Quicar in Germany, Stulle said the lack of awareness and relatively insufficient data for car sharing at the time of developing a service design model were the barriers, which was the same issue in Liveworks' streetcar case. However, the barriers are not critical in the current circumstances where the car market is showing rapid growth globally. Instead, interestingly, novelty itself was another issue, as some people did not want to be early adopters but wanted to use a service when it reached some sort of steady level and had been proven to be a successful model so that even the neighbours began to use it.

In addition, Stulle pointed out the German perspective towards car sharing. He said a social status issue is connected with the owned car and this is an interesting perspective as car club is normal trend in Berlin, whereas in southern part of Germany, some people regard car club users as students or people who cannot afford a car, which shows a big regional difference towards car sharing in Germany. Thus, the service design team for Quicar focused on the value of using the car club through a campaign that describing the usage of the car club as a part of a digital urban lifestyle.

"In Germany there is a big social status connected to car you own and this was a very interesting aspect for car sharing. In Berlin, car sharing was normal, but in the southern part of Germany, people said 'Are you a student? You can't afford your

car? So that was a cultural and social aspects that is very different from region to region in Germany"
"So one solution was to make it very easy to understand what the value of using car club provides and other aspects was a concept of campaign that cool people use the car club and it is normal." - Robert Stulle

Stulle's mention ofthe perspective towards car sharing is not just about the issue in Germany but could also be a common issue across lots of places that might have different perspectives depending on the area: city versus suburb due to various reasons according to each circumstance, which might include the demographics of city dwellers and suburbanites as well as other environmental conditions such as parking spaces and the network density of public transport.

6.2.3 The role of service design in car clubs

Lastly, both interviewees summed up their views on the role of service design in car sharing scheme. Stulle said that planning and developing a mobility service model allow organisations to shift their perspective towards a car, moving from it being a mere product with a transportation purpose to a wider perception. Thus, it is imperative that car manufacturers should consider the wider solution of providing mobility that is not restrained by the idea of just selling more cars.

"I think car manufacturers need to embrace the idea of selling mobility instead of hardware. Thus, in the perspective of service design, we need to consider not just about end-user purchase and driving the car but what happens before getting in the car and after using the car and the days they do not use the car." - Robert Stulle

Løvlie said that creating a better customer experience, which encompasses exciting, rewarding and irrigation-free aspects, is the key role of service design in car clubs as customers could become advocates in the organisation of mobility services. He mentioned three levels of innovation in terms of applying service design – the system innovation level, the service innovation level and quality improvement.

Firstly, at the system innovation level, organisations could see and set up a suitable service proposition within the changing circumstance where new technology, legislation and trends are introduced and diverse cooperation between companies and governments are happening, which will consequently lead to the emergence of new services in various sectors.

For instance, Løvlie anticipated that most car manufacturers would produce a sort of car sharing featured car whose technology would be as simple as just putting a sim-card into a mobile phone. Through the service design approach, the company could understand the latest trend and technologies, allowing them to find out new opportunities and directions towards inventing new applications for sharing.

The second level is service innovation, which takes a similar approach to that which Livework took for car club organisation such as Streetcar, concerning an increase in the adoption rate of using a car club. At this level, the role of service design also considers more detailed issues of actual usage such as providing information of accessibility and usability while removing irritations, which leads to the improvement of the overall service quality. Løvlie said that service design could play a significant role in all those three levels.

"If you are a service designer for Hyundai car sharing scheme, you could help them to look at the opportunities different urban areas in the world. Density of population, legislation or financial situation, those are extremely valuable information for someone who want to develop a new business in car sharing. Also, service design could help to improve the exiting service model by removing irritations and improving the performance for both customers and business."

"I think service design has a potential in all those levels from system innovation, service innovation level, to improving quality, but I don't think there is no process between those three levels because there was no system innovation in place when street car started its service" -Lavrans Løvlie

It is worth noting that both service experts emphasised the importance of customer experience in the process of developing service design for car clubs. When Livework initiated a project for Streetcar, it was a huge leap for customers to switch from owning their own car to a shared car mobility scheme as this concept was unfamiliar to most car drivers. Thus, it was important to make the customer experience a key aspect when aiming for a successful car club model.

Through the service design expert interviews, it was possible to find out that the service design projects in car club not only enabled users to consider using this car club by various efforts of lowering the barriers such as providing simplified rules and a customer call centre, but also by considering factors such as connecting users to the service that led them to recognise car club as a convenient and flexible mobility service rather than as a mere personal transport in the city.

In this regard, as Stulle pointed out, it seems that car manufacturers need to consider placing more value on selling the mobility service rather than on hardware in order to expand the current car club market and widen the range of users. Perhaps, such a transition might advance the advent of car converting into car sharing featured cars with technical features that would be as simple as changing the sim-card of a mobile phone, as Løvlie himself envisages the future of car clubs.

6.3 The prospect of car clubs: a more flexible mobility service in urban areas

6.3.1 The Integration of car clubs with public transport

It is evident that the main value of car clubs is to provide more flexible mobility in a metropolis like London where owning a car has become a burden due to chronic problems such as insufficient parking space and expenditure on maintaining the car. The most noticeable advantage of the car club is that it allows the customer to use a personal car without concerning themselves with

any other hassles of ownership. For instance, the fact that fuel expense, insurance and secured parking space (in relation to the round-trip model) are included in using car clubs has made this shared mobility a positive alternative transport option in the city.

In this sense, more and more people are joining car clubs and particularly in London, it is expected that the total number of car club members will reach almost a million by 2020 (Frost & Sullivan, 2014). Fergusson (2014) anticipates that people will not own a car but will be able to plan a journey and enjoy the access of a car and other mobility options whenever and wherever they want. This is because car clubs will be fully integrated with public transport, in terms of brand and system, within the TfL's public service brand and along with the underground, buses, and bicycle-sharing schemes (Fergusson, 2014).

In the report, Car rental 2.0 (2012), LeVine also urges that the integration of car clubs with public transport is a pressing issue for the public sector as there are examples of joint service operations in North American and other European market, which are expected to be introduced in the UK (Le Vine, 2012).

Moovel and RideScouts are two examples of smartphone apps in Germany and the US which provide various transport options ranging from the underground, the bus network, the taxi network to car clubs. They show the simple but efficient integration of car clubs with public transport thanks to digital technology. In most metropolises, well-organised public transport systems allow people to travel and commute without heavily relying on cars and these lead to changes in mobility habits. Bond Jr. claims that such a transition among people entices car manufacturers to explore new business models of generating profits by providing mobility services rather than just selling cars.

Figure 69: The transport integration map with Moovel, Car2go and other various modes of transports (Moovel GmbH, 2014)

However, he refers to analysts' comments that car companies need a clear plan to promote such a view in order to generate profits from this market. Although producing and selling cars were traditional ways of generating profits to all car companies, those companies now need to rebrand themselves as mobility service providers that could respond to the shifting circumstance of mobility habits of customers and various needs of cars, whether that were an owned asset or shared with others (Bond Jr, 2015).

In this regard, the acquisition of RideScout by Moovel, which is a subsidiary of Daimler AG and owns a free-floating car sharing service Car2go, shows a trend of car manufacturers to extend their portfolio to mobility services by merging a smartphone app company that provides various transport options including car sharing. Since the Moovel is also a smartphone app company that offers similar services to customers with their Car2go car sharing scheme, it is expected to strengthen the company's existing car sharing mobility service. Etherington says that this acquisition shows how the car manufacturer places serious emphasis on the mobility service sector in the traditional transport business (Etherington, 2014).

It is also worth noting that the integration of car clubs with public transport could be seen as an addition of a private mobility system into a public service, creating a new space between the private and public sector.

The following table illustrates the advantages and disadvantages of car clubs and the current public transport network in London.

	Car club	Bus	Underground	Santander Bicycle
Advantage	・Offering private mobility ・User could decide the destination	・Frequent service ・Covering wide service network	Frequent service ・Covering wide service network ・ Not affected by traffic congestion	・Offering private mobility ・User could decide the destination
Disadvantage	・Relatively expensive price ・Limited service area (one-way car club) ・Relatively small number of accessing points	・No private space ・Operating on the prearranged routes (cannot decide alternative destination)	・No private space ・Operating on the prearranged routes (cannot decide alternative destination)	・Limited luggage space ・Unsecured returning spot ・Road safety issue ・Affected by weather condition

Figure 70: Advantage and disadvantage of car club and other modes public transport

6.3.1.1 The role of city authority to support the growth of car club in London

However, and more importantly, it is certain that the role of the city authority is crucial in order to support the growth of car clubs in the cities: this could lead to a truly integrated mode of transport, the co-ordination of car club and public transport. Le Vine (2012) asserts that an appropriate role for the public sector is one of the issues that policy makers for car clubs as it has required an intimate interaction between the private sector (car club operators) and the public sector since the early days of car club operation in the city.

In particular, the access to parking spaces for car club cars is the main issue. Local authorities, who control public spaces, need to co-operate with car clubs for whom access is vital for their development (Le Vine, 2012).

The report, '*A car club strategy for London growing car clubs to support London's transport future*', a strategy developed by car club coalition, London councils, and Transport for London (TfL), defines 'Policy and governance' as one of the key barriers along with 'Delivery' and 'Low awareness and visibility' that prevents car clubs from becoming mainstream mode of transport in London.

When it comes to 'Policy and governance', this issue relates to the parking permit of car club cars, which is one of the crucial aspects for operating car clubs in a specific area. This report points out that there is an absence of one governing body that has responsibility for parking and street, and that governance is shared between TfL and 32 separate boroughs in London. Moreover, in the case of off-street parking for car club cars, this issue should be dealt with private and public landowners.

As a result, the current situation has been a barrier for car club operators to enter the market and to expand their car club service. In the case of some boroughs, a single car club contract is another barrier to extending the car club service on a wider scale. Although such a single operator contract might be suitable when operating a small scale of car club and local awareness is low.

However, as the car club service grows along with the awareness among the residents, a multi-operator situation could offer expanded mobility options for users and also contribute to an expansion of the car club network across London.

Most of all, this report urges that a greater UK-wide policy direction and national government support for car club is needed as current policies for car clubs such as vehicle taxation and local authority support have been managed at the national level in a way that cannot support the promotion of car clubs effectively (Transport for London, 2015).

6.3.1.2 Interview with the transport planner of the borough of Hackney

In order to understand Hackney's authority's view on car clubs and the role of support in London, I conducted an interview with Qasim Shafi, transport planner for the London borough of Hackney.

Figure 71: The borough of Hackney offers two types of car club, round-trip and one-way model to the residents

First of all, in terms of Hackney authority's view towards car clubs, he said that this mobility service is a mixture of both private and public transport. Since the purpose of using car clubs depends on each user's mobility behaviour, such as how often they use the car club car, he said the nature of the car clubs could be decided by the users' views:

Car club is mixture of both private and public transport. Some people treat car club as an additional public mobility service, while others may replace their car by using car clubs and use it as a private vehicle. Some of car club cars are shared by

approximately 80 individuals while in other locations may be more or less, so I think it depends on how user perceives this mobility service.

The borough of Hackney is one of four boroughs in London that participates in the floating one-way car club scheme, DriveNow. Qasim said that the main reason they decided to make a contract with DriveNow in 2014 was that introducing a different type of car club would be complementary to the existing two round-trip car clubs, namely Zipcar and City Car Club, and it could provide diverse transport options for residents in this area.

When DriveNow approached us with this one-way car club concept, we thought that we would not necessarily choose round-trip car club over floating one-way car club or vice versa. We think they complement each other. So users use each model for different reasons. For instance, shorter trips could be managed by one-way car club while users could use round-trip car club for longer trip. So by providing different model with different price, we think users could access more diverse transport options.

According to Qasim Shafi, there are currently 180 round-trip car club vehicles, and approximately 160~200 floating one-way cars, which are shared between four boroughs. In Hackney alone, there are around 80 one-way vehicles.

Since the one-way model of a free floating car club means users could drop-off the car anywhere, including in pay-and-display parking bays within the service area, there has been an assumption that this model could cause insufficient parking space issues or traffic congestion. Qasim Shafi said that this model has not caused any parking stress or traffic congestion yet. In this regard, the relatively small number of one-way car club cars might be the reason for this in a sense, but the local authority's active intervention in controlling the parking spaces and implementing restrictions is the solution to tackling the traffic and parking issues of one-way car clubs.

Currently around 80 one-way car club cars are not causing any parking stress based on our data. Perhaps, until now, the number of one-way cars is not that many so this could be one reason that this model is not causing parking or traffic congestion issue yet. By one-way car club model, which the car could be parked on pay-and-display parking bay as well, reduced parking space might happen in some areas. But we also control the parking space by restricting some of the streets in the borough. If there is extremely high parking stress such as market streets where we have market trading, we do not allow the access of one-way car club by implementing restriction such as red routes.

During the interview with Qasim Shafi, it was interesting to discover that the local authority and car club operators are cooperating together, monitoring the car club cars' utilisation of the area and implementing actions in order to increase the availability rate of car club cars.

We monitor whether there is any clusters of one-way car club cars. If there are too many cars in certain area then we can block the pay-and-display bays and call up car club operator (DriveNow) and tell them the cluster issue on that area and to move around cars. We share the data such as the cars' location and utilisation with DriveNow to manage the availability issue of one-way car club car.

In terms of the integration of car clubs with public transport, Qasim Shafi said that it makes business sense for car clubs to be integrated into a public transport network for instance, by having a car club parking space close to the transport hub, which would then increase more utilisation of their car club cars.

In terms of integration with public transport, I think it would happen and make sense from a business perspective. When we had a meeting with car club operators, they ideally wanted to be closer to high street or transport hubs such as stations and Santander bicycle hubs. Car club operators see this as an important issue so we do see that integration with public transport is the overall picture over time.

Lastly, Qasim Shafi stated his views on the role of the city authorities in supporting the growth of car clubs. He pointed out that enabling residents to access the car clubs within a short distance of the transport hub is one of their important roles. In this regard, he emphasized that monitoring the utilisation of car club cars with car club operators and encouraging them to re-locate the car club parking space is also an imperative role that fills the gap in the matter of car clubs' accessibility to residents.

One of the local authority's roles in managing car clubs in our borough is ensuring all our residents have an access to car clubs, enabling them to access the car clubs within a walking distance or through public transport. We see the locations of each car club car to see where are the gaps and discuss with car club operators (round-trip) to encourage them to re-locate the cars. Also, if the utilisation of cars is good in a certain area, then we encourage car club operators to add more cars to those areas. We have the final decisions of where to have a parking bay for a round-trip car club car, except for the one-way car club car as this model is usually member-led, so users decide where to leave the car.

We anticipate that the demand for car clubs will keep increasing and the number of car club cars we have to provide to people through car clubs will definitively increase along with various models in the shared car fleet.

Throughout the interview, it was interesting to discover that close co-operation between the Hackney authority and the mobility service provider (car club operator) contributed to offering a better mobility service for residents in the borough of Hackney, London.

However, most of all, it is apparent that ensuring residents have close access to a car club vehicle by constant monitoring of the data with car club operators plus balancing the number of cars and re-locating access points seems to be the most crucial role of the Hackney authority that truly supports the growth of the car club and could allow people to consider car clubs as a reliable alternative mode of transport in London.

6.3.2 Expanding brand awareness through car clubs

With various reports and statistical figures that forecast the rise of car clubs and their integration with the public transport that is already viable on the smartphone app that allows modal shifts, it is interesting to note that accustomed car club customers could establish connections with the shared car brand they drive. Mark Walker, the managing director of Zipcar UK, claims that the main reason that Daimler AG and BMW have participated in the car sharing market is to establish the brand identity through their car clubs as they recognise the opportunity in this market.

In this context, it is also worth noting that the majority of car club users are young drivers, who put more weight on network connectivity and a personal preference of a distinct smartphone platform that could even affect their car choice (Williams, 2015). Thus, persuading potential users into a specific brand when using a car club might involve a period of establishing brand awareness. It might also provide a good opportunity for car manufacturers as they may buy the cars of that specific brand when they need to buy a car due to changed circumstances in later life.

Mark Walker says that there is a typical period of time when customers use car clubs in their life, namely, in their mid-30s when they are without children. Once they have a family, then they might stop using car clubs and purchase a car. However, after more than 5-10 years of being a member of a car club, they tend to choose the same brand of car that they are used to driving. According to Zipcar's internal survey, two thirds of customer answered that they would buy a car that they have driven at the car club (Walker, 2014).

In this sense, it seems quite natural that car manufacturers participate in car sharing as a car fleet supplier or even introducing their own brands. Honda, Ford and Chevrolet are providing their vehicles to car club operators, recognising the value of enhancing the brand loyalty through the shared cars which are driven by many car club members (Bond Jr, 2015). Walker says that through the

association with car clubs, car manufacturers could have not only a group of people who are paying to test drive their cars but also that such a partnership could bestow a progressive and sustainable image of their car brand. (Walker, 2014)

Figure 72: Promoting Zipcar's student with drive programme with Ford logo

The changing mobility habits of urban residents has led therefore to the change of car manufacturers who are re-positioning themselves as mobility service providers and making associations with car clubs. Just as companies are urged to set up a plan to sell their cars several times, instead of selling as many as possible to customers, people have changed their habit of purchasing cars thanks to the various modes of transport available in urban areas. In this regard, the integration with public transport could contribute to the positive result of an expanding car club market from current early adopters to a wider range of an early majority market.

Moreover, it is also expected that such a transition in the traditional automotive business sector and in the attitudes of customers towards cars could contribute to illustrating an advanced transport circumstance whereby people recognise the car club as a part of public transport options and exploit the mobility service via an intimate partnership between car companies, car club operators and public transport networks.

6.4 Summary

It is evident that service design has played a prominent role in car clubs. Through the application of service design principles, users could understand the mobility concept, value and enabled users to use car club quick and easy.

The role of service design is not just limited to offering a positive user experience but also lies in generating co-production, which sees users not as anonymous consumers but also as valuable assets which could improves the overall level of mobility service through the active participation of such users. According to Carplus annual survey of car club London 2014/15, 92% of car club users responded with a positive view of their car club with 'good' and 'very good' emerging at 37% and 55% respectively of total respondents (Car plus, 2015).

In contrast to other mobility services such as bus or tube, in the unique circumstance of car club, whereby the customers have to deal with all the process by themselves, the role of service design is crucial in order to offer a positive experience of using shared mobility service. In this regard, designing a customer journey map helps organisations (service providers) to illustrate the users' diverse touchpoints and channels of accessing the service, which the map shows the correlation between service, products and experience while customers use the service model. Through the process of analysing, re-arranging and conceiving touchpoints and channels, service provider could see the overall flow and point out any barriers: inappropriate aspects, of the entire service model.

The service design expert interviewees who have conducted service design projects for car club operators, have shown how service design methodologies were applied in actual car club services and how they fixed related problems. Through the interviews, it was clear that those service design approaches placed much value on end-users in an effort to provide a new concept of mobility scheme that could connect user and mobility service more intimately that could

encourage users to behave better towards the service by treating the shared cars more respectively.

The emergence of various modes of transports, particularly the car club, have led to changes of mobility behaviour of car drivers in the cities. As a result of using a car club, the user is aware of the fact that the car is not always a 'default mode' on every trip. Instead, users start to plan their journey by calculating travel time, cost and consideration of the comfort of diverse modes of travel via a modal shift - walking, bicycling, car sharing and other public transport - on a more rational basis (Ball et al., 2005).

In this regard, car manufacturers are repositioning themselves away from being traditional metal mover sellers to mobility service providers and are thus significantly expanding their association with car clubs.

In this regard, the integration with public transport could contribute to a positive result of expanding the car club market from its current scale of early adopters to the wider range of the early majority market. Moreover, it is also expected that such a transition in the traditional automotive business sector as well as the altering attitudes of customers themselves towards cars could contribute in illustrating the advanced urban mobility circumstance (landscape). This could lead to people recognising the car club as a part of public transport options and the mobility service itself could be exploited via an intimate partnership between car companies, car club operators and public transport networks alongside the rapid improvement of Information and Communication Technology (ICT).

In the next chapter, 'User interview, observation and analysis,' the diverse views of car club users are discussed. Also, those collated car club user perspectives are presented to car club operators in order to understand the service provider's view as perspective.

Chapter 7. User interview & observation session: materials and analysis

In this chapter, key insights of interviews and observation sessions with car club users are presented in order that we understand their experience, thoughts and perspectives about using car clubs.

The car club user observation sessions play a pivotal role in this research as it shows users' diverse experiences and thoughts, including both the positive and negative moments of using car clubs as well as their own opinions about user-centred car clubs that might work towards a better mobility service in urban areas.

This section offers a fresh perspective on system development for current car club operators in London and provides fundamental and imperative aspects for this research to propose a service design map of car club systems from users' perspectives.

The aim of this research stage is to explore key insights from customers using car clubs in London through qualitative research methods such as in-depth personal interviews and participant observation, and to test those outcomes with one of the car club operators (Zipcar), which is the party that actually provides the mobility service to users. The key findings and suggestions were thus presented to Zipcar personnel and discussion and responses to these outcomes ensued.

7.1 In-depth interviews

The interviews progressed via the prepared questions in a set order. However, the flexibility of the semi-structured in-depth interview meant participants could talk about diverse and detailed car club-related stories that might contribute ultimately to bringing about a new trend in car club culture or a shift in the users' attitudes.

For example, one of the participants, user interviewee H, urged the car club operator to consider encouraging their customer to take more pride in using the car club, which is contributing to the community by offering the best alternative mode of transport in urban areas.

As a result, the customer might take more care when using car club cars and keeping the car clean, which would lead to providing a better mobility service to other people. However, it seems that such an improvement for the car club user could be viable and work more effectively if the car club operator could provide a more practical compensation scheme as well, such as DriveNow's extra free driving minutes rewarded if users fill-up the car when the fuel tank level is under 25%.

It was decided in-depth interviews formed the appropriate research method to understand the users' mindset and opinions of using shared mobility. This session enabled me to collect their rich and diverse experiences, which can only be gathered by listening and interacting with the participants, the actual users of car clubs in London.

7.2. Insights from the interviews

The interviews were held from June 2014 to August 2014 at each participant's house or workplace. First, demographic research questions were asked, covering the living circumstances of the interviewees, for example, whether they were married/single, had children, and most importantly had a parking space. These were discussed in order to explore whether those factors actually affect user's decision to join the service.

Participant	Sex	Age group	Occupation	Children	Parking space	Using smartphone app
1. User interviewee A	M	25-34	Senior Technologist	No	Yes	Yes
2. User interviewee B	M	25-34	Product Designer	No	Yes	Yes
3. User interviewee C	M	25-34	Front-end software developer	No	No	Yes
4. User interviewee D	M	25-34	Consultant	No	No	Yes
5. User interviewee E	M	45-54	Car Designer	Yes	No	Yes
6. User interviewee F	M	25-34	Design Researcher	No	Yes	Yes
7. User interviewee G	M	25-34	Kitchen Designer	No	Yes	Yes
8. User interviewee H	F	25-34	Local Gardener	No	Yes	No
9. User interviewee I	M	25-34	Analyst	No	No	Yes
10. User interviewee J	F	25-34	Corporate Manager	No	No	Yes
11. User interviewee K	M	25-34	Charity work Manager	No	No	No

Figure 73: The basic profile and living circumstances of the interviewees

In this section discussing fundamental factors, children and parking spaces were found to be the most important issues for users. Among 11 interviewees, 45% of them have had a parking space while 55% did not have a space for their car.

First of all, although they may have had a dedicated parking space around their residential area, the cost of purchasing an expensive parking permit was also one of the barriers that deterred them from buying a private car.

It was revealed that using a car club gave them a sort of reassurance, as they did not need to be concerned about finding a parking space for the car, despite the fact that some had a free parking space, depending on where they lived.

Second, if they had children, in particular, young children who required extra equipment such as a baby seat, they said they would leave the car club membership and buy a private car as they would need the car more often. According to user interviewee D, who is a former employee of Zipcar, being childless is one of the characteristics of car club users from the company's perspective (User interviewee D, 2014).

During the in-depth user interviews, only one user was found to have children among the 11 interviewees. The rest of interviewees who did not have children said they would leave the car club membership and buy a private car when they did so.

Perhaps such a perspective from the company derives from understanding that the availability of the car club would not be as crucial because a family with children that needed private mobility would carry lots of extra luggage such as a buggy or baby seat when they moved around.

Along with those two factors discussed above, the situation of the users was another main factor that had led them to join the car club. Since all the interviewees' workplaces were located in London where the density of car club vehicles is incomparably higher than in other areas in the UK, the benefit of using a car club was an immediate mode of transport when they needed a car. However, they mentioned that if they moved out of London due to changed living or work circumstances, they would cancel the car club membership as the availability of car club vehicles would be not as good as in London due to the relatively low number of shared car fleets. They would buy their own private car as a consequence.

7.2.1 Cost & flexibility – The two main issues of using car club

7.2.1.1 Cost

The first section of the questionnaire (see Appendix 1), 'General user experience of using the car club' was an opportunity to understand the detailed reasons why the car club users had decided to join the car club and had kept using it. The most notable reason for using a car club was the cost. The customers could use private transport – a car – without being concerned about the expenditure of maintaining it.

User interviewee K, an office worker who sold his own car and joined a car club, said that the running cost for his own car, including insurance, mechanical repairs and MOT was approximately £1000 a year, therefore the price of having a private car is more expensive than using a car club. Such a transition from private car to sharing mobility has lifted the burden of ownership of a car from the users.

I used to have a car but I sold it three years ago and I need to move things such as instruments as I played in a rock band. Also I moved house occasionally, so it was useful to hire a van sometimes. I am a member of Zipvan and it works out cheaper than renting a van, as I use it just couple of hours. So car club is very cost effective.

[The reason that I sold my car was] because I was not using it enough to justify the expense of running it. Insurance, mechanical repairs and MOTs, it was coming to about approximately £1000 a year just to run the car on the road. So I worked out how many journeys I could make in a hire van and I can use the hire van every week pretty much with the same running cost. So I realised that using a car club is cheaper. User interviewee K

According to User interviewee E, who started using Zipcar when he lived in the United States and enjoys the same car sharing service in London, the best part is that the customers do not need to deal with ownership which encompasses

maintenance, parking and keeping the car clean. Moreover, since the total cost includes the fuel and insurance, the car club cost was one of the absolute strengths.

7.2.1.2 Flexibility

The degree of flexibility of a car club was another significant reason. This flexibility encompasses the other diverse benefits that car clubs offer to customers, namely, accessibility, availability and the convenience of using mobility whenever it is needed. User interviewee H, a local gardener, said that the reason she decided to join the car club was to hire a van. Although she could hire it from a traditional van rental company, the flexibility to use it whenever she needed was the vital factor to her. There were other advantages of using car clubs: namely, the convenience of renting the car without going through the hassle of paperwork but rather arranging hire at the very last minute; the availability of cars located near the user's residence, and the accessibility of various cars in a car club's fleet within 5~10minutes' walking distance without being restricted by rental office hours. All of these could be understood under the umbrella of flexibility.

The fact that a car club is an effective form of mobility in the city, and at a reasonable price in urban areas, whereas owning a private car has been a financial burden and hassle, were the two general but key reasons why interviewees have joined and kept their car sharing membership. 72% of users said that cost was the critical aspect of using a car club while 81% of users chose the flexibility of a car club as the reason they were using it while 63% of users said both issues were the most crucial issues.

In terms of the key findings from the main sections, five key insights were summarised from the interview. Interestingly, most interviewees expressed their satisfaction with using a car club, without having many difficult moments while doing so. However, as they began to expand upon the questions,

the participants presented in-depth opinions, which were creative and sharp insights that had accumulated throughout their experience of using it for 2~3 years or more.

Among the five key insights, the most common and positive benefits from the users' perspective were that the overall concept and process of using a car club was simple and easy to understand. Since the system of using a car club is a little different from a traditional car rental service, such a simple and easy process of introducing the service was a critical aspect for users to understand how it works.

7.2.2 Simplicity & Ease

In contrast to a traditional car rental, the car club is being operated with a membership system, meaning those who want to use the mobility scheme have to join the car club and pay the annual or monthly fee to retain their membership. As mentioned above, there are a few different rules that people should be aware of when using car club, for instance, the rules pertaining to returning the car to the original parking bay and returning it on time for the next customers. People should also be informed about the features which are included in the car club service such as fuel expense, insurance and free mileage or congestion charge (depending on the car club). The questions that asked the users to recall their memories of understanding and joining the car club show how the users think about their first impressions of a car club and whether this sharing mobility system is really as simple as professed in the advertising of ' Book, Swipe and Go[6]'.

Most interviewees[7] said that it was simple and easy to understand the rules of using a car club when they had considered applying for membership. This positive experience continued through the joining process, as they had not felt any problems when filling in the application form and checking their driving

[6] Hertz 24/7's' explanation of how it works' webpage.
[7] All interviewees were members of Zipcar UK.

licence through a three-way telephone conversation, in which the customer, car club staff and DVLA staff are talking at the same time to check the license details.

Although they had to wait a couple of days until they received the membership card, thanks to the improvement of IT, most users were able to use the service by using smartphone app as soon as the company approved their registration. User interviewee K said that it was very clear to understand from the Zipcar's website the price for joining and other costs such as hourly rental rate, and an extra damage-waiver insurance fee. Such clear information was useful as there was no discrepancy between the expected fare and the actual charged cost.

In terms of the process of reserving and finding the car, the users have not had any issues for booking and finding their shared car. From the reservation to finding the car, the smartphone apps played a vital role that meant users recalled the experience of accessing that mobility as easy and simple. They found the app to provide sufficient instruction with maps and pictures that showed landmarks around the reserved car. One of the interesting ways in which the users found their car was to press the horn icon to honk their cars so they were able to spot the car easily, which was a simple and intuitive way to find their reserved car.

Although two of eleven interviewees were not using a smartphone, the car club's on-line website provided instruction with postcode and pictures which helped them to plan their route to their car. In addition, the clearly marked 'car club only' at the parking bay was also useful for users to find the car without any difficulty.
In the case of Zipcar, the users did not need to operate an on-board computer 'which could be seen as another layer of complexity'.

In many ways not having on-board computer make the accessing process simpler by removing the layer of complexity and not having in the car. User interviewee D
By removing the on-board computer from their car fleet when they merged with Streetcar in 2011, Zipcar enabled the users to just drive their car right away.

During the interview, most users mentioned that they did not want to do extra work before driving a car such as inputting the PIN number or rating the car's cleanliness.
The benefits of doing without an on-board computer not only saved the cost of device maintenance but also delivered the sense to users that they were using a 'normal' car, like one that they were used to driving. User interviewee F, a design researcher, said that he did not want any other stuff in the car that made it less than a normal car and the current Zipcar system worked perfectly so there was no need to add any extra system. User interviewee H, who had joined the car club when it was still Streetcar and currently uses Zipcar, said she preferred not to have an on-board computer, as it was another issue that she had to concern herself with.

I prefer not to have an in-car computer that requires me to put in a PIN because it is easier and putting a PIN number is another code to remember. So you may worry about the fact the - what if I put the wrong PIN and may not be able to get the key? So I liked when Zipcar changed the system that all I need is just my card and storing the ignition key in the glove compartment. User interviewee H

This simplicity and ease was the most common positive experience recorded by the interviewees, but it was also a very prominent aspect of the car club system as this key aspect convinced people to become members of a car club and enabled the members to enjoy a flexible mobility system in the urban area.

7.2.3 Standardisation

One of the advantages of using a car club is that the customer could drive a variety of cars depending on the purpose, such as moving house, price or availability of cars from the user's location, although other car clubs such as Car2go and Autolib offer only one kind of model in their shared car fleet. As mentioned just above, the simplicity and ease of use of the car club was the most noticeable key finding from the interviews.

Most interviewees said that driving a different type of car was not an issue as most cars have a relatively similar layout of the control system, for example, operating windscreen wipers, turning on the headlights or the heating, ventilation, and air conditioning (HVAC) system. User interviewee H said that being familiar with the car did not take long because the vehicles in the car fleet had a similar design in terms of the adjusting seats, mirrors, handbrakes and so forth. One of the interviewees, user interviewee F, who is design researcher for a London taxi project at the Helen Hamlyn centre for design, said that applying the same logical principle for designing a car makes it easier to get used to unfamiliar car interiors.

Nowadays a car's interior is designed around the same principle, most switches are positioned at same or similar location and identifiable. The same logical principle has been applied to almost every car these days. User interviewee F

Despite the fact that most interviewees had few issues with controlling and driving the car, some mentioned a few other ones that made it difficult for them to maneuver one car when they had been used to driving a different one. The first issue was to move into reverse gear. One of the interviewees, user interviewee D told the story of one such difference when putting a car into reverse gear had caused confusion due to using diverse cars in a shared car fleet.

A similar issue involving adapting to different cars was getting to start the car as some customers didn't realize that recent cars have a safety feature, namely the car won't start unless the driver presses down the brake pedal or clutch pedal. As technologies improve, the many part of cars have been automated. The Automatic or electric aspect of the modern car offers another convenience to users, for example, automatic transmission and electric windows in modern cars.

The latest cars are even equipped with automatic parking brakes and those cars, such as VW Golf mk.7, are some of the cars to be found in the car club's fleet. If the customer books this particular model, Zipcar provides detailed instructions

on the reservation web page of how to release and apply the automatic parking brake.

There is no doubt that the current trend of adopting various electric functions in the cars enables drivers to drive more conveniently, however, in terms of adding those new cars into the car sharing fleet, it might cause complicated issues between the car club users, who are not used to sharing a car every day, and the car club operators. In particular, several features such as automatic handbrake and the safety engine start function which users have to press a brake or clutch pedal to start the engine, are the functions that could bring safety impact of users if they do not know how to use those features properly.

Such a situation could be a challenge but also a task that car club operators need to consider seriously. They need to consider a balance between providing sufficient information and doing so in an effective way that enables a user to understand quickly and easily when using such new features. Otherwise users might think that they are being bombarded with too much information when they use a car club.

One anecdote of a car club user in Netherlands is that he rang up the customer call centre and complained that he couldn't wind down the window as he had never driven a car with an electric window before (Roij, 2014): this could be seen as an extreme case but the user is representative of one type of user who rents a car. User interviewee F said that he observed a lot of damage of Zipcars and Zipvans, even when they were brand new ones, as the users did not even know how wide or long the vehicles were. An image of the Hertz 24/7's hourly rental van, whose roof was severely wrecked by presumably a signpost or low bridge, reveals the negative aspects of driving a vehicle which the driver was not accustomed to using every day.

It is clear that one of the strengths of using a car club is that users can access diverse types of vehicles without going through complicated processes.

However, this advantage could simultaneously be a complicated issue for both car club operators and the users.
Each car club car is insured and offers diverse damage waiver programmes to users. User interviewee H said that she always applied a damage waiver when she used the car club car, which not only allowed her to claim no responsibility in the case of damage, but also gave her some reassurance when she used a car club car.

I always add damage waiver option so I reduce the amount [I am] responsible of paying damage fee to nothing, which gives me peace of mind. User interviewee H

However, such a damage waiver option could be seen as a passive way of dealing with damage of a shared car, in that a programme may be good at protecting users from unexpected road accidents by other cars but could not mitigate severe damage caused by users while driving an unfamiliar car club car. Therefore, car club operators should consider a practical solution to tackling this issue, for instance, sending a text message or providing key information about a reserved car after confirming the reservation.

Figure 74: The damaged roof of car club van

7.2.4 Availability

Zipcar, the world's largest car club, has a slogan: 'Wheels when you want them'. The car club user can arrange the reservation at the very last minute and access the reserved car which is located within 5~10 walking distance, thanks to the

more than one thousand cars in the club's fleet. It is estimated that there are approximately 2500 car sharing vehicles in London. The numbers of the two leading car clubs in London, Zipcar and City Car Club, are approximately 1700 and 750 cars respectively (Zipcar, City Car Club, 2016). In general, the availability of a sharing car is critical as this is the first touchpoint for users to begin the journey of the entire car club usage.

Despite the fact that there are nearly 2500 car club vehicles available in London, it was revealed that the availability of cars was one of the key factors for the car club users as 81% of interviewees had mentioned availability is the key issue when they book a car club car.

User interviewee D said that the main issues from the users' perspective is the availability which ensures the car club users that the car is always there when they need it, although there were other issues which could be improved to offer a better customer experience.

I think in-car experience is fine, although there are ways to improve it but it is fine for money issue (value for money). But the really important aspect is just availability. It is so frustrating when you want the car but do not have a car. User interviewee D

So the key to the perfect system is to always have enough vans available because the main problem you might encounter, for instance, I can't find the vans in a good location and or the van is not available. So as long as there are enough vans in enough places, then it would be perfect. User interviewee K

The majority of interviewees picked the increase of the total number of car club vehicles as the potential appeal of a perfect model of car club from their own users' perspective.

The answer to those views could be the simple one of just adding to the number of cars in a fleet. However, this produces a dichotomy regarding what is a

positive aspect of a car club in the city: the reduction of the total number of cars in the city versus the demand of customers who want more car club vehicles in the city. In turn, this raises the further question of whether a car club still can play a role as a positive mobility scheme in the metropolis.

According to Zipcar and City Car Club, the total number of cars in their car fleet has increased from approximately 1500 and 330 in 2014 to 1700 and 760 respectively in 2016. Increased numbers of shared cars might mitigate availability issues in the short term. Also, the current price scheme of raising the fee over the weekend usage by 15~20% seems to be an option to tackle the fact of increasing demand of the car club car at weekends.

However, in the medium-to-long term, we need to consider diverse aspects that could affect the availability such as the late return of a car or locations of car club parking bays across London, or whether the location is accessible by public transport, particularly in the case of the round-trip car club when the car is returned to the same parking space. In this regard, as mentioned in Chapter 6, the co-operation of the city council and car club operator in monitoring the availability and utilisation of car club cars of each borough and re-locating the location of shared car could contribute to enhancing the overall availability rate.

It is clear that the total number of car club vehicles is the main factor in the availability and flexibility of sharing cars. However, the other issue that is related to this key finding of 'availability' is about managing the current period of a rental, making it as available as possible. As all car club users are aware, one of the key rules of using a sharing car is to return it to its original parking space on time in order to make it available to the next customers. Otherwise, the current user could be fined.

Extending a rental period is one solution to avoid such an inconvenience, however, this is only possible when no one has booked after this rental. The other option is to reserve the car for a little longer to cover the potential lateness of the car's return, for instance, 30 minutes or an hour more than it is actually

needed. All interviewees mentioned that such a circumstance, for example, when they were stuck in traffic congestion and unable to extend the booking due to the next reservation right after them, was the most difficult moment of using a car club. An interviewee said that he was not able to extend the booking by calling the customer centre as he was in the middle of driving.

It is certain that availability is a significant factor in the car sharing service. The customers want a car as soon as they need it. It is estimated that the approximately 2000 vehicles in car club fleets in 2013 in London are expected to increase up to around 75,000 ~100,000 by 2020 (Frost&Sullivan, 2014). However, just increasing the number of car club vehicles cannot solve this issue, as the total number of users is also increasing as well. Therefore viable solutions for managing the level of availability of the current system should be considered.

7.2.5 Smartphone as a new on-board computer

The rapid growth of IT has brought significant changes to the car sharing industry, enabling car club operators to offer various convenient features to customers. The cars can be locked and unlocked remotely in case of an emergency situation thanks to the wireless communication system and, most of all, the advent of the smartphone has broadened the level of flexibility of using a car club by enabling users to manage their car club usage, such as booking and accessing a car club car wherever they are.

The car club membership card still plays a key in accessing the car and delivers solid assurance to the users in the unlocking and locking of the reserved vehicle without being restricted by outside influences such as when the user is unable to open the car by the smartphone app due to a weak signal or a drained battery. Despite such annoyance, the role of the smartphone in the car sharing industry has become more prominent than ever. The whole process of using a car club can be managed by a smartphone app, from reservation, finding the car, accessing, to locking the car after the rental period.

In contrast to other car clubs in London, Zipcar's vehicles do not have an on-board computer, but enable users to manage various tasks, including extending the original rental period or calling to the call centre through the smartphone app. The smartphone is an on-board computer for Zipcar's customers. The advantages of using a smartphone as an on-board computer would not be lessened by having to reduce the cost of installing an extra device on every car club vehicle. The fact is that users do not need to learn a new device when using the car club, as a smartphone app's familiar interface fulfills the role as an on-board computer for users.
However there is an issue of using a smartphone app while driving a car. Drivers are not legally allowed to use a smartphone while driving in the UK, as it could cause a serious road accident through the driver being distracted by such an action.

The way of extending your booking is on your phone by sending a text message or by calling them, but if you are driving, that is difficult and also illegal of using mobile phone while driving. User interviewee G

One of the interviewees said that when he needs to extend the rental period, he uses his smartphone at the red traffic signal. When a user needs to extend the rental, Zipcar advises users to send a text such as 'Ext 30m' instead of typing in all the characters. This could be seen a solution that enables users to send a shortened text for a quick extension of their rental period, however, users still need to take his/her eyes off the road to use a smartphone while driving.

Nonetheless, it is evident that a smartphone app is one of the key tools for the delivery of a better service and car club experience for users. Lyndsey Donald, senior brand marketing manager of Zipcar UK, says that Zipcar is currently investing in major improvements not only on the website but also on the smartphone app, aiming to move the customer's experience and use of the mobility service much more through the app, which reduces the complicated process to a one touch system.

For instance, the damage report process in Zipcar was relatively complicated compared to other processes such as the reservation or the extension of the rental period, as once users find damage not reported in the damage log book, they have to call the call centre, explain the damage and receive a reference number to fill in the damage report. That process takes more than 5 minutes and as the time is more precious than in traditional rental hire – with users booking one hour at a time, five minutes is a huge time-loss for car club users.

However, the 'damage reporting' function of the new smartphone app for Zipcar, which is expected to launch by the end of 2014 or early 2015, will shorten that long process of reporting damage considerably just by the pressing of one button and as a consequence, the level of convenience of using the car club will increase.

During the interviews, it was interesting to notice that some interviewees preferred to manage their car club membership via PC, as it provided a bigger screen and more detailed information. However, it was apparent that the convenient aspect of the smartphone lies in its expanding its role from a supportive part to an essential one that covers the overall process of using a car club.

Most interviewees mentioned that the smartphone app offered flexibility as they could access the mobility whenever or wherever they were.
It is about convenience. When I make a journey at some point, it could be a queue in the shop or during my lunch break. So booking a car by smartphone app saves my time and I think that the interface of smartphone app is very good. User interviewee I

I use my smartphone - I have saved a few cars as my favourites, which are the closest to me, so I check those first at the smartphone. If you do on your computer, you would get more detailed information, like the map view is pretty good. The map view on the app is also ok. I usually use smartphone because it is more convenient maybe third of time I use my computer to book it. User interviewee E

If I am at work, I use web-site because I don't have a good signal where I work. But when I am at home, I normally use smartphone app because it is more straightforward. User interviewee G

User interviewee D, a former employee of Zipcar, insists that it is positive that Zipcar is giving importance to improving the smartphone app and people should think of the smartphone as their on-board computer. As a result, users would not need to log on to on-board computers, answering questions or putting in the PIN number and carrying the membership card. He urges that the process should be feasible with the user's phone and that would be the better experience.

People have got used to using their smartphones all the time these days, managing their daily schedule and accessing various kinds of information.
In this regard, when it comes to using a car club from the users' perspective, the notion that the smartphone will replace car club car's on-board computer and will play as a new on-board computer could prove a viable and effective solution for both car club users and operators, who would not then need to install an extra device in their car club cars.

In terms of the advanced smartphone app, there does not seem to be a need for radical change of exiting app. The interface is easy to understand and provides key functions, such as 'finding cars', 'displaying available cars with hourly rate and other menus for using a car club.
Instead, car club operators should approach this issue by analyzing what is missing from the current smartphone app and then filling the gap between key functions. For instance, after the reservation and finding a car club car, providing key features with instruction about, say, the automatic parking brake or an alarm message about the height of the car in the case of driving a tall van, could prove highly useful functions for users before they drive an unfamiliar shared car.

Also, the damage history and report menu could allow users to see the damage issues of a reserved car and how to report these to the car club operator by touching a specific part of a car's diagram: this function could reduce the time-

consuming process of the current cumbersome damage report process whereby users have to fill in the damage log book and to call the customer centre to get the reference number of this report.

Changing the menu, graphic interface and other functions could be added in order to provide an advanced smartphone app for users. However those changes should be made within the concept framework of supporting key stages of using car club: Reserve, access, drive and finalize.

These changes would deliver a more convenient car club user experience compared to the existing experience with the car club's smart phone app and the problem of insufficient technical support. Moreover, if all shared cars in the fleet were equipped with simple technical support and an advanced smartphone app, car club operators would not need to invest in developing and installing their own on-board computer with its interface, which is another hassle for car club users to learn.

Thus, the investment in smartphone apps would provide an enhanced shared mobility service to users. Conceiving the solution of technical support for the car club vehicle's interior through a smartphone that enables users to use the device without being concerned about battery drain is crucial, because the role of the smartphone is becoming more important than ever and will play a vital role in such a competitive urban mobility market in metropolises.

7.2.6 The branding of the car club – the appearance of the shared car

The benefits of using a car club vehicle have led to more and more customers joining and enjoying flexible mobility in urban areas. Since the car club operators are using mass-produced conventional cars for their car fleet, it can be hard to recognise those cars on the street, although they have slight differences compared to a private car, as these vehicles are equipped with devices such as a card reader for multiple car club users.

In the case of the City Car Club, all of their cars have a distinctive pink coloured logo on the side door which clearly shows that these cars are car club vehicles. By contrast, though a small number of Zipcar's vehicles have a logo on their rear door, the majorities do not have any except for the small stickers on their rear windscreen. Even this sticker does not seem to have the intention of advertising the car brand but merely identifies these cars as Zipcar's. This could be because those who drive a car club vehicle with the logo carry a sign that they are enlightened consumers who are using the mobility in a smart way. However, on the other hand, users might not want to be seen to use a hired car for other reasons. During interviews, this emerged as a key finding; the interviewees presented polarized opinions on this issue, although some of the reasons given were not just about whether they liked the logo or not.

The interviewees who were positive about exposing the car club's logo on the vehicles said that the logo was useful to spot the right car they had reserved, as sometimes there were two of the same models in the car club parking bay in central London. User interviewee H said that when she was driving the Zipvan, it was quite nice to see the other Zipvans as she felt that they were using sharing mobility and the logo was even more appealing as she could find the shared car more easily.
Moreover, she insisted that the value of using a car club was that it contributed to a community by maintaining environmental and smart mobility values.

When I drove a Zipvan and spotted another Zipvan, I waved my hands to that car, although he didn't wave back, it was quite nice to feel that we are using sharing mobility.

I can understand that why some people do not want to be seen driving a shared car and pretend it is theirs. But I don't bother about that because I hold the environmental value, so I like the fact that I am supporting car club rather than people having their own cars and don't think that is always needed. Car is just sit there and not being used. That's why I am quite happy to promote this sharing mobility User interviewee H

In terms of the appearance of the car club's vehicle, user interviewee K said that this was not an issue to him. He emphasized that using sharing mobility entailed the specific purposes of customers, hence the appearance of the vehicle was not a major issue to him.

However, on the other hand, the interviewees who were opposed to car club logos on the vehicle said that one of the conveniences of renting a car was that it was the same as using a conventional car. The interviewee, user interviewee I, analyst, said that he did not care whether other people distinguished that he was using a car club or not, as that was not the reason for using this kind of mobility but rather it was the convenience of not having to own a car. But still he would rather people did not know he was using a car club car.

User interviewee G, a customised kitchen designer, had a similar view on this issue, saying that one of the benefits of using Zipcar was the car could be anyone's car. Interestingly he also pointed out that the logo of the car club might affect other aspects such as the user's work or activity while they were using the car club vehicle with the logo.

The reason that I do not like a car with a Zipcar logo is because I use Zipcar a lot for work. It is about brand. I think customers (who are buying a customised kitchen) expect you to have a particular taste or style so customers have confidence what they are buying from you and they can relate that brand of car you use. So I'd rather not drive up in a car club branded car to a customer's house for business.
User interviewee G

In terms of the perspective of the branding of the car club, user interviewee E, former design director of equipment at Nike, said that driving a car with a logo might presume a smart consumer over one who owns a car. He said he would rarely use his own car, but that a car was a personal thing.

I think the brand of Zipcar itself is really clever and well done, but that graphic on the car looks very unsophisticated, compared to the rest of execution, which are

very good, namely, service, cars and apps. I understand the reason of doing this advertising. But the best advertising you can do is word of mouth, using the current people who are using Zipcar, which they are trying to spread the word about the brand. This (Zipcar logos on each side of car) is easy and this is low bar but you have to think about the other implication, the downside of this. Does the downside outweigh the positive you might gain about brand awareness? User interviewee E

User interviewee F, design researcher at the Helen Hamlyn Centre for Design, said that the logo on the side doors did not seem appealing to him. Although the relatively small logo on the door could be seen as a discreet branding strategy, others might not even pay attention to it as it seems like a car dealer sticker that exists on every car. The interviewees claimed that the fact that users were driving a car with logos, which advertise for the company, while they were paying a hefty fee for using mobility is another downside, unless the users gained some financial benefits such as discounts or offering extra mileage. During the interview, 55% of interviewees said that the car club logo is not an issue when they use car club car whereas 45% of interviewees expressed a negative view about driving a car club branded car.

In the current circumstances, where a car club has been regarded as an emerging mobility solution in the metropolis, it is critical for car club operators to promote their brand to people by using diverse methods. In this sense, to put the brand logo on their vehicles on the street might be one of the options that could maximise the efficiency of advertising. However, as user interviewee E pointed out, the car club companies also need to contemplate the other implications and whether such branding strategy that put the logo on their vehicle could be as effective as they anticipate. During the interviews, the appearance of the hired car was a polarising issue among the interviewees.

From a practical perspective, car club cars with brands are easy to find when more than one of the same model is parked at a car club parking bay. However, on the other hand, there were negative views on car club cars with brands, as in some cases, it was revealed that the fact of using a car club car with logo, clearly showing it was a rented car, could affect the user's business due to the negative

perspective of some people towards using a rented car. In addition, the fact that users are not incentivised by driving a car club branded car was another downside of using one.

Regarding the branding issue of the car club car, digital window display technology, introduced by several concept vehicles such as Mercedes F105 could be a solution. For instance, a viable solution might be a flexible price system that could offer discount/non-discount prices for using car club cars depending on whether car club users decided to turn on or off the car club logo on the electric window display. This potential branding solution might become reality in the near future of car clubs.

7.3 Suggestions from the users

The interviewees were asked to present their ideas for conceiving 'ideal/positive car clubs from the user's perspective'. Interestingly, the suggestions from the interviewees were not radical changes of the current system, but small changes expected to enhance the level of convenience that would lead to increasing the customer's overall experience. The four key ideas pooled from various suggestions of the interviewees are summarized below.

7.3.1 More available cars

As mentioned above in the 'availability' section, this might be a dichotomous issue between car club users and operators, as one of key strengths of implementing car clubs in the city is reducing the total number of cars on the street. Moreover, lowering the carbon-dioxide emissions and traffic congestion are other well-known benefits which the car club contributes to the community. Although approximately 2500 car club vehicles are deployed in London as of 2016, the interviewees said that more cars should be added to the car fleet as they have experienced difficulties of booking a car when needed. One interviewee even mentioned that offering availability to users by increasing the number of the total car club vehicles is the most important aspect - a top priority

issue in comparison to secondary issues of using car clubs, such as the one-way service or the in-car experience.

Adding more cars may sound an obvious option to increase the availability rate in a sense. However, as mentioned above, various aspects that could affect the availability of car club car needs to be considered. Late returning, the location of car club parking bay and the introduction of diverse modes of transport in London, including one-way car clubs and ride-sharing mobility service, are also co-related with the availability of car club cars and affect users' mobility behaviour as well.

Although the total number of car club cars have shown a gradual increase, the total number of car club users are also increasing. Thus, simply adding more cars will contribute little in enhancing the overall availability rate of shared cars, but car clubs need to suggest a practical solution.

For instance, a flexible rental extension option that constantly monitors a car's location and extends the rental period of current users while offering a discount hourly rate to the next user who has to use the next nearest car club car could be one of the practical solutions to tackling the late returning issue that directly affects the availability of shared cars.

7.3.2 In-car support for smartphone usage

Car club users are using smartphones to manage their car club service, from booking to finalising the rental with the car club's smartphone app. As the senior brand manager of Zipcar mentioned above, the car club operators are also aware of the importance of this small device. Since most car club vehicles' trim level is a basic model that does not even have a USB port, it is difficult to charge the user's smartphone while they use the device for navigating the routes that quickly drains the battery. It is anticipated that the role of the smartphone app will become more significant as the range of the service through the smartphone app

is not limited to just managing the booking and opening the shared car, but providing a wide range of service to the car club users.
As a result, interviewees claimed that the car club vehicles should be more technically able. It may sound complicated, however, they insisted that just providing an in-car charger and smartphone holder would form a simple yet effective solution for car club users.

However, the theft issue might not be resolved in this way, and there also remains the compatibility issue between each smartphone model as each one has different charging ports, which might then produce another obstacle. Most of all, there remains the fact that using a smartphone while driving is illegal as its use could cause a severe road accident. In this regard, voice control or gesture control technology could be considered as a viable solution that allows user to use the functions of smartphone app while driving a car without taking eyes off the road.

7.3.3 Car club web-UI & Smartphone app

This idea is closely related to the current trend of increasing the usage of the smartphone. When the car club users use the car, listening to their favourite music is one of the common activities that offers a familiar and comfortable environment to users. Thanks to another recent technology, most cars have a Bluetooth function, which connects the mobile phone with the car, so drivers can listen their saved music or contact a friend via in-car hands-free features. However, linking a mobile phone to a car takes a certain amount of time; it may even take up to 20 minutes or more to sync all the data such as music from a user's smartphone.

The idea of the car club web-UI is conceived as a sort of web-server, by which the user can sync all the data and context to the shared car. As a result, when the car club operators know the user has hired the car, they can transmit the data to a car s/he has reserved. So the user can listen to their music or access their data in the car. For example, using a smartphone sat-nav might be affected due to

network connectivity. So users can download their directions from Google map and access the offline map data in the car while driving. This was an interesting suggestion in terms of the concept of personalising the car to the user who is using it by improving the technical aspects or implementing syncing system via web-UI.

However, in terms of providing familiarity to users, developing and providing a car club web-UI could result in another system that users need to learn before using a car club. So, users might simply use familiar functions such as Spotify or iTunes for listening to their favourite music while using a Google map or other apps for navigating their routes instead of accessing those functions via car club web-UI.

7.3.4 One-way service (A to B or floating point to point model)

The one-way car club models have begun emerging in Europe and in U.S (Le Vine 2012). Most car clubs, including Zipcar, City Car Club and other local car clubs in the UK adopt the round-trip model, calling these 'back-to-base' car clubs. By contrast, the other car club, such as Autolib in Paris and Car2go, DriveNow in Germany that were introduced recently, adopt a floating point to point model whereby the customer does not need to return the vehicle to its same parking bay but can leave the vehicle in the service area. The round-trip model car clubs insist that the one-way model is contrary to the objectives of reducing congestion and pollution in the cites, as customers would use the car club vehicle whether they really needed it or not.

Since there is little data is known about the one-way car club (Frost & Sullivan, 2014, Le Vine, 2012), it is hard to predict the impact of this model. However the introduction of DriveNow in London in 2014 and Autolib in 2015 will show how the one-way model affects on existing mode of transport including influence on round-trip car club usage, whether this kind of model actually competed with the current mode of transport as increased car usage as round-trip operators anticipated.

Also, it is worth seeing how they expanded their service area by coordinating separate boroughs in London, which Car2go had failed. Most of all, from the users' perspective, the assumption that a one-way model would be more convenient than a round-trip because it does not need to be returned to the identical parking space can only be proved by trialing this model in London. Perhaps the fact that users could use both type of round-trip and one-way model rather provide a broader mobility option and complement each other rather than compete and increase car use.

Prior to the user interviews, it was expected that this one-way model would be the most demanded improvement from the users' perspective. However, interestingly, it was revealed that most interviewees thought the one-way model might be interesting or more useful, but they anticipated the realistic difficulties of implementing the point-to-point model in London. They saw difficulties in terms of the operational or the legal, as convincing and negotiating parking issues with 32 different boroughs in London would be complicated. Furthermore, redistributing the shared cars effectively around the city was another concern raised by the interviewees.

Above all, they said that most of their car journeys were round-trips: they rented a car near their residence and returned it. As a result, although they thought the point-to-point model might be useful in rare occasions such as going to the station or the airport, the interviewees said that the current back-to base model is the most realistic system that satisfies the demand of mobility and secures a reasonable level of availability of car club vehicles in the city. In this case, the car would not be floating around, stacking up at certain places but returned to the dedicated parking spaces after a certain period of rental duration.

7.4 Participant observation

Participant	Sex	Age group	Living Arrangements	Accessing channel to Car club	Years of using Car club
1. Participant A	F	25-34	House share	PC	7 years
2. Participant B	M	25-34	Flat share	Smartphone app	3 years
3. Participant C	M	25-34	Flat share	Smartphone app	2 years
4. Participant D	F	45-54	Flat share	Smartphone app	3 years
5. Participant E	M	45-54	House share	Smartphone app	5 years
6. Participant F	F	45-54	Flat share	Smartphone app	3 years

Figure 75: Participant observations basic profile

7.4.1 Participant observation A

I carried out participant observation with six participants. First of all, one of the interviewees, Participant A, agreed to this participant observation, using video recording of her car club usage from making a reservation to returning to the dedicated parking space. Participant A is a local gardener and has used a car club for seven years. She joined the car club as a Streetcar member back in 2009. Since she has started her own business, gardening work, she has opened a business account and merged her personal account into one account. As she is a local gardener and has a business account, she uses Zipcars or vans frequently for transporting plants and gardening tools without investing her money in purchasing a car.

1. Logging in & booking a car

Participant A made the reservation with the pc, as she did not have a smartphone. She used her laptop to make a reservation and said that it was convenient to make a reservation with her own PC as it remembered her Identification and Password for logging in.

When Participant A chose the date and time, she intended to rent it for 30 minutes as we expected that 30 minutes of rental period was long enough to

undertake the observation and also, it seemed feasible to set a time from 12:00 to 12:30, as 12:30 was displayed on the screen. However, it was not possible to rent it for just 30 minutes so she had to rent it for an hour. The selections of the location and the type of car were followed. She chose the nearest available car from her location, and a small car. When the available cars were displayed on the screen, the closest one was the automatic transmission car. Since the participant did not want to drive an automatic car due to previous negative experience, she considered reserving a manual transmission car, though it was located a bit further away from her house (half a mile away).

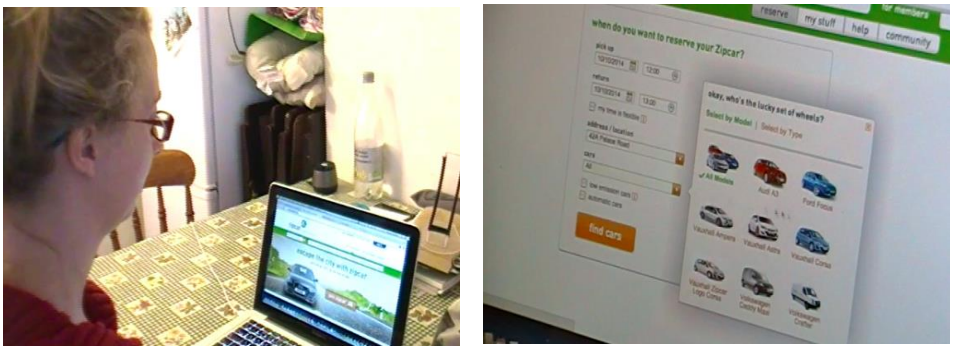


Figure 76: Reservation process, setting time and type of cars

Before clicking the 'reserve it' button, she checked the map of how far the car was actually located, and then confirmed the booking. The next page was the detail of the reserved car, providing the information of the vehicle, for instance, capacity of the luggage space, fuel type and registration number. As she also included complete damage waiver in her annual membership, she also checked whether the damage waiver was applied with the reserved car.
After checking all the details of her reserved car, Participant A wrote down the vehicle's registration number and drew a simple map to the car's location, looking at the pictures around the area where the car was parked. Since she did not use a smartphone app, assuring herself of bringing the membership card was critical otherwise she could not access the reserved vehicle.

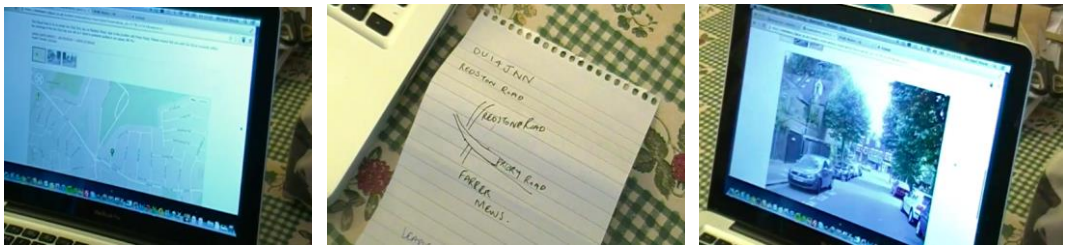


Figure 77: Checking a reserved car's location and a user drawing a simple map

At the reservation stage, the key issues for the user were to identify the nearest car's availability and location through carrying a membership card.

2. Finding & accessing the reserved car

It took less than 10 minutes to locate the reserved car. Although the participant drew a simple map to navigate herself to the location, she did not look at the map as she had lived in the area for more than 4 years. When she arrived at the car, she looked around the car to check for instantly visible damage. That was the first step she made, along with a brief checking of the inside of the car through the window. She opened the car by swiping her membership card on the card reader and retrieved the ignition key from the glove compartment.

Figure 78: Conducting visual inspection and accessing the car by membership card

Checking damage was one of the important steps and also reading the damage logbook to be aware of any damage or problems with the car. In the logbook, which the customer should fill in by writing down the damage with a pen, the boot opening failure was reported and she tried it, but the boot did not open in spite of the fact that the car was a relatively new model. Since the issue of being

unable to open the boot was mentioned in the damage log book, she did not need to report the same issue again.

Figure 79: Checking the damage report log book and boot opening failure of the reserved car

Such an issue could have caused a serious problem if the customer had to accommodate heavy luggage. She said that it was lucky as she did not need to use the boot space, but this would have been quite a big problem otherwise.

The main problem at this stage was that such an unexpected technical damage issue of a reserved car was not made known to the user before she reserved the shared car. If the user had brought heavy luggage or had goods to accommodate while using this shared car with, say, 4 other people, it would have caused a serious inconvenience as there was no way of opening the boot or even putting the luggage on the rear seat.

In the circumstance of using a shared car, several minor forms of damage or cleaning issues, for instance, body dents, scratches or the dirty interior of shared car are inevitable. It may not be possible to respond to those issues instantly. However, by informing the car club of damage or technical problems of available cars via a PC reservation web page or via a smartphone app before reservation, such a serious inconvenience would not have been caused; rather, it would have helped users to plan their car club usage more efficiently.

3. Inside the shared car

Participant A adjusted seat and mirrors in the inside of the car. Since the car was a new model that she had not driven before, it was a little complicated for her to adjust the reclining seat's backrest. She was struggling to adjust it for a few minutes, attempting to find the right lever to adjust it. After familiarising herself with controlling the other buttons and dials, checking which one was the indicator switch, the windscreen wipers, and how to control them, she tried to start the engine.

However, the difficulties of adapting to a different type of shared car continued, as she could not start the engine. This was due to the latest cars being equipped with certain safety features, as in the driver having to press down the clutch pedal in some case of manual transmission car. The small display window between the speedometre and engine rev counter displayed the instruction 'press the clutch to start the engine' but although she had read the instruction, she was actually pressing the brake pedal.

Figure 80: Adjusting the seat and starting the car

A few seconds later, she noticed that she was pressing the wrong pedal and was able to start the engine with her foot down on the clutch pedal.

The absence of the on-board computer of this car club (Zipcar), which required users to put in a PIN number and showed an induction video about how to start

the car as Car2Go does, was an advantage for these users as they did not need to go through those extra processes before driving an hourly rental car.
However in this case, such an advantage had rather caused a serious confusion as she did not know how to start the car. Although the car's small built-in screen between the speedometre and the rev counter showed how to start the engine, such a small display was not good enough for the user to notice it.

In some cases, the reservation PC web-site displays some of the key functions which the user might not be accustomed to operate, such as the electric parking brake, as more and more diverse car models are included in a shared car fleet.

4. Driving & returning the car to the parking bay

After 30 minutes of driving, we returned to the original parking space. While she was trying to park the car, she parked it provisionally and got out from the vehicle to check whether the car was in the car club's parking bay; she then moved the vehicle to make it fit exactly in the bay. When the car was parked, she turned off the engine and put the ignition key back into the key holder in the glove compartment and checked whether she had left any belongings in the shared car.

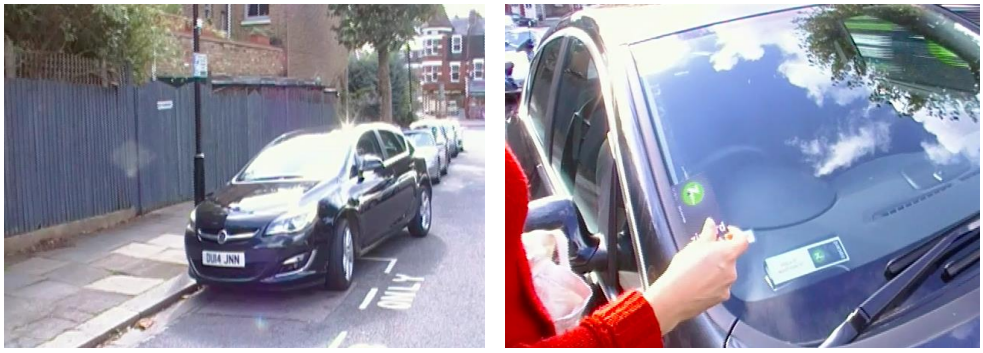


Figure 81: Returning the car to the original parking space and locking the car

Before finalising the rental, she checked thoroughly whether the windows were closed and any damage had occurred while she was driving. Once the final checking process was done, she locked the car with the membership card and pulled the door handle to make sure the car was locked properly.

7.4.2 Participant observation B (accessing via smartphone app)

I carried out a second participant observation with a user who uses the smartphone app to manage the car club usage. Participant B is a design engineer and has used a car club for three years since 2013. The main aim of this second participant observation session was to find out how car club users use the smartphone app from booking, accessing to finalising the rental and secondly, what the issues of using a car club service via a smartphone app are. This was achieved through closely observing the user's actions.

1. Logging in & booking a car

Participant B made the reservation with his smartphone app. The process of logging on was as same as for the PC that Participant A underwent, and during which the user sets the date and time and sees the available cars on the map. He chose a Ford Focus. The reservation screen provided basic information of the reserved car with an image of a car, location, rental date and time together with Zipcar's unique name of a car for instance, Viking ship VW Golf.

It also provides a description of the capacity of a car such as 'medium capacity, 6-8 standard file boxes'. However he said that such a description was not that useful to understand how much capacity the car would have exactly. Sometimes the reserved car was smaller than he expected. So he said that when he needed a car to transport a large amount of luggage, he just rented a van instead.

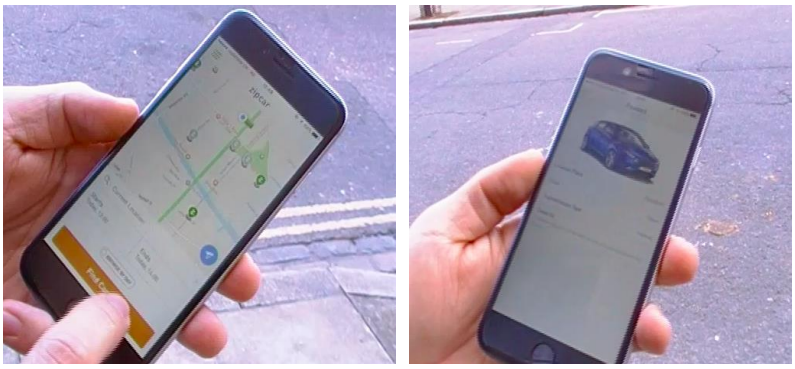


Figure 82: Making a reservation and checking the reserved car's detail via a smartphone app

2. Finding a car

After the reservation, Participant B tapped the reserved car's location menu which provides a description of car's location with two street view pictures that shows where the car is parked. He said that those street view pictures are sometimes not matching as the surrounding environments such as buildings, houses or roads are changing but Zipcar does not upload up-to-date street view pictures.

Figure 83: Finding a reserved car with street view pictures of the app

Although he reserved a Ford Focus, the car in the street view pictures was a BMW 1series, which are not even in the current Zipcar fleet. He said that street view pictures were not useful, particularly if he had never been to this location before and he always had to operate another app to navigate his route to find a reserved car. He also said that such insufficient information about a reserved car's location sometimes made it difficult for him to find the car before the rental period started.

3. Accessing a car

When he arrived at the reserved car at Lee Street E8, the car was parked at the car club only parking bay. In the Zipcar's smartphone app, there is a menu titled 'Honk and Unlock me' which enables the user to access the car with a

smartphone app without a RFID membership card. Participant B said the 'Honking' function was useful when several cars were parked in a row and he could not find his own reserved shared car. When he pressed the horn icon button, it did not work in real-time but there was a 10~15 second delay to the sound of horns. Then he pressed the unlock icon, but had to put the password in again to unlock the car. Again, it also took 10~15 seconds of delay until the car was unlocked.

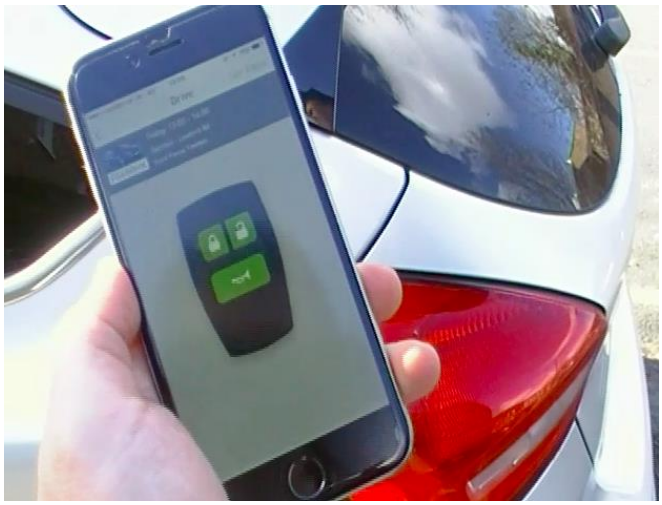


Figure 84: Accessing the car via smartphone app's unlock me function

Such accessing of a shared car via smartphone app is one of its notable features, with an icon and layout that was designed to be similar to the car's real remote control key. However this accessing was not always reliable when the signal was weak. When Participant B tried to open a car with a smartphone app at the underground car park, it was unable to open a car as the signal was very weak. So he even had to call the customer centre to ask them to open the car, but even that was not viable and Zipcar had to cancel the reservation and refund the fee. He said that although the app worked well in a normal situation it was not always a reliable option, which made him acquire a membership card as well to avoid such frustration.

4. Sat-nav and technical support.

Since Participant B is from another country, he said he always used a smartphone sat-nav function. He said that using a sat-nav app via a smartphone app was a more or less straightforward action for him as he used a smartphone from the reservation process to locking the car via an app. However, the absence of any device that holds a smartphone when he uses it as a sat-nav is inconvenient.
He said sometimes he put the smartphone between the speedo and rev-counter so that he could see the screen well while driving but it would fall off at a sudden move of the car. Also, he said he always carried a USB cable and cigar lighter converter to charge his smartphone when he used a car club car due to his anxiety about the smartphone battery drain issue.

5. Extending a rental via a smartphone app

The situation that users have of needing to extend the rental period due to a traffic jam or a sudden change of schedule can happen anytime when using a car club car. When Participant B had to extend the rental period, he said he was fully aware of the regulation that using a smartphone was not allowed while driving, but in order to avoid the late returning penalty fare, which is much higher than the hourly extension fare, he extended the rental at a red signal.

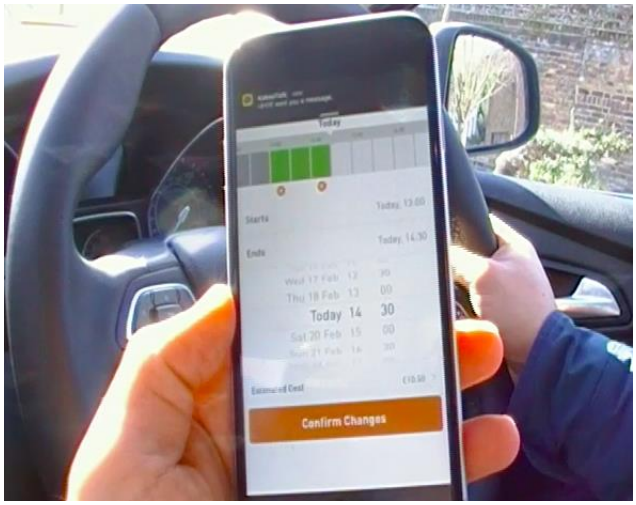


Figure 85: Extending the rental

He said pulling over the car was sometime not possible if he was in traffic congestion or driving in an area where you are not allowed to stop. In addition, it was even more difficult to use the smartphone app when he was driving a manual transmission car. So he said that he sometime asked his friend to extend the rental period as it was not safe to use the smartphone while driving.

6. Finalising the rental

Participant B locked the shared car with his smartphone app. At this stage he did not need to put the PIN number again, which was required at the unlocking the car process. However, it also took 5~10 sections until the car was locked. At the finalisation stage, he said that there are several issues that always made him concerned about whether he had properly finalised the rental procedure. In this regard, he mentioned that sending a confirmation text with summarised the key data of rental usage could be a useful function to users.

Figure 86: Finishing the rental by pressing the lock icon of the app

For instance, parking the car in the car club parking bay, leaving at least ¼ tank of fuel and information about how much mileage the user had driven with an additional charge per mile if users had driven more than 60 miles of free mileage. He said that sending such a confirmation text with information would give him the assurance that the rental was properly finished and he did not need to be concerned about it anymore.

7. Overall verdict and suggestion for smartphone app

Participant B said that the overall functioning of the smartphone app was good in terms of basic functions for using a car club. This was particularly so in terms of the layout that shows the cars' location and availability via Google maps: this was intuitive and easy to understand. When the signal is strong, the app shows a fast response and speedy processing of the reservation and changing the reservation, however, he pointed out that the membership card was still an important item as sometimes users cannot access the shared car if the signal is weak. Also the button that directly connects the user to the customer centre is a useful function as they are responsive 24/7 and helpful in any case of emergency except in the case of dealing with the weak signal issue of a smartphone app that blocks users from accessing the reserved car. Within the main menu of the smartphone app, he said the feedback and survey were the menus that he rarely used because inputting the user's opinion through the smartphone keypad was time consuming and inconvenient for him.

Overall, he said the layout and functions were straightforward and easy to use, displaying all necessary information in one screen. He mentioned that the process of reserving and accessing the shared car would have been much more complicated if he had not used a smartphone app. However, insufficient information and inaccuracy of the street view of the car's location along with the technical issue of a weak signal that even blocked the user from accessing the shared car at the underground locations were the main drawbacks when using a smartphone app, although the latter was more about technical issues than the smartphone app itself.

He also suggested a new feature for reporting the damage of a shared car that could be achieved by syncing the function of taking pictures along with the damage history menu. He said that in the process of reporting the damage, sending pictures with damage report would be fast and easy in pointing out the exact location of the damage of a shared car. Also, providing a damage history feature could play the role of informing car club operators when a specific

damage area was reported in multiple numbers by users. Such a function is not only useful for the user to shorten time spent on the unspecific damage report process, but was also useful for car club operators in terms of saving their time in tracking down the damage in their car fleet.

7.4.3 Participant observation C

The third Participant observation was carried out with participant C who stated he had used the car club while he was studying in Germany and had joined the car club in 2014 when he had started to work in London.

1. Logging in & booking a car

Since Participant C had not accessed his car club for a while, he could not remember the password to log into the smartphone app. The process of resetting the password took more than 10 minutes as he had to log in the Zipcar customer website and set the new password for logging in his smartphone app. After re-setting his password, he logged in and set the time he wanted to book the available car.

Figure 87: Making a reservation via smartphone app

At this stage, it was not viable to use the car club car for just 10 or 15minutes but only for 30minutes or 1 hour. So, although Participant C wanted to start using the car club car from 14:50, at 14:44 when he set the time via his smartphone app, the only options he could choose were either from 15:00 or a later time. The first screen right after the booking time displayed a list of the available cars

closest to his current location, but it was not easy to read exactly how far they were from him, so he changed to the map screen and booked the closest car.

2. Finding a car

It took 7 minutes walking to locate the booked car. Since the car was booked in his town, it was not difficult for him to find, however, as with the second participant observation, the booked car's colour did not match the car's picture in the street view provided by smartphone app. In order to check that the car was the one he had booked, he pressed the honk button of the app. But in the process of accessing the car, he had to re-type the password again, a process he found quite annoying although this was a security feature.

Figure 88: Finding a reserved car with smartphone app's street view

3. Accessing a car

Before getting into the car, Participant C had carefully made a visual check of the booked car, finding damage and checking whether it was reported in a damage log book. After the careful visual inspection of the car club car and sitting in the driver's seat, he felt ready to go, however he had forgotten to retrieve the ignition key from the glove compartment. It seems that the fact he had not used the car club car for a while put him in such a situation: collecting a key from an untypical place is not a habitual action when getting into a car.

Figure 89: Accessing a reserved car via smartphone app and checking damage

4. Driving & returning the car to the parking bay

After 25 minutes of driving, Participant C returned the car to the identical parking space. He parked the car and returned the ignition key to the glove compartment. Then he locked the car by clicking the lock icon of smartphone app while mentioning that he usually checked whether he had left any personal belongings. When the car was locked with a clicking sound of the door lock, he pulled the door handle again to see whether it was properly locked.

Figure 90: Returning the car and checking whether the car is properly locked

7.4.4 Participant observation D

Participant D has owned and driven a car in London for 15 years but she sold her car and joined the car club in 2014 as she thought that using a car club was a more economical and flexible way of using a car.

1. Logging in & booking a car

Participant D had made a reservation via a smartphone app. The car she booked was located very close to her house and could be reached within 5 minutes of

walking. Although she made a reservation via a smartphone app, she also brought the membership card because she said that accessing the car club car via the app was a complicated process, i.e. re-typing the password and waiting for the car to be opened, while she could instantly access the car by swiping the membership card without such a hassle.

Figure 91: Reservation process with smartphone app

2. Finding a car

When she arrived at the car club parking space, noticing the car club car, she checked the number plate with the details of her reservation to see whether it was the correct one. But when she tried to open the car by swiping the membership card over the front windscreen, she swiped it on the opposite side from where the card reader was installed. When nothing happened, she asked herself whether this was the correct one but realised the card reader was on the driver's side and swiped the card again to open the car.

3. Accessing a car

While Participant D tried to start the car, she said that she normally did not check the damage report as she thought it was a tiresome process and had become a habit, but she just checked the fuel. She also mentioned that she always adjusts the seat position and door mirror to make it comfortable to drive, while she rarely tries to use other functions such as controlling the blue tooth feature. The latter takes a certain amount of time to learn and it even feels a bit of a waste of time if using a car club for a relatively short period of time.

Although Participant D did not check the damage report, she said that she always took pictures if the booked car's interior was dirty - with trash and even pet hair - in order to avoid a complaint or even being charged for the dirty interior caused by a previous user.

Figure 92: Accessing the booked car via membership card

4. Driving & returning the car to the parking bay

In terms of driving diverse kinds car club cars, Participant D said that some new technical features such as the automatic parking brake were a barrier to her and it took a while to learn how to release and lock the car. Also, different types of moving into reverse gear within the car club car fleet was also an issue as she did not use the car club that often. As a result, she said that providing such critical information via a smartphone app would be very useful, particularly to women car club users.

When Participant D returned to the car club parking space and parked the car, she put the key back into the glove compartment and carried out a visual inspection to see whether there was any damage or not. After locking the car by swiping the membership card, i.e. via a relatively more convenient way than locking via a smartphone app, she pulled the door handle to check the door was locked properly.

Finally, she shared her experience of using a car club as a female user. In her personal opinion, she said that female drivers seem to struggle more than male drivers to get used to driving different cars in the car club's car fleet.

Figure 93: Returning the car and explaining why she locked the car via membership card

Although she had driven a car for almost 15 years in London and had no issue when she was driving her own car, when it came to driving a different model while using the car club, she felt a little difficulty and even that such a confusion might lead to a car accident. So Participant D said that more detailed information of the booked car should be provided more clearly via a smartphone app that could enable users to be well acquainted with the booked car.

7.4.5 Participant observation E

The fifth participant observation was carried out with participant E, who is a product designer and has used a car club for five years.

1. Logging in & booking a car

Participant E said that he normally uses a smartphone app for booking the car club as it has already been logged in, while accessing via a PC means putting in the password which he did not always remember. When deciding on the available cars list via a smartphone app, there was one model that was relatively cheaper than others as it offered a pay-per-mile tariff with a cheaper hourly rate (£3.00/hr) but at the same time, it was also decorated with a large car club company's livery. However, at the booking stage, the different look of the car was not clearly communicated except for the sample image of the car. Anyway, it seemed that Participant E did not care about it. In terms of the map that displays the booked car's location with the street view, he would like to see it linked to Google maps as the app map was not always useful even though he could roughly assume where the car was located.

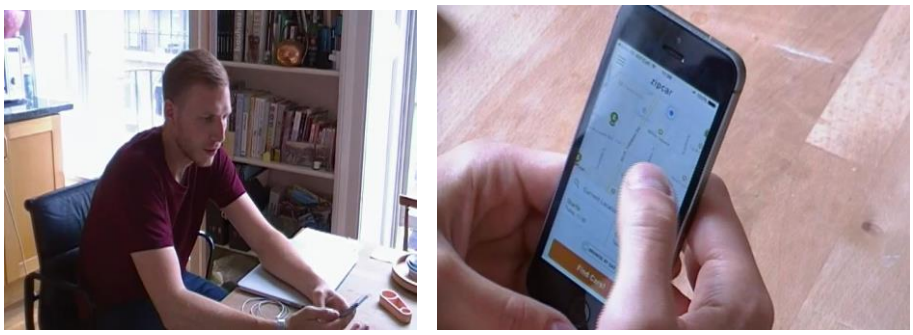


Figure 94: Making a reservation via smartphone app, searching the nearest car club car

Such an issue sometimes made it difficult to locate the car easily and as a result, he said he sometimes copied the postcode of the reserved car's location description window and put it into a Google map to see the location more clearly. By controlling the familiar interface of Google map's app, he was also able to see the easiest way to arrive.

2. Finding a car

Participant E used Google map's app to find the exact location of his reserved car club car, however he also read the description of the car club's smartphone app to know more detailed information about street names around the booked car's parking space, including which side of the street the car was parked. When he arrived at the parking space where his reserved car was parked, he was a bit embarrassed as the car was decorated with a large car club logo livery the branding of which was unusual to him. He assumed the reason might be that this car's tariff was pay-per-mile with a relatively cheaper hourly rate, but he said he would avoid a car with such massive branding on it as he wanted to drive a car club car that looked the same as a privately- owned car.

Figure 95: Locating a reserved car via smartphone app

3. Accessing a car

Participant E carried out a visual inspection, carefully checking dents on the door or wheels. He said it was difficult to find scratches or dents when it was raining as such issues were less visible than on a sunny day. While he was going through his visual check he also checked which side the fuel cap was placed in case of re-fueling the car. After the visual inspection, Participant E tried to open the car via his smartphone app, tapping the unlocked icon, but it was not activated even though the bleeping sound was heard.

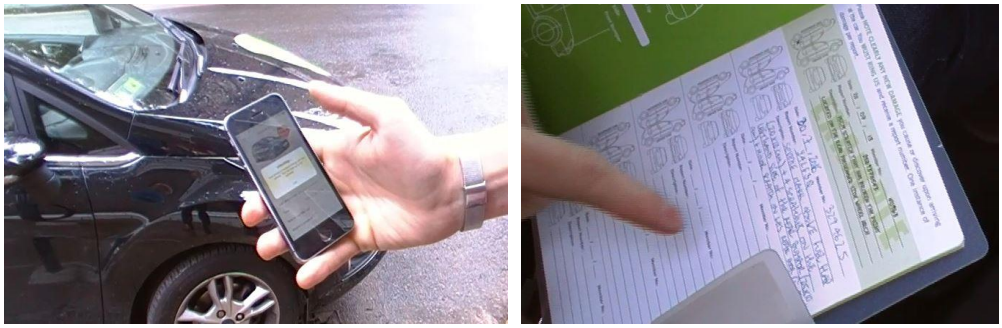


Figure 96: Accessing the car via smartphone app and checking damage log book

Since he had to re-type the password which he normally did not remember, he opened the car with the membership card which allowed him to access the car immediately. When Participant E got into the car, he collected the ignition key from the key holder stored in glove compartment and checked the fuel card was in place, then opened the damage log book to check the damage he needed to know about and also to cross check that the issues he found during the visual inspection were properly reported in the log book. Before starting the engine, he checked the residual level of fuel, adjusting the seat position and door mirror. He also mentioned that he always paid attention to the gear lever to know clearly how to get into reverse gear position as some cars have different systems such as pushing or lifting up the gear knob.

4. Driving & returning the car to the parking bay

After driving a car for 15minutes, Participant E returned the car to the parking space. Once he parked the car provisionally, he got out to check whether the car

was properly parked in the car club parking bay and moved it forward a little to make the car fit exactly in the bay. Then he returned the key back to the keyholder in the glove compartment while checking whether he had left any personal belongings in the car. In terms of locking the car, he again used the membership card instead of using a smartphone app, as he said it was easier than via an app.

Figure 97: Returning the car to the parking space and the key back to key holder

Once the car was locked, he pulled the door handle to check whether the car was properly locked. As observer, and after carrying out five participant observations, I recognised this action of pulling the door handle after locking their car via a smartphone app or membership card, as a common behaviour. It seems that the action of locking up the car by tapping the icon of the smartphone app or by swiping the card was still an unfamiliar way of accessing the car compared to the traditional way of accessing the car with the ignition key.

7.4.6 Participant observation F

The sixth participant observation was carried with Participant E who is a freelance editor and has used a car club for 3 years in London.

1. Logging in & booking a car

Participant F tried a reservation via a smartphone app and chose the closest available car from her current location near Stoke Newington. However, when she tapped the button to confirm the reservation she selected, the app said that it

was unable to charge the rental fee from her credit card. So she had to call the customer call centre to sort out this issue and was then able to book a car.

Figure 98: Making a reservation via smartphone app and calling to call centre to sort out payment issue

2. Finding a car

After walking for 6 minutes, Participant F arrived at the car club parking space where her booked car was supposed to be parked, but the car club car was not there. So she had to call the customer call centre again and explain the situation. Customer call centre staff re-arranged the reservation and gave an address of another available car that was near her current location.

However, when she arrived at the new location as informed, it was not even a car club parking space but just a residential parking bay. So she had to call again and spent almost 20 minutes sorting out this reservation issue before eventually arriving at the newly reserved car's parking space.

Figure 99: Finding a booked car but car was not parked at the car club parking space

3. Accessing a car

When she arrived at the car club parking space, Participant F pulled out her membership card and read the instruction again as she did not use the car club that often. After unlocking the car by swiping the membership card and getting into the car, Participant F searched the interior space to find the glove compartment where the ignition key was stored. However, due to the unfamiliar interior design of this reserved car, it took a while for her to find the glove compartment.

Figure 100: Finding an ignition key and starting the car

When she found the key holder in the glove compartment, it seems that she was puzzled for a second as the cable was attached but thanks to the simple instruction attached on the key holder, she was able to pull out the key. However, starting the engine was not as simple as in a normal car to Participant F as she had never driven this kind of hybrid car with an electric motor before, one with an engine start/stop button type car. Moreover, the booked car's transmission was automatic - a totally different type to usual.
So it had taken a while to understand how to start the car. She said that the fact that she was not used to an automatic transmission car and had also never driven a hybrid car were two main barriers to her.

4. Driving & returning the car to the parking bay

After reading the manual for several minutes and trying to adjust herself to a totally new system of a car which she had not driven before, Participant F was able to start the car and drive. Although it was her first drive of an electric-driven

hybrid car, the Toyota Yaris, she immediately got used to driving the car though she mentioned that she kept wanting to use her left leg, which was supposed to press the clutch pedal as when driving a manual transmission car.

Figure 101: Returning the car to the parking space and retrieving the belongings

After driving for 20 minutes, she returned the car to the same parking space, pressed the engine start/stop button again to turn off the engine and put the ignition key back into the glove compartment and finally retrieved her personal belongings from the back seat. Lastly, she checked whether the car was properly parked in the car club parking space, then locked the car with her membership card.

It is evident that this participant observation has highlighted several issues of using car clubs such as the booked car not being ready and having to find a new one, or difficulties of starting and driving a new type of car that the user has never driven before. Participant F does not use the car club often, just once or twice a year, similar to 31% of total users, according to the 2014/15 Carplus annual survey (Carplus, 2015); in other words, the process of accessing a shared car could remain unfamiliar to such users.

Moreover, driving a new type of car club car in the fleet, such as an electric hybrid car with a button start type compared to a traditional ignition key, could be a critical barrier to non-frequent car club users. The assistance from the customer call centre was swift and helpful in sorting out some issues such as the unavailability of the booked car at the parking space and rearranging a new reservation.

However, it seems certain that providing more detailed information about the booked car, in particular in the case of using such a relatively new type car, via smartphone app will be useful to such non-frequent car club users particularly; a suggestion that another woman user, Participant D, mentioned above.

7.4.7 Summary of participant observation

The participant observations showed how the detailed actions and behaviours of the car club user became an invaluable opportunity to observe and analyse the actual process of using shared mobility. The sessions also explored how the car club user was using the car club service via a smartphone app, yielding discussion about diverse functions, plus the advantages and disadvantages of the current app.

Since the participants were frequent drivers of shared cars, it was very helpful to understand the ordinary users' action pattern.

During these sessions that showed overall procedure, from making a reservation to returning a shared car, the user said she was quite satisfied with the current car club service. However, several problems were revealed throughout the participant observation. In particular, the absence of the current damage status of the available car at the reservation stage via PC or smartphone app was noted. Specific damage or a technical fault could have caused a serious inconvenience of using the car club. In addition, there were difficulties in using a new model's technical features, mentioned in 'stage 3'. 'Inside the shared car' also revealed the problem of failing to provide sufficient information of the reserved car to users on-site.

It is anticipated that those problems revealed during the participant observation would have been mitigated by introducing an advanced smartphone app with detailed information of available cars, including damage status, residual fuel along with the induction video or description of using unfamiliar technical features such as a safety engine start and other basic functions of the reserved

car. Moreover, a simple technical support, for example, a charging cable or a docking station would be a practical solution to providing the ideal circumstance that enables the user to keep using their smartphone app and various relative functions such as the sat-nav app. However, at the same time, it was possible to understand the technical issue of the current smartphone app which could block the accessing of the car club car in the case of a weak signal, which could not even be dealt with through the support of the customer centre.

The comments of the first participant A, while she was using the car club, were useful to understand the user's perspective of each action of the whole process of car club usage. And as Participant A said during the in-depth user interview, prior to this participant observation session, small improvements expected to alleviate several problems during this session, could enhance the overall lever of the car club user's experience without the necessity of huge investment in equipping the car with an expensive on-board computer and developing user interface for each shared car.

7.5 Zipcar interview

The interview with Zipcar, the biggest car club operator in London, was an interesting but also valuable opportunity to listen to the mobility service provider's perspective. In particular, the main aim of this session was to present the key insights and suggestions from the in-depth interviews with car club users and listen to the corporate's views on those research findings.

Figure 102: Lyndsey Donald, senior brand marketing manager of Zipcar UK

The interview was held on 8th September 2014 at Zipcar UK's head office in Wimbledon. Prior to discussion about the key insights and suggestions, Lyndsey Donald, senior brand marketing manager of Zipcar talked about the company's visions and perspectives on users' experience, which is the key theme of this chapter.

She said that the main vision of Zipcar is providing mobility and making cities more livable in. The major role of Zipcar is, of course, providing a mobility service for the people within the city who cannot or do not want to own a car. However, from a civically responsible perspective, using a car club takes the cars off the road and reduces congestion and air pollution in the city. Thus the zipcar's vision and responsibility is to create a greener city by car clubs but also provides brilliant mobility solutions for people.

In terms of Zipcar's perspective of the user's experience, it was interesting to notice that Zipcar is focusing on community as a pivotal point in the process of improving the user experience of car club customers.

Lyndsey said being a member of the car club means that people in the community are using the same vehicle, but rarely meet other people in the community unless the car is late or they leave something in the car. Although the customer has a problem, they only interact with someone from Zipcar.

Lyndsey said that it is difficult to get people to feel like a bit member. From the user's experience and member's experience perspective, Zipcar is trying to focus on getting users to feel as if they are part of a community: the car club. Lyndsey emphasised that Zipcar aims to build the app and user experience around the community. Thus, through the improved smartphone app, it is expected that they can reveal the expense that was saved along with the reduced amount of carbon-dioxide emissions in comparison to people who drive their own car everyday. As a result, this would give users a sense of how they have

contributed to the community, i.e. in a civically responsible way, by being a member of Zipcar.

7.5.1 'Key insights' discussion with Zipcar

As mentioned, presenting the key insights and suggestions from the car club user interviews was the main aim of this interview with Zipcar. From the perspective of conducting interviews with the actual mobility service provider, the entire process of this session acted as a discussion that tested whether the problems or interesting areas that were pointed out by the users were the same ones that Zipcar saw.

1. Simplicity and ease

Interestingly, the most noticeable and common insight from the users, connected with the 'simplicity & ease' of using car clubs, proved to be significant for Zipcar too. Lyndsey said that one of the key objectives was to keep the application process simple and make it more user friendly – that was the key, and the top priority for Zipcar.

Since the car club system is still a new concept to people who join the club, educating new members is another part that Zipcar is focusing on. As a result, they have developed six simple rules that users should know when they use the shared mobility. Lyndsey said that the safety issue could be described as the second but nevertheless absolutely imperative issue. This related to insurance and the prevention of non-registered members from driving a car, as well as the car cleanliness of shared vehicles. In these senses, education is also a significant aspect from Zipcar's perspective: the pointing out of the members playing a part in the community. However, Lyndsey emphasized that this community could only work when members abided by those rules and the minute someone stopped doing that, it ruined the community including other users' experience, their trips, and the values of shared mobility.

Thus, communication plays a vital role that educates customers and informs them of the functions such as extending rentals by texting or by sending newsletters. However, Lyndsey admitted that communicating with members can be quite difficult sometimes as they regard engaging with Zipcar is like dealing with a utility such as a bank account or a gas bill. So, using social media is the most effective and key focus for Zipcar, who convey a lot of messages in this way. Nevertheless, quite often, some people opted out of being on the mailing list, so there are some with whom Zipcar is not able to communicate, but there is a website where those people can gain information and learn for themselves.
One of the interesting points of Zipcar's policy is that balancing between providing information and keeping the system simple. Zipcar is aware of the fact that members do need to have more information in order to use the car club but it does not want them to be overloaded by so much information before a member's first Zipcar drive because it is supposed to be a simple service.

2. Availability

Managing the availability of cars is a complicated process for Zipcar and analytics people in locations, FP&A as well as fleet teams are managing this issue. However, Lyndsey said that controlling the availability does depend a lot on the areas as the cost of parking spaces varies a lot from borough to borough. For example, if there are x number of Zipcars in Islington and Clerkenwell, they make a sophisticated report to see whether the utilisation in one area is as good as in another area, and the number of car fleets tend to move around quite a lot.

The actual number of Zipcar parking bays in London is more than the number of Zipcar's vehicles. So sometimes, people might see the Zipcar parking bay is empty because Zipcar moved the shared car to another area, or perhaps the utilisation in that area was not good. So, for instance, an empty Zipcar parking space may be because 1. Zipcar moved the shared car to another area or 2. perhaps the utilisation was not good in that area (there was a lower rate of sharing) so Zipcar withdrew from that borough. So if a shared rate in Islington is

lower than Camden, then Zipcar moves the shared cars to Camden where the sharing rate is higher, leaving the Islington car club parking bays empty.

Contracts with the city council also affect the availability. When Zipcar works with certain councils, there is a stipulation that the councils have to have a certain number of cars in their borough, so this forces Zipcar to move cars around in order to provide better availability. In order to achieve the optimum utilisation in the borough, a certain number of cars should not leave that area. Thus, it is difficult to decide on where the best place for usage and utilisation is, but it is also necessary to ensure that there is the correct spread of vehicles across London so members can always access one of the cars within 5 minutes. The 'late' issue was one of the reasons affecting the availability of car sharing and many interviewees felt this issue was difficult. Interestingly, Zipcar undertook a focus group in 2013 regarding member experience and found that one thing that some members did not like was the pressure of having to return the car on time and always against the clock, although there were others who did like this, as it put pressure on them to undertake all their tasks very quickly.

Lyndsey said that Zipcar is aware that this is an issue members have battled with, so text messages to extend the service is a good solution for them to manage their booking. It can remind customers about whether they wish to return it back on time or extend the time easily, without stopping the car and calling up Zipcar. However, this service is also about communication issues with customers, Lyndsey said. Since not everyone wants to be communicated with, not everyone actually knows that kind of service exists, even though Zipcar explained that to them when they signed up.
As Lyndsey mentioned above, there is a lot of information about how to use the shared mobility when someone becomes a new member, but Zipcar does not want him or her to be overloaded at the beginning. So Zipcar provides the information they need to get started and anticipates that they learn more as they actually use the car club.

3. Driving & Controlling the shared car

Zipcar receives all kinds of phone calls from customers about controlling the new car which they haven't driven before. A couple of stories regarding this issue during the interview with Zipcar were about steering locks, as some customers did not know the cars had a steering lock and complained that the steering wheel was not working. The other story was about driving an automatic car about which a customer had called up and said they could not get into gear, forgetting the fact that it was automatic. Lyndsey said that such issues were quite natural because a member in a completely new vehicle does not know where the buttons or levers are or what they are for: those cars are not theirs.

Hence, Zipcar is aiming to allow members to access information about the reserved cars in the car itself or through the smartphone app, without having to phone the call centre. Lyndsey insisted that having information at customer's fingertips when they had those questions of using new or different cars would be 100% better than having to call up and potentially wait and use their time for booking on the phone.

4. The branding of the car club – the appearance of the shared car

This was the key insight that brought up polarised views on the shared car's appearance and whether it should be branded or unbranded.
However, on this issue, it seems that Zipcar has setup a clear direction, namely that the branded car is the most effective way of advertising their brand. Lyndsey said that even though this car club had been around for nearly 10 years in London, people still did not know about the car club and Zipcar still had quite a low level profile in London.

So, the main reason why Zipcar introduced the branded car was to use their car as a medium for letting people know that Zipcar was operating in the area without them having to pay for media advertising. Customers who advocated cars without a displayed logo argued that someone who passed such a car would not know it was a Zipcar instantly, and that would be great in one way. However, the strength of exposing the logo on the car clearly showed others that they had

an option to use the mobility when they needed it. As a result, having that logo is really important.

Lyndsey emphasized that the most important reason for putting the logo on the car was to increase the level of awareness which could lead to more people joining the car club. As a consequence, Zipcar will have a bigger fleet and can provide better network coverage while reducing the number of private cars on the street and thereby reducing congestion in London. She admitted that Zipcar was also aware of the fact that a lot of customers liked to use the unbranded car as Zipcar is the only car club that does have an unbranded car in the car fleet; but ultimately, she said, they have to make a trade-off between awareness and profitability. According to Lyndsey, Zipcar has become profitable for the first time last year, but they still have to keep trying to drive towards more members. She highlighted that unless Zipcar could continue to persuade more people to join, they could not continue to provide the level of coverage and service they currently do.

Interestingly, she described that managing the membership was like a plug-leaking bucket, as people joined and left annually: that is why the continual attraction of new members is critical for the car club operator. Lyndsey said it would be great to have an unbranded vehicle but unfortunately, it is not a possibility for them to make all cars unbranded. Thus, in the future, they are planning to introduce more and more vehicle with the logos while leaving the premium vehicles unbranded, the latter however coming with a relatively expensive hourly rate.

The main aim, then, regarding the branding of the car is to make people aware of Zipcar. Zipcar did a study on this issue, conducting a pilot programme in order to understand the choice of the members. What they found was that people chose the unbranded car if they had a choice. However, if that choice was taken away, and they were forced into a branded vehicle, they still drove the branded vehicle.

She concluded the branding issue by saying that it was a hard one and she understood that some were not going to be happy about it, but for Zipcar, car branding was a necessary evil.

7.5.2. Zipcar's opinions of car club users' suggestions

This session was the last part of the interview with the presentation of the suggestions from the interviewees and the responses from Zipcar's. The aim was to see whether they thought the ideas were feasible or at least whether they had thought about the issues.

1. More available cars

Although customers wanted more available cars on the street, it seemed that more availability during weekdays was in evidence, whereas it became relatively less easy to book a car during weekends. Lyndsey said it was required for members to adopt an attitude of planning things in advance. The more they used the car club, the more they would realise that sometimes they cannot always rent a car at the very last minute.

In terms of the dichotomy between asking for more shared cars versus taking cars off the road by using a car club, Lyndsey insisted that some might say it was a trade off because Zipcar could increase the total number of cars but that what we are aiming do to is to reduce congestion. However, she disagreed with this perspective, as ultimately Zipcar would like to have better coverage in London and people would still use shared vehicles while not owning their car. So, Lyndsey said that Zipcar is still definitely taking cars off the road and there is not a conflicting problem at all.

2. In-car support for smartphone usage

It was revealed that the role of the smartphone has become more important than ever before. As mentioned above, Zipcar is also investing in improving the

smartphone app, and is expecting to manage various tasks in this way, by, for instance, adding a shorter damage report function and providing more information about a reserved car through the app. Thus, there has been a high demand from the users for Zipcar to consider supporting in-car chargers that would allow members to access the app without being concerned about battery drain. According to Zipcar, in fact, they have thought about introducing in-car chargers before. Currently Zipcar's vehicles provide iPhone & iPod cable jacks. In terms of the in-car charger, Lyndsey said it was one of the issues they had considered. However, the difficulty about installing such a system is obviously the cost as well as the issue of theft. Moreover, providing more than one type of charger (iPhone& Android) in each car could be quite cumbersome work. However, she was adamant that if Zipcar could find cost-effective solutions, then they could provide those in the future.

3. One-way service

The one-way or floating point to point model appeared to be one of the critical and emerging issues in the car sharing industry. I was therefore most curious to hear the thoughts on this from the car club operator in London. Since Autolib, which has adapted a one-way system as their operating model in Paris, announced the introduction of Autolib in London in March 2014 (Topham, Willsher, 2014), understanding Zipcar's view on this issue was the most interesting part of this interview.

Currently, Zipcar is offering a round-trip service, whereby the users need to return the car to the same car club parking bay. In fact, Zipcar have been carrying out a pilot one-way service in Boston, U.S. Lyndsey said that there were positive and negative points of such a one-way model, and whether this model was actually good for the city. Before introducing such a one-way model in the UK, Zipcar UK had been thinking very carefully about whether it was the right thing for London, as opposed to what people wanted. She argued that people might want to use a one-way car club, however, if a one-way service was available, people would use the car club as a replacement for the public transport services,

which was not the direction that Zipcar was aiming for; it was rather seeing itself as a complement to the transport group as a whole.
Moreover, Lyndsey asserted that if Zipcar introduced a one-way service, this model would be competing with taxis or Uber, which involved a whole new set of customers.

Hence, whether the one-way model is right or not is the question. That is why Zipcar has been carrying out a pilot programme of a one-way model before they actually decide to introduce it across any of their markets. Lyndsey said that the one-way model would be introduced on a market basis, but also mentioned that Zipcar did not know yet whether the one-way model was an appropriate system in London.

Turning to the parking rules and restrictions in London, this is another issue which raises the question of whether the one-way model is suitable for London. Lyndsey asserted that all the boroughs in London have different parking restrictions and there is not one single parking permit which allows customers to drive and park wherever they want in any borough. Thus it is anticipated that one-way model car clubs, which are going to introduce their mobility service in London, would face problems which Zipcar has wrestled with for years and therefore Zipcar concluded that a one-way model is not the definite solution.

7.6 Summary

Through the qualitative methods of in-depth one-to-one car club user interviews and participant observations, this research stage has yielded specific insights and suggestions from the users. Such an outcome would not have been possible via a quantitative survey. It is worth nothing that users have expressed a positive opinion of this sharing mobility scheme in principle, particularly, the fact that they could access the private mobility that a car affords with a relatively lower financial burden than owning a car.

Among the diverse key insights and suggestions, the most notable aspect was the convenience of using a car club via a simple and easy policy (system). Since this mobility scheme is unfamiliar to most new users, such a policy has played a vital role in enabling users to understand the mobility concept and use it easily. In terms of the process of accessing the car before driving, such as swiping the membership card or operating the on-board computer, though those procedures might seem an inevitable process of accessing shared cars, most users preferred a more simplified process, which could be as simple as driving a privately owned car. In this regard, it was proved that the role of the smartphone is becoming more important than ever. More and more users are managing their car club usage via a smartphone app. As found during the car club service provider interview, the companies are also aware of the importance of the network service, investing in new design of web pages and smartphone apps particularly by simplifying the complicated process such as how to make a damage report and by enhancing the key functions of the app, such as finding a car and extending the rental period.

Most users mentioned that a 'one-way' is an interesting idea, which could produce a more convenient car club model than the current round-trip model in London, however, it was interesting to note that some users expressed a doubt about this model. This was because most journeys by car are round-trips which start and end at the same location: the car park. Moreover, existing car club operators have expressed their concerns about this model as such a car club service could not be complementary to existing public transport but rather compete with it and substitute the car journey from a private car to a one-way shared car. However, at the time of writing, another one-way car club, DriveNow, has commenced its service, and Paris' Autolib is to be launched in London in late 2015. Despite several concerns towards a one-way model, for instance, expanding the service area by negotiating parking issues with each borough and installing charging points for the EV car sharing fleet, such introductions of one-way car club models are interesting to observe.

Since the introduction of the car club, the unique system of its concept, whereby users do not need to own a car but can access one when required, has been a distinguished aspect and a great convenience of using this mobility scheme. However, under the current rapidly-changing urban mobility landscape where diverse mobility options are emerging such as Uber or other smartphone app based minicabs, the perception of the convenience of car clubs seems to have evolved and improved in order to fulfill its role as an alternative transport in urban areas.

In this regard, diverse key insights from this session produce the outcome that a set of small improvements on this basis could enhance the overall level of the users' experience.

In the next chapter, I present the new car club model from the users' perspective, a model that is conceived on the basis of key insights. The primary aim is to propose an ideal car club model that reflects the users' diverse evaluations and demands from their rich experience. But a critical assessment with the car club operator was also carried out to discuss whether the direction of this proposed car club model showed sufficient crucial qualities and values to appeal as an ideal car club from the users' perspective.

Chapter 8. The Proposed car club model

In this chapter, a proposed car club model is presented on the basis of the research outcomes of the previous research works. Through previous case studies, user observation and service design experts interviews, I was able to collate the key insights of each research session and illustrate the users' perspectives via the car club journey map. This customer journey map reflects the diverse thoughts and suggestions of the car club users who participated in in-depth interviews at the user observation stage along with key insights from the case studies of existing car clubs in London.

During the process of conceiving the proposed solution for the ideal car club from the users' perspective, it was critical to maintain the balance between realism and the possibilities of future technology. Although the main aim of this chapter is to present a better car club model to enhance the users' experience of using car clubs, it is also imperative to suggest a solution from a practical perspective in order for existing car club operators to first, (a suggestion) contemplate this model and second, consider applying this model to their own car club system.

8.1 A proposed new car club model from the users' perspective

Through the case studies of car clubs, on-site researches of using car clubs and in-depth user interviews of actual car club users, two key aspects for conceiving the new car club model from the users' perspective have been selected and explored.

1. Convenience – a simple and easy to use car

Convenience is the most important aspect when a customer is considering joining a car club. Moreover, using a shared mobility service is a huge leap to customers who have been used to driving a privately owned car. As mentioned in Chapter 7 User interviews, 'simple and easy' was the common request from the

car club users during interviews, but such qualities also played a vital role in delivering a positive impression on users so that they retained membership and used a reliable alternative mode of transport instead of owning a car. In terms of proposing an ideal car club model from the users' perspective, several sub-aspects were conceived to enhance the current level of convenience of using car clubs.

The principle of the simple and easy to use car club will be applied to overall process of car club usage, ranging from the application process, managing the reservation and rental extension and finishing the rental. Through the case studies of existing car clubs and interviews with car club operators, I was able to find out that operators have tried to explain how users could use their car club without much confusion and difficulty by using various solutions such as simple steps in a diagram form as well as slogans, for instance, Hertz 24/7's Book, drive and go.

This could be understood as an effort to make the car club simple and easy to use. In this context, the proposed car club model from the users' perspective will embrace this 'simplicity and ease' principle as one of its key aspects along with the following specific suggestions that can further enhance the level of convenience of using the car club from the users' perspective.

1.1 No on-board computer

Most car club cars have an on-board computer that requires users to operate it before driving. During the case studies and user interviews, this process was not so much one that took a long time, but the fact that every customer had to input a PIN number and tick several questions every time they used a shared car was revealed as another complicated layer before driving an hourly-rented car. Therefore, the on-board computer will be removed from the shared car and an advanced smartphone app will replace this. In terms of the users' side, they will not need to operate the on-board computer but the advanced security system of

encryption and password via car club smartphone app could be as secure as the existing identification system of operating by on-board computer.
This change could also be a benefit to car club operators as they could reduce the cost of installing and maintaining the device on every single car in the car fleet.

1.2 Various models in the car fleet

Accessing diverse shared car models depending on the specific purpose of car usage is one advantage of using a car club. In particular, the fact that a user could hire a van is a distinctive strength, enabling them to use a van by paying an hourly rate, which is relatively more flexible and cheaper than renting a traditional rental van. In fact, prior to case studies and user interviews, it seemed that one kind of vehicle design developed specifically for shared purpose could be more competitive in the car sharing market.

However, through the interviews of car club operators and users, having one kind could be rather less competitive than operators with various car models, such as a single kind of car fleet, as it limits customers' options. Moreover and interestingly, having a sole model for a car club operation could be risky to car club operators. Vicky Shipway, head of marketing at City Car Club, says that if a car club operator relies on one model, there could be a sort of hostage of the car manufacturer in many ways as car club operators could do little when dealing with the leasing price or maintenance expense of the car fleet they use.

Major car clubs in London, such as Zipcar and City Car club, have a van in their car fleet. However, most one-way car club models such as DriveNow, Car2go and Autolib have one or only two specific models in their car fleet, mostly passenger vehicles. DriveNow already began the service in London in December 2014 and French's one-way car club Autolib is expected to be launched in 2015.
Those specifically designed cars, with built-in touch screen on-board computers and a distinctive brand image, form their unique assets, it could be argued, compared to other car clubs. In terms of operating one type of car club vehicle in the fleet, Autolib, the only advantage of such a type is that this car club is

distinctive on the street, easy to recognise and users do not have to learn new operating controls in different cars.

However, the fact is that accessing diverse cars, including specific vehicles such as vans in urban areas, outweighs the unique aspects of the other two car clubs. This is because the option of selecting from various cars offers better practicality and advantage than driving one specifically designed car for shared purposes. Such learning of new controls of different cars is a less serious issue than limiting the option of accessing various types of cars, such as a van or seven- seaters when users do need to use those kind of cars. Information of controlling key differences or added new features, such as automatic parking brakes or a safety engine start, could be provided via smartphone apps with step-by-step info graphics that allow users to check before using the car club car.

Thus the proposed car club model should provide various models in their car fleet, as owning a private car could be a hassle in the city while on the other hand, accessing diverse models in a car club could respond to various needs: this is one of the distinctive advantages of using a car club.

1.3 Flexible rental extension - time predictability

Regardless of types of car clubs, round-trip or one-way, availability is an imperative aspect of car clubs, as this issue directly affects the users' impression of whether a mobility scheme is really reliable or not at the point when they need a car. As mentioned previously, car club users have shown behavioural changes, such as increasing their use of other modes of transport and using a car club service when they really need it to plan a journey in advance: this amounts to a reduction of induced travel by driving a car.
Nonetheless, availability is still one of the critical issues to both car club operators and users. In terms of improving the availability issue of car club cars, adding more cars, planning a journey in advance, and choosing alternatives do not seem practical options from users' perspectives of an ideal car club. Instead, we need to focus on the late return of a shared car, which would delay the next

customer's car club rental and affect the overall shared car's availability as a consequence. In order to mitigate this problem of 'time predictability', a flexible rental period extension could be a feasible solution for the current car club operating system.

In essence, a car club fleet management team could monitor the current location of the car and calculate the estimated driving time and therefore whether customers could return the car on time or not. If the car's location determines that it is not possible to be returned on-time, the car club sends the pre-empted message to the customer to extend the rental. This would replace the current system whereby a customer has to send a text at the last minute when they are sure they cannot return the car on time and wish to avoid a late fine. Such an action causes delay for the next customers and might affect the overall availability of entire car club cars.
However, such a rental extension by time predictability also needs to consider the next users if the car club car is booked after a current rental. In this case, an advanced car club app suggests three following options for the next users in order to allow them to continue their journey as conveniently as possible.

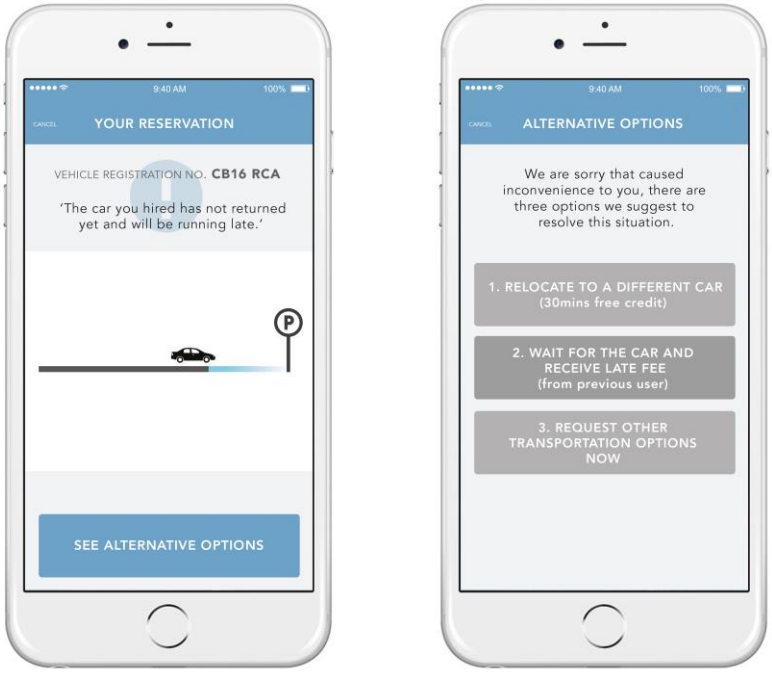


Figure 103: Mock-up screen of suggesting three options for the next car club user in a late issue scenario

First of all, users could choose another car that is close to the user's current location. If the user clicks the 'relocate to another car' option, car club operators show a few available cars and reserve one of them for the users to choose free of charge along with 30 minutes free driving credit at the next reservation.

Secondly, if the users decide to wait until the reserved car arrives, they could receive a late fine from the previous user. Normally, the car club operators charge the late fine if they fail to return the car at the agreed time. However, if there is a reservation immediately afterwards and the next user waits for this late returning car, this late fine could be passed onto the next user.

Lastly, when it comes to considering the end result of car club users in extreme conditions such as having an important meeting with clients, what they really want is to arrive their destination no matter what the mode of transport would be. In such an extreme situation, provided with another available car club car or being compensated with free driving credit would be no use, as getting there is the most important issue for them. Such a late issue is one of the crucial problems of car clubs therefore operators should contemplate diverse solutions to mitigate this issue.

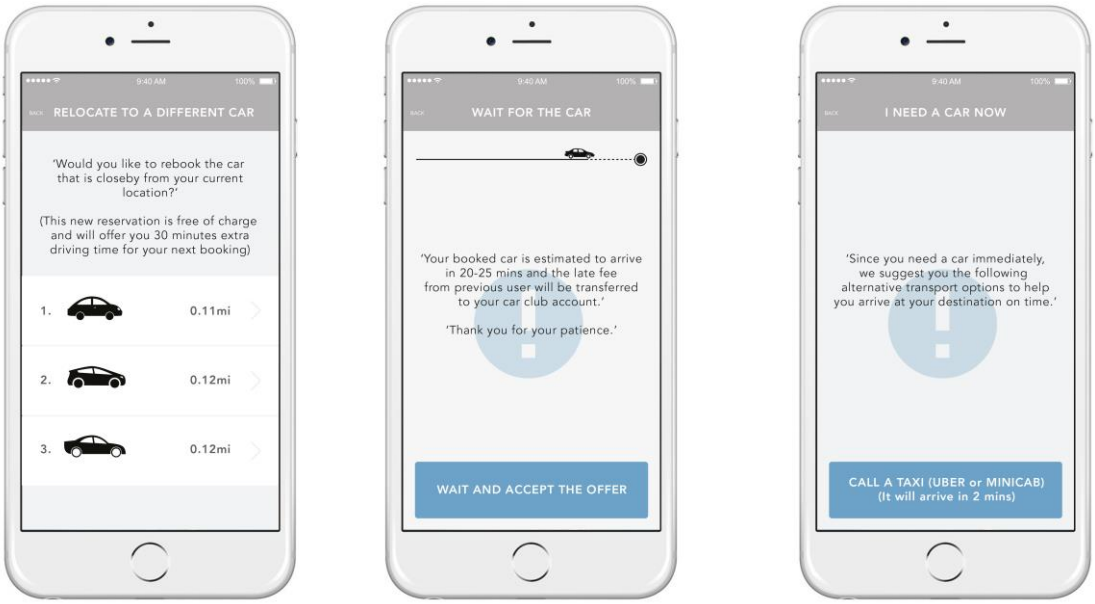


Figure 104: Mock-up screen of three options; Relocate to a different car, wait for the car and request other transport options

The car club has offered an alternative mobility service, enabling users to access the car and use it when they need it in the city. However, such a car sharing mobility service could be affected by traffic circumstances of urban areas such as traffic congestion and the late return of previous users and could cause inconvenience to other car club users as a consequence. Thus, in order to provide an ideal car club service from the users' perspective, a car club could propose various different options, as above, to try to make the service as convenient as possible and to allow users to reach their destination, which is not only the ultimate aim of the mobility service but also relates to the car club brand's reputation.

2. Advanced smartphone app and technical support system

2.1 Smartphone apps in other industries – Uber

The smartphone app is widely used in various industries, particularly in ride sharing services. The role of the smartphone app in ridesharing service Uber is crucial: the app correctly guesses the user's location by using GPS and gives precise estimated arrival time for picking up with an estimated fare. Also, when it comes to making a payment, users do not need to go through a process of making a transaction by paying with a cash or credit card or even the time-consuming wait for a receipt. Rather, that is already taken by a smartphone app that is synched with the user's payment method. The user then receives a payment detail with e-mail soon after finishing the Uber service (Dent, 2014).

Moreover, Uber is testing an innovative pilot programme via a smartphone app to provide a better ride quality and safety for users by verifying Uber drivers' driving behaviour. With the gyrometres in a smartphone, it can measure small movements, while GPS and accelerometres show how often a car starts and stops, as well as their overall speed. So at the stage of giving a rate of a driver after finishing the ridesharing service, if users complain that a driver drove a car too aggressively, accelerating too fast or braking too hard, the company can review that specific trip by using the data from the driver's smartphone sensor

(Moscaritolo, 2016). Such an innovative technology that exploits the smartphone along with the existing smartphone app of Uber could proactively improve safety and also provide a high level of user satisfaction.

2.2 Advanced smartphone app

One of the strengths, as we have seen, of using a car club is to access diverse cars in the car fleet from small cars to vans. For instance, if customers choose one-segment, a 5-seater hatch back, there are more than one brand of cars in the car fleet. Significantly, research has shown that controlling and driving different kinds of car was not a major issue due to the similar or identical layout of the interior, though recent cars may throw up some issues when equipped with new technologies, such as an automatic parking brake or a safety engine start (pressing the clutch or brake pedal to start the engine) which customers are not familiar with.

The advent of a smartphone app for car club users has enabled them to manage the car club usage without being restricted by rental office time or going through paper work; it has rather enhanced the level of convenience by providing various functions such as managing the reservation and accessing the shared car without the need to carry a car club membership card. Moreover, it is anticipated that key issues emergent from the case studies and user interviews, including insufficient information of available cars, finding a booked car, the hassle of controlling an on-board computer, the time-consuming damage report process, and the absence of a sat-nav (or having to bring one, or a London AtoZ), could all be mitigated by introducing an advanced car club smartphone app.

The advanced smartphone app would not need to be radically different from the existing ones. However, by adding a few more functions, for instance, detailed information about new technical features such as the electronic parking brake or an intuitive damage report system by which a customer could pinpoint the exact nature of the damage, the overall level of using a car club could be significantly enhanced. The key additions of new smartphone apps are as follows:

-Detailed information about new technical features of reserved cars: with the explanation of new features, step-by-step info graphics are provided to allow users to understand and operate those functions without the confusion and embarrassment of controlling unfamiliar new features.

-One click damage report and history: at the stage of visual inspection of checking the damage of a reserved car, if users find damage, they do not need to open the damage log book and read to find out whether such damage was reported or not. Also, in the case of reporting new damage, users just click the location of the reserved car's damage via a one-click damage report app's side, front and rear view image of the car instead of filling in the damage logbook and contacting the call centre to report it, which is another time-wasting process. Moreover, the damage history function will enable users to see the car's overall damage history. This function will be useful not only for users to see the available car's damage history but also for car club operators to trace the damage more easily and efficiently as the listed damage issues are arranged from top to bottom in order of the frequency of damage reports.

-Finish the rental: after finishing the rental period, the finish function of the app manages the finalization process of the rental. If users press the 'finish the rental' button, it automatically turns off the lights, close the windows and locks the car instead of user going through these processes manually.
Thus, the advanced smartphone app is expected to play the role of an on-board computer thereby replacing the existing on-board computer.

2.3 Technical Support system

In the context of proposing the idea of removing the on-board computer and introducing an advanced smartphone app for car club usage, a technical solution that could support those two ideas is required. However, this idea does not require a radical modification or changes to the interior through a built-in touchscreen system such as DriveNow or Autolib possesses; nor does it require the installation of an extra device for sharing purposes. Instead, the change could

be achieved by adapting existing technologies that enable a smartphone to be connected to a shared car. In this regard, in the short term, Renault's R&GO or Hyundai's smartphone docking station system could be considered as a practical solution.

Figure 105: Renault Twingo's R&GO, enabling a driver to use their own smartphone

In this way, the customer could connect their smartphone to a shared car and access the various functions of an advanced smartphone app. They could also use their mobile phone as a sat-nav by using the familiar interface of Google maps. The smartphone holder will be installed on the central air vent of the IP (Instrument panel) by using universal phone holder that could accommodate various sizes of smartphone. Since all the android smartphones use the same charger, providing two connectors for iPhone and Android phones could form a practical solution in the short term, although there is a theft issue when providing such a cable in the shared car.

However, if the wireless charging technology could be commercialised, the theft and compatibility would not be an issue anymore. In the mid-term, the recent development of automobile telematics standards from Apple's car play and Android's Auto, could be available to most cars, including car club vehicles, and customers could operate their advanced car club smartphone app more easily through those in-car mobile platforms.

Car manufacturers are aware of the growth of the car club market and the value of the mobility service. Thus, Mark Walker, UK Zipcar director, anticipates that a car company may produce a car which could easily convert into shared purpose

as simply as changing a simcard. Since major car manufacturers such as Daimler AG, BMW, Ford and recently GM, have participated in the car club market with their own brands, it seems that such cars could be converted into shared-purpose cars in the future.

8.2 The proposed customer journey map

On the basis of key insights collated from the case studies, in-depth user interviews and service design expert interviews, the proposed car club customer journey map from the users' perspective has been conceived (See Appendix 2). This is potentially applicable to the round-trip car club model.

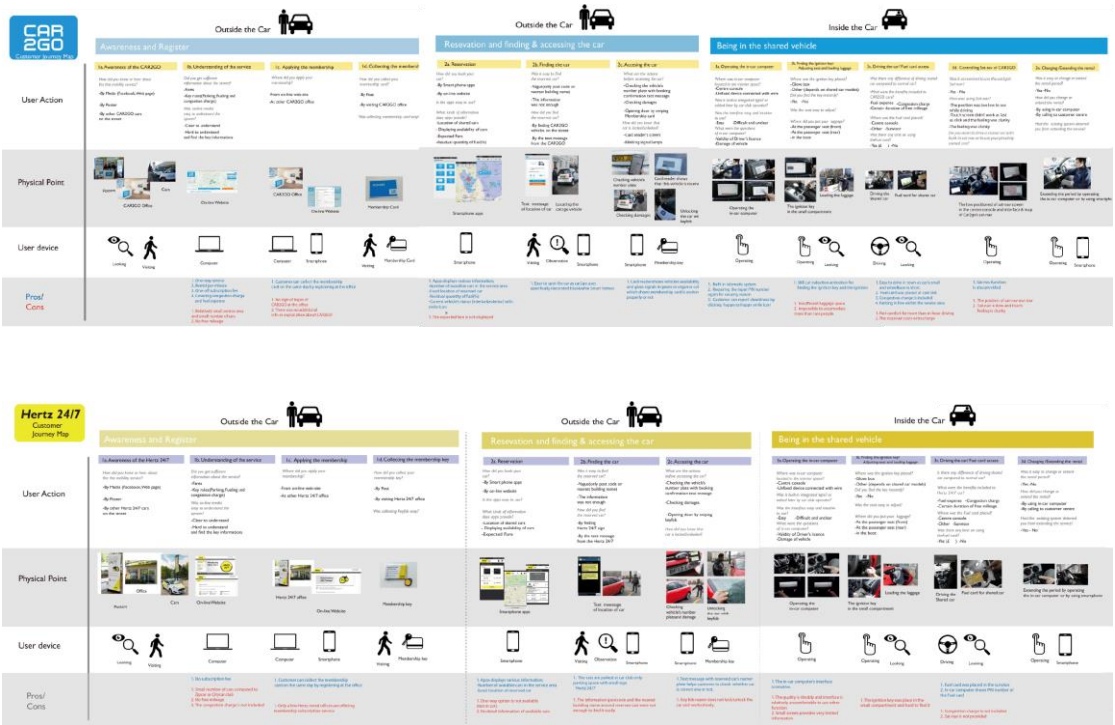


Figure 106: The customer journey maps of two types of car clubs

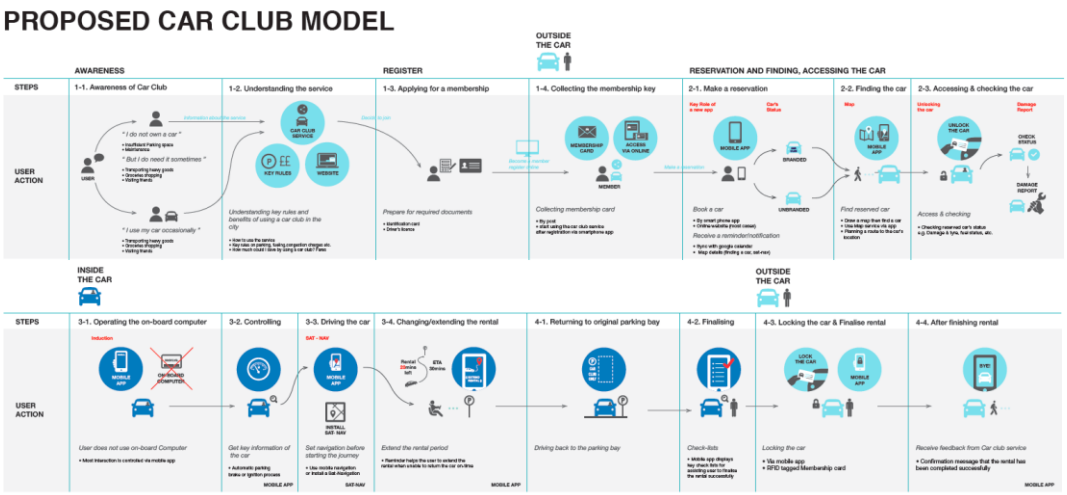


Figure 107: The map of a proposed car club model

This map shows the same layout of customer journey maps of existing car clubs that I created after the case studies of two types of car clubs in London (See appendix 3). These were divided into four stages, namely, 1. Awareness and register, 2. Reservation, finding and accessing the car, 3. Being in the shared car and 4. Finalisation.

1. Awareness & register

As the concept of a car club could be unfamiliar to those who demonstrate an interest in them, it is important for car club operators to provide key information and a clear explanation about using a car club. Potential new customers want to know how a car club works and whether using it is more beneficial for them than owning a private car. Through the car club website and smartphone app, customers could understand the key rules about using a car club and familiarise themselves with the new smartphone app that replaces the on-board computer of the shared car.

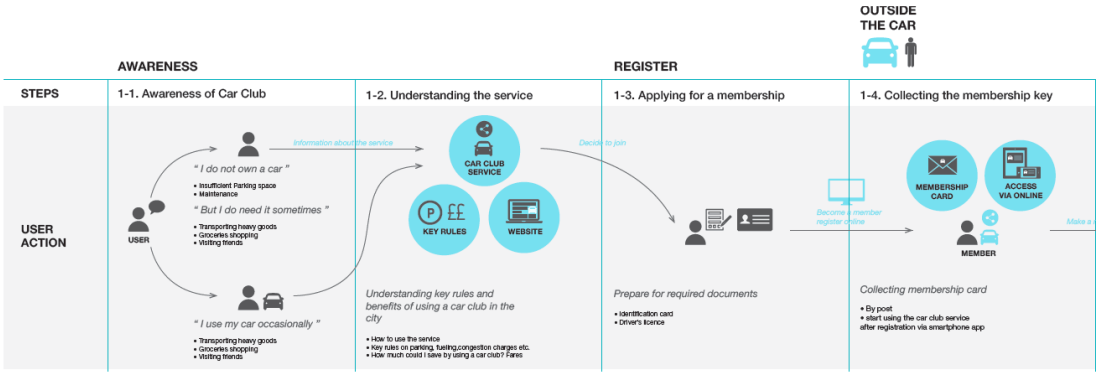


Figure 108: Awareness and register stage

At the registration stage, the customer fills in the application form and receives a conference call from the car club office and DVLA to check the validity of their driving licence. After finishing the joining process, the customer is informed that s/he could start using the service via the smartphone app while waiting for the membership card to be delivered.

The customer is also informed about the new functions of the smartphone app by call centre staff and can also see detailed information about the app via the company's web-site. This is with the understanding that the smartphone app manages all processes of using the car club and further, that a RFID membership card can be used as a back-up (contingency) mode of accessing a car club car when the user cannot use the smartphone app through a battery drain issue or some such.

2. Reservation, finding & accessing the car

The customer could make a first car club reservation via the advanced smartphone app. The following table shows the added functions that are new and unique compared to the existing car clubs' smartphone app.

	Existing car club's app	Advanced smartphone app
Availability & Location with Map	✓	✓
Detailed status of the car (e.g. Auto/Manual transmission, residual fuel %, and car club logo (branded or non-branded)	Δ (Car2go app displays residual fuel % and condition of exterior and interior with smile logo)	✓
Detailed information of operating extra features (e.g. electric parking brake)	×	✓
One-click damage report and history	×	✓
Flexible rental extension	×	✓
Finish the rental	×	✓

Figure 109: Comparison table of an existing car club's app and advanced smartphone app

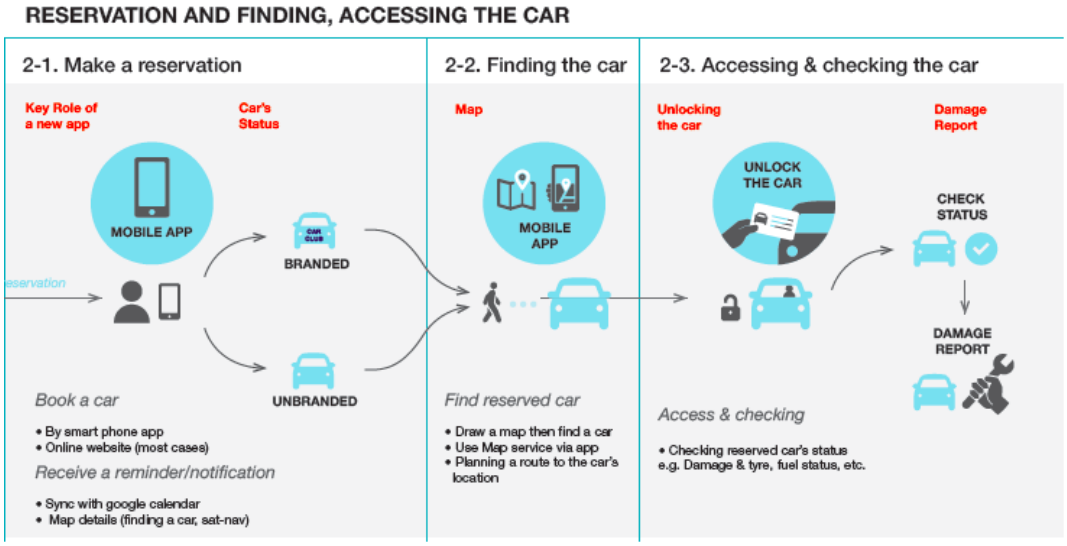


Figure 110: Reservation, finding and accessing the car

In contrast to existing car club smartphone apps that provide little information about available cars, a future app would include contents such as the status detail or extra features of cars that could help the customer to choose the most suitable car they need. In terms of availability, the customer could choose the

cars with or without a car club logo, and as in the case of choosing a branded car, they could use it with a discount rate.

The advanced smartphone app would sync with IT platforms (e.g. Google calendar and map), so in the case of reserving the car in advance, the booking detail syncs with Google calendar and reminds the customer via email and text messages. Finding the car could be easier than the previous passive style of information, which provided postcodes with land mark buildings, and explanation in text: the new app would sync with Google maps and display the car's location. Hence, the customers could click the map and it would open Google maps on their phone/or in the app and then Google map app would provide walking sat-nav instructions leading them to the reserved car club car.

It is expected that the procedure of reporting damage could be simplified significantly through the intuitive interface of the damage report function in the app.

In the case of spotting some damage before driving a shared car, the customer could report the damage, pointing out the specific damaged part of the car and submitting the damage report via the smartphone app without going through the complicated process of filling in the damage log book and using a call-to-call centre to report this sensitive issue.

Exceptionally among other new functions of the advanced smartphone app mentioned above, this one-click damage report feature is better and more intuitive than the existing damage report process. Firstly, it will save the user's time spent reporting by the facility to click the specific location of the damage of the car. Such a function is not only easier for the user to report the car but also car club operators could spot and respond to the damage issue more quickly. Secondly such a damage report app takes out the worries of users that they have to use up their time by going through the time-consuming process of reporting damage while booked in an hourly-rental car.

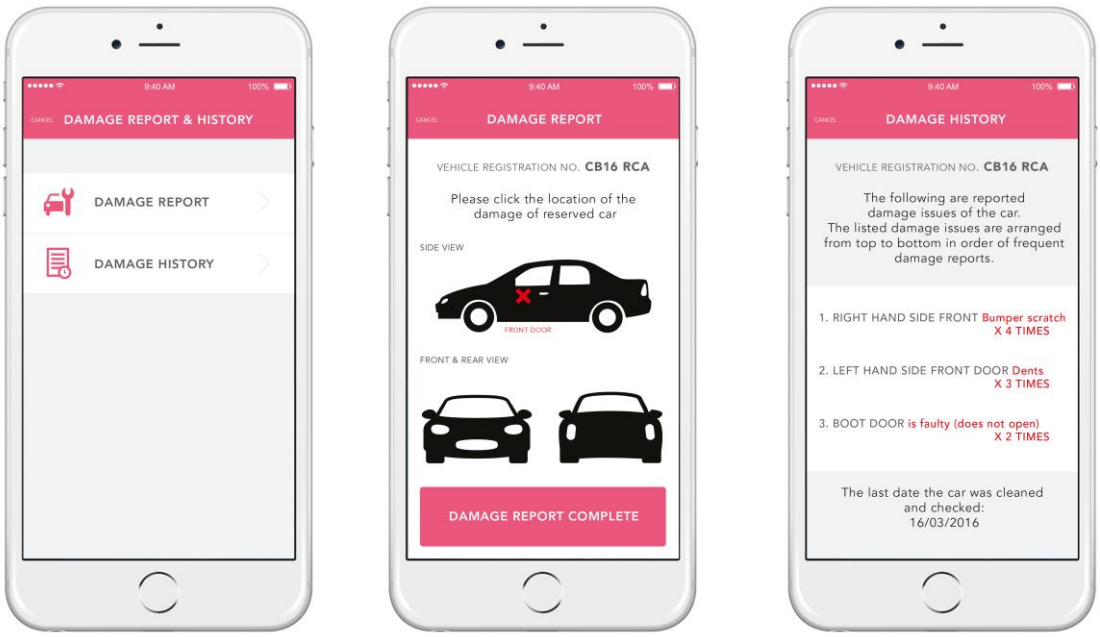


Figure 111: Mock-up screen of one-click damage report & history functions

3. Being in the shared car

As the advanced smartphone app would replace the on-board computer of a shared car, via which customers undertook several steps such as inputting a PIN or checking the validity of a driving license, the customer could start using a shared car after collecting the key from the glove compartment without operating any extra device before driving.

The expanded role of the smartphone shows its strength in responding to various purposes: offering an induction video or instructions for new technical features such as an electronic parking brake or a safety engine start (pressing the clutch or brake pedal to start the engine). In these instances, small but unfamiliar new features of the latest cars could make customers confused and would take up unexpected time, wasting the hourly rental, as revealed during the participant observation stage.

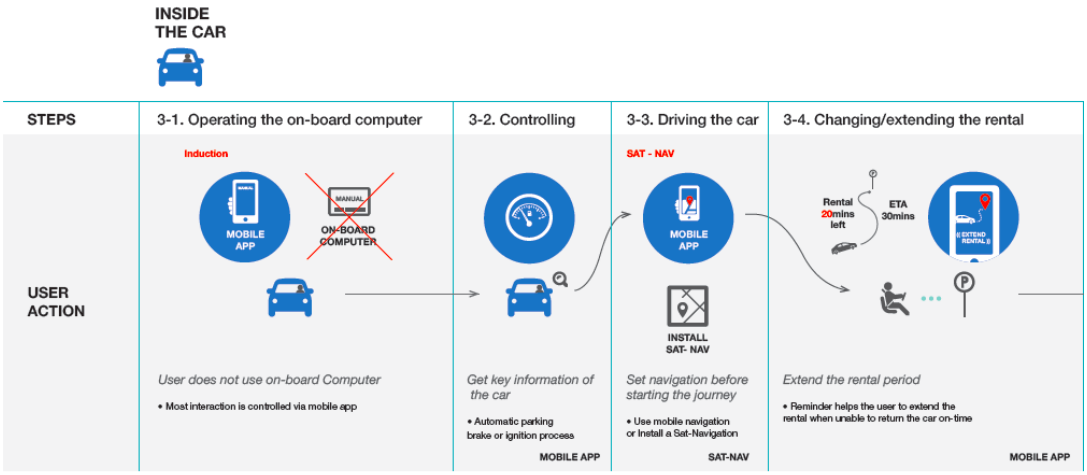


Figure 112: Inside the car

Thanks to the smartphone docking system, customers could use Google Maps for navigating without being concerned about the battery drain of their phone. Moreover, the interface and position of the smartphone is more convenient when compared to the lower positioned OEM sat-nav with its clunky interface in some car clubs.

Figure 113: The smartphone is positioned on the central air vent by using a universal phone holder

The flexible rental extension function based on time predictability forms another of the notable features of the advanced smartphone app, which calculates and suggests the rental period extension option to customers before they send or use a call-to-call centre to extend their rental at the last minute. Such an action could cause a negative impression on the next customer as their reservation would

have to be re-arranged, and this would further affect the overall availability of the shared car fleet. Providing the new circumstance that enables customers to manage their car club usage by operating their own smartphone with its familiar interface would definitely be more convenient than learning and operating an extra device of the shared car.

4. Finishing the rental

At the stage of finishing the rental, customers could finish the rental by pressing 'finish the rental' button in the app, which automatically turns off the lights, closes the windows and lock the car, instead of going through such a process manually.

Since there would be no on-board computer, customers could finalise their rental period in the same way that they would park and finish their journey when driving their own car. After locking up the shared car through the smartphone app, customers would receive a text message with usage details of hours, mileage and extra charges. Although Hertz 24/7 provide a similar service to users after finishing the rental, for instance, sending a brief information of rental hours, mileage and an estimated fare, such a simple message would assure customers that the rental had finalised successfully, so such a service will also be added to a new car club smartphone app.

Sending a message after finalising the rental might not be a big difference compared to the existing service flow of car club usage, however, from the users' perspective, such a simple message could give a firm assurance that they completed the rental properly and do not need to be concerned about whether they could be faced with any unexpected extra charges or claim from the car club operators afterwards.

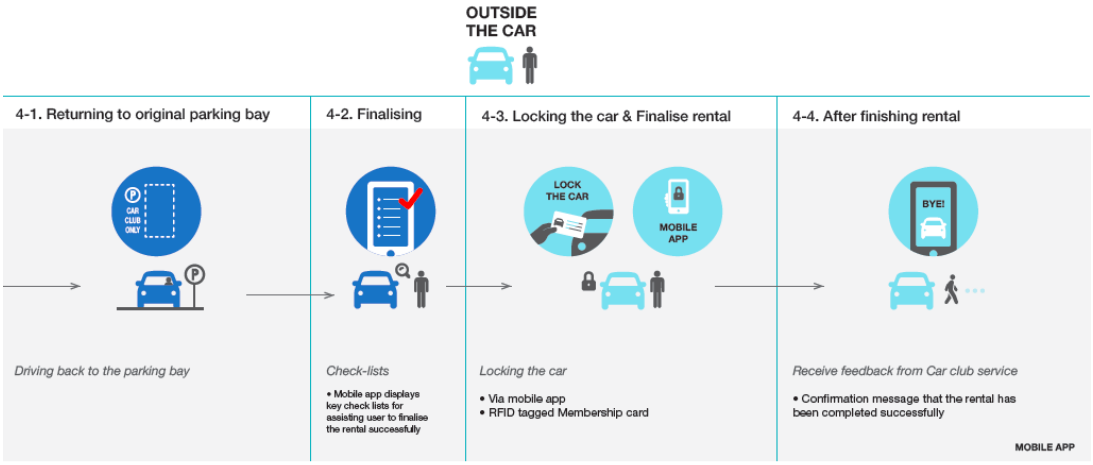


Figure 114: Finishing the rental

During the in-depth user interview, user interviewee H said that small changes could make a big difference to improve the users' experience. In terms of conceiving the new car club customer journey, there does not seem to be any radical change to the existing process.

As found from the in-depth user interviews, existing car clubs have tried to offer a good service via a simple and easy process for users to access the car club service.

However, the new technology offers the possibility to go further in providing a better mobility service in urban areas. In particular, introducing the advanced smartphone app with the added new features mentioned above and a technical support system, it is expected that there will be an enhancement of the overall level of customer experience with improved and added functions such as swift damage report and smart rental extension features.
My suggestions would turn the car club from the existing conception of it being some useful new mode of transport into it being an urban mobility service that is a genuine alternative to owning a car. This would be achieved by making it as simple and easy as owning a private car in the city.

8.3 Validation of proposed solution

This session covers the assessment of the proposed car club model with critical assessment from an industry expert.

The main aim of this session is to present key aspects of the new car club model and obtain the opinions from the car club service operators on the research outcomes, and whether they could contribute to enhance the experience of using car clubs and contribute values that could be applied to the future development of car clubs. During this meeting, the key proposals and touch point map were explained to the Go Drive manager, who offered the following feedback.

8.3.1 Background context of GoDrive

The selected car club operator is GoDrive, which is Ford's car sharing scheme in London. Ford's GoDrive initiated preliminary researches such as competitor analysis and a contextual interview in June 2014. They concluded the Alpha phase and commenced the Beta phase in February 2015 (Plan, GoDrive, 2015).

Figure 115: Ford's car sharing scheme GoDrive and project leader, Alicia Agius

These encompassed the first open service and conducting of various researches of price options and operating options. At the time of the interview with GoDrive in May 2015, GoDrive was in the Beta phase of offering the first open sharing service and conducting researches of user interviews as well, testing out various ideas towards a car club model. Therefore, the unique circumstance of GoDrive was conducive for me to engage in a debate about proposing new ideas of a car

club service model as well as listening to GoDrive's opinions about the feasibility of introducing those ideas into the actual car club model.

8.3.2 GoDrive interview with validation of the proposed solution

The interview was held on 14th May 2015 at Plan, a service design consultancy office, whose company is co-developing the GoDrive car sharing model with Ford. Prior to discussion about the proposed map with the key aspects, Alicia Agius, project leader, briefly explained their research work during the Alpha and Beta phases, covering several common but crucial issues of operating car clubs, which include the smartphone app, common issues from the users, branding the shared car and availability.

First of all, she introduced the common issues raised about using a car club: namely, the difficulties of extending the booking when someone has booked after the rental, finding a car and the hassle process of damage reports. Most of all, the GoDrive research team found that customers did not like the current damage report process, as I had previously pointed out in the proposed car club model part of this thesis. This is due to the length of time it takes to report the damage by filling in the form and using the call-to-call centre to avoid the damage claim of the previous user.

Regarding the branding of the car, Alicia Agius said that GoDrive is testing diverse options of promoting the brand, in particular, whether the logo of the shared car should be obvious on the vehicle or not; customers do not seem to mind having a big brand on the van but they do on the passenger car. As a result, the company is trying to be subtler in its branding strategy by considering the option of not putting a logo on the driver's side but on the other. She said that currently the logos are applied on both sides but that the response from the test drivers will be monitored.

In terms of availability, which is one of the critical issues from both users' and operators' perspectives, Alicia Agius believed that just adding more cars would

not mitigate the availability issue. Instead, she stressed the need for the integration of car clubs into a bigger transport network like TfL underground. Since the shared car would not be in every corner in the near term, integration is the key to mitigating the scarce availability of cars as well as to increasing incentives to good car sharing customers.

She claimed that the integration of car clubs into the TfL public transport network could provide a more connected mobility option so that users would not need a shared car on every corner. Regarding such an integration, Qasim Shafi, the transport planner for the London borough of Hackney also anticipated the integration would happen as it would clearly make sense from a business perspective for car club operators: more and more people are using car clubs, thus increasing the utilisation of the car club car.

However, in contrast to Alicia Agius's anticipation that the car club car would not need to be located on every corner when we have a more connected mobility option in the city, Hackney authority's view on this issue was distinct. It was argued that increased utilisation might lead to the addition of more car club cars in the borough because Hackney encourages car club operators to add more cars in order to provide closer access of car club cars to the residents.

It is worth noting that both Alicia Agius and Hackney Council have expressed shared views on the integration of car clubs into the bigger network of TfL in order to form one of the major mode of transport options in London. Such visions correspond to the main point of TfL, and boroughs' goal to encourage car club usage to reduce the total number of cars on the roads. However, the different aspirations of car club operators and the Hackney authority regarding the number of car club cars integrated into TfL leads to a further question: whether better connected mobility circumstances would actually lead people to a modal shift, making their journey via diverse transport options, or whether it would actually increase sole reliance on car club usage and therefore cause an increase in car driven journeys instead of an increase in using diverse modes of transport in the city.

8.3.3 GoDrive's opinions on key aspects of the proposed map

In general, Alicia Agius strongly agreed on the two distinctive points of the proposed car club model: the expansion of the role of the smartphone app by introducing a more advanced app, and the smart car club which enables flexible rental extension and other features via real time data of shared cars.

First of all, in terms of the advanced smartphone app and the expansion of its role, Alicia Agius said that this is the direction in which the car club industry is heading because of the flexibility and convenience of updating, changing the functions of the apps, and providing diverse functions to customers. She said that GoDrive's car club usage is managed mainly via a smartphone app. Moreover, they are even considering removing the card reader to access the car so they can maximise the convenient aspect of using the car club just through the smartphone app. However, due to existing technical issues such as mobile phones' battery drain issue or an excessively weak signal in an underground car park, where the card reader is still needed. Nevertheless, she anticipated that the expanded role of the smartphone app in the car club market would be evident and managed 100% by a smartphone app in the near term together with supportive technologies.

Turning to the second point, she valued the idea of the smart car club that enables flexible rental extension and improves the shared cars' availability via time predictability through the use of each car club's real time data She anticipated that such technology could be introduced soon. Since all shared cars have a tracking system, this function could be utilised in various ways that are not limited to aiding the return of the car on time, but could also mitigate parking issues. Therefore, car clubs could be smarter by using the real time GPS data of shared car.

She then pointed out that one of the big challenges would be parking. In particular, the different rules of each London borough was one of the reasons that Car2go faced difficulties of parking permits. Regarding this issue,

interviewee Qasim Shafi, said that coordinating a parking permit could be a difficult issue for car club operators. He explained that the broader legislation, for instance parking regulations, is the same. However, he pointed out that each borough makes individual decisions about the parking permit as all boroughs have different parking space availability pressures as well as other issues such as the impact of drivers' behaviours. So car clubs need to discuss parking permits with all the many London boroughs and such a circumstance is patently quite difficult for car club operators.

Alicia Agius said that central boroughs are nervous about all car club cars ending up in their borough. However, she stressed that if the car club adopts such a smart system, GoDrive could ensure that doesn't happen.

She said that customers could obtain live information via a type of real time dashboard that shows where you could park your car. In terms of an ideal car club system, if all the car clubs coordinate and work together, then all the data are open source, and therefore, more information such as parking could be provided to customers. Alicia Agius asserts that this is the direction where things are heading.

Alicia Agius also emphasised that currently, the tracking function is only used for operational perspectives, but through the real time data, the car club could be improved in terms of its system and better usage.

She pointed out that the new car club service managed by an advanced smart phone app and real time data would enable high utilisation of the shared vehicle. High utilisation is critical from an operational perspective as it needs to make a profit but more than that, it is very important from the city perspective as boroughs expect high utilisation in the sense that one vehicle is used for as many users as possible. This would not mean adding more shared cars on the street, as in adding 20 more cars on the street that are only being used 10% of the time, but rather attempting to add just two cars that are being used 100% of the time.

In conclusion, she asserted that the car club market is on the verge of changing. However this change is not changing in fundamental aspects; it will remain virtually the same as now in terms of booking, accessing, driving and leaving. However, it will be integrated into a bigger transport network: that is the key challenge to bringing about significant change in the current car club system. In this context, the advanced smartphone app needs to be included into well-known travel planning apps such as Citymapper, like Uber, which is already included along with existing public transport networks of bus, underground, train and bicycle. Such an inclusion could not only be an effective way to increase people's awareness of car clubs but also allow people to consider them as one of a network of connected transport options; thus, they would contemplate planning journeys with this car club as an extra transport option in London.

Through the critical assessment with Ford's GoDrive, I was able to find out that key aspects from the proposed car club model are both critical and also expected to play a vital role in the car club market from both the users' and operator's perspective in the future.

It is worth noting that, despite the fact that those key aspects presented to GoDrive were conceived in order to enhance car club usage for customers, this interview session showed that those aspects could also be critical or even imperative aspects for car club companies, enabling them to operate their car clubs with high utilisation of the shared car fleet. This not only affects the overall availability of the car club cars but it is also significant factor of a London authority such as Hackney Council that is equally keen to ensure residents can access the car club service by close cooperation with car club operators (as mentioned in Chapter 6). Ultimately, this interconnected vision will contribute to reducing the total number of the cars in urban areas: one more intrinsic contribution of car clubs to urban areas.

Chapter 9. Conclusion

9.1 Introduction

This research was set out to explore the potential advances of car club design from the users' perspective and has culminated in identifying the key aspects that car club users demand or otherwise suggest. On the basis of the methodological research activities of literature and contextual reviews followed by qualitative in-depth user and expert interviews, I am now at the point of proposing a new car club model.

The ideal car club from a users' perspective is convenient, easy and simple to use and is supported by an advanced smartphone app because users require this level of customer experience in order to choose car clubs over private ownership of a car.

The current circumstances show that the car club is regarded as a positive mobility solution in urban areas, leading to the rapid growth of the total number of shared cars and registered members. It is therefore crucial to understand the customers for such a recently introduced market, one that shows sharp growth and is becoming ever more competitive. Thus, this study has particularly sought to understand the users of this emergent mobility scheme. As a result, the research sought to answer these three key research questions:

1. What are the users' perspectives towards existing car clubs?
2. What are their key suggestions as to how to improve the car club model?
3. What are the critical aspects of the proposed car club model, from the users' perspective?

9.2 Summary of research questions

These research questions have focused on car club users' own observation and analysis towards proposing an advanced car club that could play a role as a positive urban mobility scheme.

1. What are the users' perspectives towards existing car clubs?

Various research institutes and researchers have optimistically forecast the positive prospects of the car sharing market, anticipating that this market will show rapid growth within a decade. The recent introduction of BMW's Drive Now; the announcement of Paris Autolib's participation in 2015, along with Ford's Go drive - an experimental car club model in London - all support the forecast above.
The main research objective of this thesis was to obtain in-depth understanding of the car club users.

a. Convenience is the most important aspect for car club users:

Throughout the research process of customer journey mapping, which is based on the on-site case studies, screener questionnaires of the interviewees, in-depth interviews and participant observation, it has become clear that convenience is the most imperative aspect. This is what entices users to give up their private car ownership or give up the idea of purchasing a car, and instead, join a car club. The notion of convenience encompasses several crucial aspects of car club use such as availability, accessibility and a simple and easy process for using a car club whenever required. It should be possible to reserve car club cars at the last minute when needed without being restrained by office rental hours and the hassle of paper work of a traditional car rental. In addition, shared cars should be located near where users live or at least where they could be reached by public transport. As mentioned in Chapter 1, since January 2014, half the population of London are now able to access car club vehicles within five minutes walking distance of their residence. Moreover, the fact that users could use a car without

being concerned about the expenditure of maintaining one forms another distinctive convenience of using a car club.

b. Simple and Easy to understand and use the car club:

One of the key insights from the user interviews is that the car club concept should be simple and easy to understand: an insight clearly related to the matter of convenience. From the pre-member stage, where users become aware of the concept of car sharing, to actually becoming member of a car club and starting to use the shared car, simplicity and ease were critical aspects that motivated users to keep using the car club. In the process of accessing and driving the shared car, users wanted to have a similar experience to that of using a privately owned car. Hence, operating an on-board computer that requires users to put in a PIN number or other unorthodox action added another layer of complexity which opposes those notions of keeping the mobility service as convenient as possible, which users stated to be the imperative point.

c. Standardisation, advanced smartphone app and availability:

Standardisation, demand for an advanced smartphone app and availability of shared cars were other critical factors that were constantly iterated by users during the in-depth interview sessions. Those are clearly related to the perspective of convenience, and whether the overall experience of using a car club is simple and reliable enough to retain membership that could substitute for car ownership. The appearance of the shared car and whether users are concerned about driving a shared car with a car club logo or not, revealed polarised views: a few interviewees pointed out the positive side of exposing the logo in terms of finding the car easily. In addition, they said that driving a shared car with a logo could give them a sustainable and smart consumer image. However, findings also showed that specific brand logos on the car that advertised the car as a rental vehicle was a factor which other users were not fond of. In some cases, driving the shared car could affect the users' business due to the fact of them being seen in a rental car, not a company one.

Under the present circumstances of the emergence of the sharing economy, we have witnessed that the culture and psychology of ownership are in transition, as Gansky argued (2007). As a result, more and more people are joining car clubs as the perception towards cars is in transition as well. In terms of car club usage, the notion of convenience was the most significant aspect that enabled users to have a positive experience of using a car in more flexible ways without carrying the burden of owning a car. However, at the same time, the fact that some did not want to be seen as a car club user reveals that the specific perception towards cars, which is connected to social status of car ownership, still seems to be a sensitive issue to car club users.

2. What are their key suggestions as to how to improve the car club model?

This question is answered in detail in Chapter 7.3, 'The suggestions from the users', which was part of a questionnaire of the in-depth user interview session.

a. More shared cars and a one-way service:

In general, the findings clearly showed that most users are not particularly interested in the positive implications of operating a car club in an urban area, such as the reduction of the total number of cars on the street and lowering the carbon dioxide emissions. Such a perspective could be found from their own suggestions that more cars should be added to the shared car fleet. In addition, the introduction of a one-way type of car club was another common proposal voiced by users. That might seem to be the most straightforward solution to mitigate availability issues and offer more flexible shared usage; a solution that would not impede the level of convenience of use from the users' perspective.

b. Advanced smartphone app with simple technical support:

In this regard, the growing reliance on using a car club's smartphone apps and the absence of technical support, not even a simple charger, were also regarded as key issues among the users pursing ease of use. They wanted an advanced

smartphone app that provided extra functions such as a swift damage report or sat-nav, beyond the existing functions such as booking or accessing the shared car.

c. Enhancing the level of user experience through small changes:

During the discussion session, users claimed that introducing radical change of the current car club model was not necessary, but those small changes could improve the users' experience. However, adding more cars or implementing a one-way type car club seemed to be the major changes proposed to shift the current landscape of car clubs in London. In particular, this would increase induced travel by car because users could leave the shared car wherever they wanted without being concerned with returning the car. As a result, the one-way service might bring unexpected implications, aggravating traffic congestion or parking issues somewhat in each borough. Nonetheless, it is anticipated that the context itself might change as the scale of car clubs grows and evolves over time. The potential integration of car clubs with a public transport network and the smartphone app offering various travel options, together with users' behavioural change towards car use, would practically mitigate the availability and other current issues of car club usage. Instead, other minor problems that have not caused serious issues yet, for instance, shared car maintenance or cleanliness, could arise as critical issues as more and more people are expected to use the car club in the long term.

3. What are the critical aspects of the proposed car club model, from the users' perspective?

a. Convenience – Simplicity and ease of car club usage

Throughout the in-depth car club user interviews and participant observation, insights and suggestions were collated to form a potential new car club model. Chapter 7. showed a consideration of key issues in detail. Most of all, and as pointed out in the two research questions above, convenience is the main factor

in conceiving the proposed car club model, with a focus on delivering simple and easy to use car club usage, which minimizes unnecessary actions and complicated processes.

As a result, the future model sees the on-board computer removed and the advanced smartphone app replacing its role, covering all processes of car club usage. The expansion of the role of the smartphone app by introducing advanced features such as swift damage report and real-time data, will be notable aspects of this new model. In particular, the convergence of real-time data with a smartphone app can provide various new services, using GPS data and locating the shared car's position (Neather, 2015). For instance, time predictability, which was suggested in Chapter 8, is one of the hypothetical new functions that is expected to alleviate the late return of the shared car which affects overall availability. The potential of real-time data will not be limited to merely mitigating late issues, but can bring about a new landscape of urban mobility scheme and traffic, which could lead to revolutionising the car club and sharing economy as a consequence.

b. Advanced car club smartphone app

It is expected that the advanced smartphone app will enrich the overall level of car club users, providing detailed information of available cars, which includes key features such as electronic parking brakes and other features that users might get confused about when controlling the vehicle. In addition to this, other fundamental features, for instance, finding a car or reservation reminder, will be improved by linking with the existing web platform such as Google map and Calendar, which allow customers to use the service with a familiar interface. Moreover, sending a simple summary of the key details of the car rental by text after finalising the rental could/will give an assurance to users. Such a feature does not require any sophisticated technology but just the sending of a simple rental summary message.

In short, most features of an advanced smartphone app do not require any revolutionary new technologies, but are feasible by linking with existing apps, technologies and IT platforms. Under the current circumstances where people are accustomed to live in such an ICT driven society, the smartphone has become an essential device that has gone beyond its primary function as a mere communication device. In this regard, expanding the role of the smartphone app in car club usage could be seen as a minor change, linking other technologies and features. However, this could/will be the most effective solution that could/will improve users' experience without requiring any radical changes nor huge investment in the current system.

9.3 The identification of the implications of research

Along with the empirical findings from the study discussed above, this section provides theoretical implications with respect to the main research topic of the car club and how this shared mobility scheme may alter existing views of car clubs as well as the urban mobility landscape in the future.

a. The policy and business of car clubs - *The implications of integration with public transport and the expansion of the one-way car club model*

During this research, many experts and reports have asserted that car clubs should be integrated in a bigger transport network in order to provide better mobility solution and could also play a role as a complement to existing public transport, such as the tube or the bus network. When an effective solution of integration with public transport is found, shared-use mobility schemes are expected to help address the first and last mile problems (Shaheen, Christensen, 2014), particularly people who live in suburbs or areas where public transport cannot cover the last mile of the journey.

However, there are also mounting concerns that this could rather increase car usage because people would continue their journey by driving a car, as the

transition from car to public transport is inconvenient, regardless of whether the transit to public transport is available (Kuang, 2009).
Furthermore, the introduction of the one-way car club might escalate the need for such a car driven journey due to its journey type whereby people do not need to return to the same parking place. From the perspective of a car club that could be a complement to public transport, this one-way car club model would contribute to reducing the number but also would compete with public transport and bicycles (Huggler, Civity, 2014): the model shift, merging various transport alternatives might lead to the increase of the total number of cars. This is because it is only the medium that has changed from privately-owned cars to diverse transport options, using passenger cars which include a growing shared car fleet.

Currently, the scale of operating a one-way service is relatively smaller than a round-trip service. UK Drive now by BMW is the only one-way car club model among other round-trip car clubs such as ZipcarUK and CityCarClub (Carplus, 2015).
However, despite the concerns about induced travel and the increase of car use due to one-way's model type, it is expected that a one-way model will grow sharply as the total number of one-way car club users will exceed the round-trip car club users by 2020. In London, Paris's station-based one-way car club, Autolib, was introduced in June 2015 and will be fully operated by 2016 (Prynn, 2015), along with the existing one-way model of Drive now.
The world's largest car club operator, Zipcar, is also operating a one-way service in Boston and predicts that adopting autonomous car technology will ease the issue of parking and redistributing shared cars effectively (McFarland, 2015).

b. Predictions for the car club industry in the future –*various emergent urban mobility schemes and the introduction of autonomous vehicle technology to the shared mobility industry*

It has become clear that car sharing has grown sharply for a decade and it is expected to continue its growth with the increasing popularity of the sharing

economy. In general, this mobility scheme has been regarded as an ideal alternative transport that could alleviate chronic issues of urban areas, which are traffic congestion, insufficient parking spaces and air pollution. This could reduce the total number of cars on the street: one of the notable advantages of the car club.

However, in terms of forecasting the prospects of the mobility landscape in a metropolis such as London, the focus on the current advantages of exploiting the car club, such as contributing to the reduction of the number of cars, could be an outdated view (a static view), because new mobility options are emerging, thanks to the improvement of IT and social media which lead to the increase of the total number of cars.

Uber is a representative case. This minicab booking app service has shown an 850% increase of registered users in London (Withnall, 2014). Although there are other issues related to the massive growth of this minicab service, such as the protest of black cab drivers, the main concern is an increase of overall traffic on the road. In this regard, the recent legislation proposed to cap the number of minicabs by London mayor, Boris Johnson, highlights the impact of emerging new transport options in the urban area, which might cause greater congestion, illegally parked vehicles and escalating air pollution (Wild, 2015).

Along with the issues of emerging diverse mobility options in urban areas, the most noticeable issue is the adoption of autonomous vehicles or so-called, driverless cars and how this new technology could impinge on the existing automotive industry but also, on the mobility sector, particularly shared mobility.

No one even considered the computer company as a contender in the mobile handset market until Apple's introduction of the iPhone back in 2007, but now, in a parallel way, Google is being regarded as a leading company that could take up a superior position in autonomous vehicle technology above traditional car manufacturers.

In 2015, Google announced that they will produce self-driving cars for the mobility service under its umbrella company, the Alphabet, inc. next year (Lippert, Clark, 2015).

Google began the testing of self-driving automotive technology from 2009 and have accumulated technology and massive map data vital for enabling autonomous cars to roam the street. The fact that most car clubs and mobility service companies, including Uber's smartphone apps for users and drivers, are based on Google map, has also enabled Google to collate massive data about transport patterns in cities as well (Stone, 2015).

Chris Urmson, director of Google X, points to the research lab already in development of driverless car technology. In terms of the direction towards utilising the self-driving car for mobility purposes, he anticipates that such an autonomous car will be ready to use over a widespread area within a two to five year time frame; this implies a possible scenario of the picking up and dropping off of customers by self-driving vehicles (Stone, 2015).

It seems evident that adopting autonomous cars in the shared mobility sector will bring a change to the existing car club industry, particularly in the solving of chronic problems of re-distributing shared cars when operating a one-way car club: it might well enhance the overall availability of shared cars. Urmson, who is in charge of Google's autonomous car project, underlines the fact that when a customer operates an autonomous car within the shared mobility scheme, s/he does not need to go out to pick up a reserved car. Instead, this self-driving car could pick up the user in one location and drop them off in another (Ceille, 2015), while these vehicles could be floating around and re-distributing themselves autonomously.

Uber is also stepping forward to adopt autonomous cars into their taxi service, launching it own research centre in Pittsburgh in order to focus on research and development for mapping, vehicle safety and autonomous technology. In this regard, Uber's CEO Travis Kalanick announced that all Uber taxis driven by

people could be replaced by driverless cars and as a result, the price of using this minicab service could be cheaper than the cost of the current manned car fee (Newton, 2014).

However, the path to introducing the autonomous car to the current taxi service does not appear to be as smooth as Uber CEOs thought. Google has developed and used excruciatingly highly detailed maps that are correspondingly expensive to produce. Obtaining the licence for such maps will cause another obstacle because Google has also announced its participation in a ride-hire mobility market with its own brand and accumulated autonomous technology, as mentioned above. Furthermore, current legislation is another barrier for adopting driverless cars for a taxi service as drivers must sit behind the steering wheel to drive a car on the public road even when the car is a fully autonomous vehicle - more advanced and safer than the current human-driven car (Hern, 2015).
Nonetheless, many experts predict that the adoption of autonomous cars will inevitably happen in the future for certain even though it is still complicated to confirm the exact time frame of when those self-driving cars will hit the road (Ceille, 2015).

Thus, it is difficult to identify the implications of this research. This is because existing theories and discussions that solely focus on the advantages of the car sharing scheme, which have been praised as a revolutionary mobility scheme, reducing numbers of cars on the street, mitigating congestion and parking demands as well as emission problems, could soon become redundant.

Even while asserting the potential of integrating the car club into public transport; predictions of expanding the one-way car club; noting the emerging various urban mobility schemes such as Uber thanks to the rapid improvement of ICT and smartphone app, it is evident that the adoption of autonomous vehicles, together with ride-sharing and the current car club system, will bring a significant change to this sector.

Therefore, the current perspectives that emphasize positive aspects of car sharing schemes need to be amplified by a contemplation of how the current shared mobility scheme will evolve. There needs to be more discussion about its role as a positive alternative mode of transport that puts users at the centre precisely because of the rapid change and the ever more competitive mobility landscape in the metropolis.

9.4 Recommendations for future research

Throughout this research, the scale of this study was identified not as extensive but rather as multifaceted at diverse levels that did not solely discuss new mobility schemes of the automotive industry but also several co-related areas that have enabled such a rapid growth of car clubs. In order to generate achievable plans and development goals with regards to providing an ideal car club model from the users' perspective, there is need for more in-depth research of case studies of diverse car club models, particularly focusing on implications for expanding the one-way model and designing an advanced smart phone app to allow further assessment of diverse dimensions of this research subject.

In addition, it is evident that further research about the adoption of autonomous cars and their introduction into car clubs could provide insights into the modal shift in urban areas under such integration with existing public transport in urban areas. The following are proposed as future research topics that can facilitate the attainment of this goal:

-**Design of the advanced smartphone app** for car clubs by introducing key features such as swift damage report options, flexible rental extensions and by providing detailed status of reserved cars: these should be the main content of the advanced smart phone app.
In terms of designing an app whose role is to maximize the convenience of using car club, there is a need to develop an intuitive interface that allows users to understand and use it to manage their car club usage easily. This would need to

be tested with car club user groups to discover any problems and develop the design to a further level.

- **In-depth case study of the expansion of the one-way** car club model and its implications, for instance, how this model would affect the behaviour of existing car club users and potential users. Further, skeptical round-trip car club operators insist that a one-way model would rather substitute than complement public transport therefore, such a model should be carefully observed and analysed. It takes more than a one-way car club model to fulfill the service required in London.

-**Broadening the research site to other cities** where the car club could have a potential to play a key role as a positive urban mobility. On the basis of this London-focused study, it is viable to facilitate the research of planning and developing a specific car club design for other metropolises. In this regard, Seoul in South Korea and Beijing in China, have both suffered chronic problems of traffic congestion and parking, and emissions are also soaring. For these reasons, authorities and government have been urged to take immediate action to mitigate those problems by conceiving diverse new urban mobility plans. In these contexts, the introduction of local car club brands has been regarded as a practical solution.

Furthermore, further research and analysis of case studies of existing car club models in countries such as Germany, France and the US are required. Those cities introduced car club relatively earlier than other cities and currently provide diverse models, including traditional round-trip, free-floating one-way and station based one-way models, that work together with a well-connected public transport network. Research into how these diverse car clubs have played a role as another mobility option along with existing public transport, and how they have affected the public's attitude to mobility is anticipated.

-Adoption of the Autonomous vehicle to the car club fleet is doubtless the subject that will form one of the imperative research topics to be explored

further. As mentioned in chapter 8.3, the implications of introducing driverless cars will bring a huge change not only to the automotive industry but also to the ride-sharing sector.

The main direction of this study should start from identifying the implications of introducing this new technology to urban mobility sector. How could the autonomous car be used in a shared mobility scheme? Could this car really be a solution to the next generation of mobility as most people predict? In addition, the new modal shift, which encompasses the existing public transport network and the introduction of autonomous cars to the ride-sharing mobility market, is anticipated to bring radical change to the current mobility landscape in urban areas and therefore must be explored further.

9.5 Thesis conclusion

As a consequence of this research, I am now able to state that the ideal car club from the users' perspective should be convenient, simple and easy to use; one that allows users to understand and use it without difficulty and with an advanced smartphone app with simple technical support. The latter should be provided in order to allow users to be connected to the network and manage their car club usage more easily while using a familiar interface on their smartphone.

We are witnessing the transition from an ownership society to an age of access where people do not pursue ownership but begin to be aware of the virtue of flexible consumption by sharing. In this context, the changed perspective towards cars, namely that people want a car but not to own it, was one of the critical factors that enabled the growth of car sharing.

Therefore, under the current circumstances, where the car sharing market has shown rapid growth and is becoming more competitive than ever, car club operators (of the business sector) and authorities should approach this shared

mobility scheme as a mobility service with consideration for the users' perspectives as a priority for delivering a flexible mobility service.

There is no doubt that car sharing will continue to grow and be a huge part of future mobility. We see evidence not only in the statistical figures that report the anticipated growth of this shared mobility scheme in the near future, but also in the participation of OEMs in the car sharing market: both support this view. Along with the existing car clubs from OEMs, such as, Daimler AG's Car2go and BMW's DriveNow, Ford and GM have also launched their own car sharing brands. Those car manufacturers are fully aware of the potential of this market and are expanding their brand identity from the current manufacturing and selling of hardware (cars) to the wider context by rebranding themselves as mobility service providers.

In this regard, the fact that the user is at the core of the mobility service means user research will be more important than ever in the future mobility market. In developing a new mobility service, it is crucial to put the user at the heart of it and carry out diverse in-depth user research to find out what users need and seek: such research will play a vital role in conceiving and delivering a successful and competitive mobility service.

9.5.1 Original contribution to knowledge

This research work has illustrated the fact that the car club is a positive contribution to urban areas and can mitigate chronic transport problems. This research field is a fast-moving area with diverse emergent issues, such as the introduction of new car club models from various organisations, diverse types of car club including the expansion of one-way models, ride sharing models and the introduction of autonomous vehicles that are expected to have a significant impact on this market.

The research process was focused on understanding car club users via in-depth user interviews, on-site participant observations and expert interviews with an

independent researcher looking from the users' perspectives. The latter process was original and distinct to the car club researches as the companies wanted to conduct research from a commercial perspective.
Further, during the process of the contextual research and expert interviews with car club operators and service designers, it became evident that service design plays a significant role in shared mobility schemes, helping to optimize a car club model that can truly reflect the user's needs and desires.

During this research work, it was found that car club operators need to consider service design more closely. Taking users' perspectives is not only significant but also vital to each car club operator in order to succeed in such a competitive car club market. The process of using a car club should be simple and easy for the user. In this regards, the main aim of considering service design in the context of a car club is to understand the user — the centre of any shared mobility scheme — while analysing the current issues around using existing car clubs. Gaining diverse perspectives of car club users allows proposals to be made, which improve mobility design and provide better user experiences.

Thus, some of specific service design principles such as the user-centred approach, co-producing the service and customer journey mapping, might be valuable tools for future car club development and also benefit the car club's long term business sustainability.

As a result, the fusion of design research principles, including case studies of existing car club models, in-depth user interview participant observation, expert interview and analysis of all the collated data and service design research principles make this research unique and significant work in its field. The approach taken — if applied commercially and on a larger scale — could help car clubs to much better satisfying user's needs than their existing models.
Service design and design research are not in themselves in any way original or unique — they happen now everywhere.

However, applying these design principles in the car club context during this research process has led to the development of a proposed mobility scheme which is much more user focused than anything in the market — and this is unique and original.

With a qualitative and mixed methods approach, this thesis contributes to the existing knowledge of mobility service operators and public authorities. It contributes in-depth research outcomes for a better understanding of current car club users, but also extends its contribution to the development of advanced sharing mobility schemes that truly reflect car club users' perspectives in this market. If applied, this ultimately should help these organisations to remain competitive, in a complex and growing industry in the future.

9.6 Learning outcome

I have been thinking about this research topic since 2009 and actually started research in 2011. At that point there was no one-way car club in London but four round-trip car clubs and the total number of car club members was around 100,000. Now in 2016, according to Carplus, there are ten car clubs in London and other major cities in UK, including those with electric vehicles and one-way car clubs with almost 155,000 members. Also, under the current circumstance of the growth of app-based taxi services such as Uber, participation of major car manufacturers and active tests of driverless car technology, the shared mobility market has changed massively. During this research, car clubs have become established and regarded as an alternative mode of transport with the advancement of Information communication technology and the emergence of autonomous cars; providing a user-centred good mobility service will be vital in a shared mobility market.

My questions for the conclusion of this research include, what is the future of the car club? Will car clubs become extinct with those changes or will car clubs adopt those changes actively and exist alongside other options?

Among the various aspects of the mobility market to create an impact and change the mobility landscape that we can consider at this moment would be the electric vehicle, different ownership models, new contenders of mobility industries such as Google and autonomous driving technology. In this context, if these are able to be combined and offer new mobility services to users, will everyone use the shared car in the end? Or will the merging into one big alternative model threaten the current car clubs and lead to the demise of the car club?
It seems apparent that the adoption of autonomous cars will radically change the current mobility landscape we know today. The introduction of driverless car technology will create a huge impact not only within the automotive industry but also significantly within the shared mobility market. Particular current issues of car club services, such as parking spaces for shared cars, locating the reserved car, returning the car to the identical parking bay in the case of the round-trip car club and coordinating each borough in terms of their service area could be mitigated by operating such autonomous cars for car club services.

In this sense, the current labelling of car club usage by its operating type – round-trip or one-way model – would become meaningless. There would be a merging into one model as the shared car could be returned and redistributed by itself. Above all, in the future, users will not need to go out to locate the reserved car but such an autonomous car club vehicle will come to the user's door and that will be the ultimate convenient car club.

Bibliography

Agius, A. (2015) *Interview on Proposed car club model from user's perspective.* Interviewed by Roe, J. London, 14 May 2014.

Arcury, T. and Quandt, S. (1999) Participant Recruitment for Qualitative Research: A site-Based Approach to Community Research in Complex Societies. *Human Organization*, 58(2), 128-133.

Armet, I., Shaheen, S., Clonts, K. and Weinzimmer, D. (2012) Peer-to-Peer Carsharing Exploring Public Perception and Market Characteristics in the San Francisco Bay Area, California. *Journal of the Transportation Research Board*, No. 2416, 27–36.

Aston, A. (2009) *Car sharing business grows despite recession.* Available at: http://www.businessweek.com/investing/green_business/archives/2009/10/car_sharing_business_grows_despite_recession.html [Accessed: 24 November 2014].

Bailey, B. (2014) *Oklahoma City Uber passenger sues after scuffle with driver.* Available at: http://newsok.com/article/4879999 [Accessed: 23 August 2015].

Baker, D. (2014) *Don't buy the 'sharing economy' hype: Airbnb and Uber are facilitating rip-offs.* Available at: http://www.theguardian.com/commentisfree/2014/may/27/airbnb-uber-taxes-regulation [Accessed: 29/9/2015].

Ball, A. et al. (2005) Car-Sharing: Where and How It Succeeds. *TCRP REPORT 108*. Washington, D.C: Transportation Research Board.

Bardhi, F. and Eckhardt, G. (2012) Access-Based Consumption: The Case of Car Sharing. *Journal of Consumer Research*, 39, December 2012, 881-896.

Bendixson, T. and Richards, M. (1976) Witkar: Amsterdam's self-drive hire city car. *Transportation*, Vol. 5, Issue 1, 63-72.

Bauman, Z. (2000) *Liquid Modernity*, Cambridge: Polity.

Baxter, P. and Jack, S. (2008) Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers. *The Qualitative Report, 13(4)*, December 2008, 544-559.

Belk, R. (1988) Possessions and the Extended Self. *Journal of Consumer Research*, 15 September, 136-168.

Belk, R. (2007) Why Not Share Rather than Own? *Annals of the American Academy of Political and Social Science*, 611, 126-140.

Belk. R. (2009) Sharing. *Journal of Consumer research*, 36, 715-734.

Birdsall, M. (2014) Carsharing in a Sharing Economy. *ITE Journal*, April 2014, 37-40.

Boag, P. (2015) *All you need to know about customer journey mapping.* Available at: http://www.cmodigitalforum.com/2016/01/08/need-know-customer-journey-mapping/ [Accessed: 23 May 2015].

Boehm, E. (2015) *In Uber case, California commission crushes contractors; could harm sharing economy.* Available at: http://watchdog.org/224804/uber-california-sharing-economy/ [Accessed: 15 September 2015].

Bond Jr., V. (2015) *Automakers spot a profit opportunity in mobility services.* Available at: http://www.autonews.com/article/20150309/OEM/303099959/automakers-spot-a-profit-opportunity-in-mobility-services [Accessed: 14 May 2015].

Botsman, R. (2012)*Welcome to the new reputation economy.* Available at: http://www.wired.co.uk/magazine/archive/2012/09/features/welcome-to-the-new-reputation-economy/page/2 [Accessed: 30 January 2015].

Botsman, R. and Rogers, R. (2010) *Beyond Zipcar: Collaborative consumption.* Available at: https://hbr.org/2010/10/beyond-zipcar-collaborative-consumption [Accessed: 12 April 2012].

Botsman, R. and Rogers, R. (2010) *What's Mine Is Yours: The Rise of Collaborative Consumption.* New York: Harper Collins Business.

Braw, E. (2014) *Car-sharing among solutions for London's bad air quality and congestion.* Available at: http://www.theguardian.com/sustainable-business/london-car-sharing-pollution-congestion [Accessed at: 12 November 2014].

Briggs, M. (2014) *Future of Mobility: Corporate Carsharing Fleets Set to Grow from ~2,000 in 2013 to 85,000 Vehicles in 2020*. Available at: http://www.frost.com/prod/servlet/press-release.pag?docid=289244478 [Accessed: 15 September 2014].

Brignall, M. (2014) *EasyCar Club: would you dare rent your vehicle to a neighbour?* Available at: http://www.theguardian.com/money/2014/feb/08/easycar-club-rent-peer-to-peer-neighbour-car [Accessed: 22 January 2015].

Britton, E. (2013) *WhipCar closes down P2P carsharing operation in Britain. What does it mean?* Available at: https://worldstreets.wordpress.com/2013/03/13/10704/ [Accessed: 9 March 2015].

Brown, C. (2015) *CarSharing: State of the Market and Growth Potential.* Available at: http://www.autorentalnews.com/channel/rental-

operations/article/story/2015/03/carsharing-state-of-the-market-and-growth-potential.aspx [Accessed: 25 September 2015].

Brown, C. (2015) *CarSharing: State of the Market and Growth Potential.* Available at: http://www.autorentalnews.com/channel/rental-operations/article/story/2015/03/carsharing-state-of-the-market-and-growth-potential.aspx [Accessed: 5 January 2016].

Buczynski, B. (2011) *Does Car Sharing Really Reduce Vehicle Ownership?* Available at: http://www.shareable.net/blog/does-car-sharing-really-reduce-vehicle-ownership [Accessed: 22 March 2015].

Bush, G. (2004) *Fact Sheet: America's Ownership Society: Expanding Opportunities.* Available at: http://georgewbushwhitehouse.archives.gov/news/releases/2004/08/20040809-9.html [Accessed: 14 November 2014].

Cabinet Office. (2005) *Transformational Government Enabled by Technology. Cm 6683.* Available at: http://www.dematerialisedid.com/PDFs/transgov-strategy.pdf [Accessed: 12 April 2014].

Cairns, S. (2011) *Accessing Cars: Different ownership and use choices.* London: RAC Foundation.

Cambio. (2014) *Can I get a car every time I want one?* Available at: https://www.cambiocarsharing.de/cms/carsharing/en/1/cms?cms_knschluessel=FAQs [Accessed: 12 October2015].

Car2go. (2015) *Smartphone only: Der Mietprozess für die Hosentasche.* Available at: http://blog.car2go.com/2015/03/10/smartphone-basierter-mietvorgang-car2go-app/ [Accessed: 13 March 2015].

Carlson, R. (1976) Anatomy of a systems failure: dial-a-ride in Santa Clara County, California. *Transportation*, Vol. 5, Issue 1, 3-16.

Carplus. (2013) *Carplus Annual survey of car clubs 2012/13 London.* Leeds: Carplus.

Carplus. (2014) *Carplus Annual survey of car clubs 2013/14 London*. Leeds: Carplus.

Carplus. (2015) *Carplus Annual survey of car clubs 2014/15* London. Leeds: Carplus.

Ceille, K. (2015) *The Future of Car Sharing with Autonomous Wheels.* Available at: http://www.zipcar.com/ziptopia/future-city/future-of-car-sharing-with-autonomouswheels? [Accessed at: 21 December 2015].

Chen, Y. (2009) Possession and Access: Consumer Desires and Value Perceptions Regarding Contemporary Art Collection and Exhibit Visits. *Journal of Consumer Research*, 35, April, 925-940.

Cheshire, L, Walters, P. and Rosenblatt, T. (2010) The Politics of Housing Consumption: Renters as Flawed Consumers on a Master Planned Estate, *Urban Studies*, 47 (12), 2597-2614.

Civity. (2014) *Urbane Mobilität im Umbruch*. Available at: http://matters.civity.de/ [Accessed: 12 November 2014].

Clark, K. (2015) *Carsharing Getting Relatively Easy Regulatory Ride*. Available at: http://www.lexisnexis.com/communities/state-net/b/capitol-journal/archive/2015/10/02/carsharing-getting-relatively-easy-regulatory-ride.aspx [Accessed: 8 October 2015].

Cohen, B. and Kietzmann, J. (2014) *Ride On! Mobility Business Models for the Sharing Economy.* New York: Sage Publications.

Cohen, M. and Zehngebot, C. (2014) *What's Old Becomes New: Regulating the Sharing Economy.* Boston Bar Journal. Available at: http://bostonbarjournal.com/2014/04/01/whats-old-becomes-new-regulating-the-sharing-economy/ [Accessed: 5 August 2015].

Columbier, V. (2012) *Interview on the Autolib*, On-line Interviewed by Roe, J. 4 July 2012.

Cornet, A. et al. (2012) *Mobility of the future: Opportunities for automotive OEMs*. Munich: McKinsey & Company.

Davidson, L. (2015) *Since Uber launched, there are 26pc more cabs in London*. Available at: http://www.telegraph.co.uk/finance/newsbysector/transport/11822711/Since-Uber-launched-there-are-26pc-more-cabs-in-London.html [Accessed: 8 September 2015].

Davis, B., Dutzik, T. and Baxandall, P. (2012) *Transportation and the New Generation: Why Young People Are Driving Less and What It Means for Transportation Policy*. California: Frontier Group.

Davis, N. (2000) *The gift in sixteenth-century France*. Madison: University of Wisconsin Press.

Dent, S. (2014) *What you need to know about Uber, Lyft and other app-based car services.* Available at: http://www.engadget.com/2014/06/27/uber-lyft-explainer/ [Accessed: 10 March 2016].

Department for Transport (2013) *Transport Statistics Great Britain: 2013*. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/264679/tsgb-2013.pdf [Accessed: 19 December 2014].

Department for Transport. (2005) *Making Car Sharing and Car Clubs Work: A Good Practice Guide*. Available at: http://webarchive.nationalarchives.gov.uk/+/http:/www.dft.gov.uk/pgr/sustainable/cars/makingcarsharingmarch2005.pdf [Accessed: 20 October 2014].

Doleac, J. and Stein, L. (2013) The visible hand: Race and Online market outcomes. *The Economic Journal*,10.1111, 1-24.

Donald, L. (2014) *Interview on Zipcar's vision and thought about the research outcome of car club users' observation, analysis and suggestion*, Interviewed by Roe, J. London. 8 September 2014.

DriveNow. (2014) *DriveNow Carsharing London*. Available at: https://uk.drive-now.com/#!/carsharing/London [Accessed: 22 October 2015].

Dutzik, T. Inglis, J. and Baxandall, P. (2014) *Millennials in MotionChanging Travel Habits of Young Americans and the Implications for Public Policy*. California: Frontier Group.

Economist. (2013) *All eyes on the sharing economy*. Economist, 9 March 2013.

Electrive. (2014) *Bolloré plans to create 16,000 public charging points in France.* Available at: http://www.electrive.com/2014/12/09/bollore-plans-to-create-16000-public-charging-points-in-france/ [Accessed: 21 March 2015].

Etherington, D. (2014) *Car2Go's Parent Company Moovel Acquires RideScout and myTaxi.* Available at: http://techcrunch.com/2014/09/03/car2gos-parent-brand-moovel-acquires-ridescout-and-mytaxi/ [Accessed: 3 May 2015].

Faiers, C. (2015) *Uber's race to the bottom: The wheels will come off this controversial business.* Available at: http://www.cityam.com/221363/uber-s-race-bottom-wheels-will-come-controversial-business [Accessed: 29 August 2015].

Fergusson, M. (2014) *Car lite London: How car clubs will help more Londoners drive less.* Available at: http://drucdn.zipcar.com/sites/default/files/pdfs/carlite_final_jan27.pdf [Accessed: 17 December 2014].

Fillenberg, S. and Pflug, E. (2012) *Smartphones are the Key to Car Sharing of the Future.* Available at: http://www.continental-corporation.com/www/pressportal_com_en/themes/press_releases/3_automotive_group/interior/press_releases/pr_2012_09_14_nfc_carsharing_en.html [Accessed: 8 February 2016].

Finlayson, J. (2014) *Interview on Thought about operating one-way car club in London,* Interviewed by Roe, J. Bath, 17 June 2014.

Frost & Sullivan, 2014 (2014) *Car-sharing in London – Vision 2020*. London: Frost & Sullivan. Available at: http://dru-cdn.zipcar.com/sites/default/files/pdfs/car-sharing_in_london_-_vision_2020_-_final.pdf?_ga=1.26641598.260003760.1400514471 [Accessed: 16 November 2014].

Gansky, L. (2010) *The Mesh: Why the Future of Business is Sharing.* New York: Portfolio Penguin.

Gansky, L. (2011) *The future of business is the mesh*, TED talk. Detroit. Available at:https://www.ted.com/talks/lisa_gansky_the_future_of_business_is_the_mesh?language=en [Accessed: 1 May 2012].

Gardiner, B. (2013) *Jump in and drive: car hire by the minute pulls on to UK roads.* Available at: http://www.theguardian.com/environment/2013/aug/22/on-street-car-hire [Accessed: 20 February 2014].

Glind, P. (2013) *The consumer potential of Collaborative Consumption:Identifying (the) motives of Dutch collaborative consumers & Measuring the consumer*

potential of Collaborative Consumption within the municipality of Amsterdam. Utrecht: Utrecht University.

Hamari, J., Sjöklint, M. and Ukkonen, A. (2015). The sharing economy: Why people participate in collaborative consumption. *Journal of the Association for Information Science and Technology*, DOI: 10.1002.

Hancock, M. (2014) *Move to make UK global centre for sharing economy, UK GOV press release.* Available at: https://www.gov.uk/government/news/move-to-make-uk-global-centre-for-sharing-economy [Accessed: 8 December 2014].

Hanson, A. and Hawley, Z. (2011) Do landlords discriminate in the rental housing market? Evidence from an Internet field experiment in US cities. *Journal of Urban Economics*, September 2011, 99-114.

Harder, S. (2014) *ÖPNV-nahe Studie: Carsharing soll Stadtverkehr verschlimmern.* Available at: http://www.spiegel.de/auto/aktuell/car2go-und-drivenow-studie-kritisiert-carsharing-von-bmw-und-mercedes-a-987998.html [Accessed: 11 December 2014].

Harms, S. and Truffer, B. (1998) *The Emergence of a Nation-wide Carsharing co-operative in Switzerland.* SNM case study: Carsharing.

Hawksworth, J. (2015) *The sharing economy – sizing the revenue opportunity.* Available at: http://www.pwc.co.uk/issues/megatrends/collisions/sharingeconomy/the-sharing-economy-sizing-the-revenue-opportunity.html [Accessed: 25 September 2015].

Henley, J. (2014) *Electric 'Boris cars' are coming to London – how do they work in Paris?* Available at: http://www.theguardian.com/cities/2014/jul/09/electric-boris-car-source-london-how-work-paris-autolib [Accessed: 5 September 2014].

Hern, A. (2015) *Are driverless cars the future of Uber?* Available at: http://www.theguardian.com/technology/2015/feb/03/are-driverless-cars-the-future-of-uber [Accessed: 27 December 2015].

Huet, E. (2014) *Uber Rider Might Lose An Eye From Driver's Hammer Attack. Could Uber Be Held Liable?* Available at: http://www.forbes.com/sites/ellenhuet/2014/09/30/uber-driver-hammer-attack-liability/#2715e4857a0b4262a9765999 [Accessed: 15 September 2015].

Huggler, J. (2014) *Germany's car-sharing schemes 'doing nothing to reduce traffic'.* Available at: http://www.telegraph.co.uk/news/worldnews/europe/germany/11072530/Germanys-car-sharing-schemes-doing-nothing-to-reduce-traffic.html [Accessed: 11 November 2014].

ITS International. (2015) *Car-sharing operators move to smartphone-based car access systems.* Available at: http://www.itsinternational.com/categories/networking-communication-systems/news/car-sharing-operators-move-to-smartphone-based-car-access-systems/ [Accessed: 8 February 2016].

Jayson, S. (2009) *Recession generation? Young adults brace for simpler lifestyle.* Available at: http://usatoday30.usatoday.com/news/nation/2009-06-23-millennial-recession_N.htm [Accessed: 15 December 2014].

Johnston, C. (2015) *Uber drivers are employees not contractors, California rules*. Available at: http://www.theguardian.com/technology/2015/jun/17/uber-drivers-are-employees-not-contractors-in-california-ruling [Accessed: 29 August 2015].

Jones, T. (2014) *Does carsharing really reduce overall driving?* Available at: http://www.sfbg.com/politics/2014/05/23/does-carsharing-really-reduce-overall-driving [Accessed: 25 May 2015].

Jones, T. (2014) *Renting isn't sharingShare conference outlines the possibilities and pitfalls for a new economy at the crossroads.* Available at: http://www.sfbg.com/2014/05/20/renting-isnt-sharing. [Accessed: 10 December 2014].

Kavanagh, M. (2010) *Zipcar snaps up UK car club rival for $50m.* Available at http://www.ft.com/cms/s/0/76d83788-4d40-11df-baf3-00144feab49a.html#axzz3xQLFBdoC [Accessed: 19 September 2014]. DriveNow. (2015) DriveNow welcome. [Leaflet]. London: DriveNow UK Ltd.

Kim, L. (2012) *Interview on the Autolib bluecar and process of using the mobility service*, Interviewed by Roe, J. Paris, 17 July 2012.

Kim, S. (2014) *Interview on The service design and customer journey map*, Interviewed by Roe, J. London. 24 April 2014.

KRC Research. (2010) *Millennials & Driving*; A Survey Commissioned by Zipcar, November 2010.

Kuang, C. (2009) *Convenience is King.* GOOD. April 18 2009.
Kubitz, B. (2014) *Raising awareness: Does the lack of awareness contributeto operational difficulties?* Available at: http://www.carplus.org.uk/wp-content/uploads/2014/11/Beate-Kubitz-Raising-awareness.pdf [Accessed: 4 May 2015].

Le Parisien. (2009) *Conseil de Paris : les Verts sceptiques sur «Autolib».* Available at : http://www.leparisien.fr/paris-75/conseil-de-paris-les-verts-sceptiques-sur-autolib-12-05-2009-510375.php [Accessed: 3 February 2013].

Le Vine, S., Gosselin, M. and Polak, J. (2009) An Analysis of Car club participation and its environmental effects, *UTSG*, January 2009, 2a1.1-2a1.11.

Le Vine, S., Zolfaghari, A. and Polak, J. (2014) *Carsharing: Evolution, Challenges and Opportunities.* London: Centre for TransportStudies, Imperial College London.

Leveque, F. and Moosa, M. (2013) Voice of Future Car Sharing Customer: It's All about Wholly Sharing and Partly Pairing. Available at: http://www.frost.com/prod/servlet/press-release.pag?docid=273798396 (Accessed: 12 March 2015].

Le Vine, S. (2012) Car Rental 2.0 Car club innovations and why they matter. London: RAC Foundation.

Lewin, T. (2004) *Smart Thinking: The Little Car That Made it Big.* St. Paul: Motorbooks.

Lewis, A. and Simmons, M. (2012) *P2P Carsharing Service Design:Informing User Experience Development.* Karlskrona: Blekinge Institute of Technology.

Lieber, R. (2012) *Share a Car, Risk Your Insurance.* Available at: http://www.nytimes.com/2012/03/17/your-money/auto-insurance/enthusiastic-about-car-sharing-your-insurer-isnt.html [Accessed: 22 February 2015].

Lieber, R. (2015) *Moral of Airbnb Horror Story: Beware.* Available at: http://www.nytimes.com/2015/08/15/your-money/airbnb-horror-story-points-to-need-for-precautions.html [Accessed 8 September 2015].

Lippert, J. and Clark, J. (2015) *Google to Make Driverless Cars an Alphabet Company in 2016.* Available at: http://www.bloomberg.com/news/articles/2015-12-16/google-said-to-make-driverless-cars-an-alphabet-company-in-2016 [Accessed: 28 December 2015].

Liu, L. (2009) *Future Voiture: Paris's Electric Car Sharing Plan.* Available at: http://www.spiegel.de/international/business/future-voiture-paris-s-electric-car-sharing-plan-a-641430.html [Accessed: 3 February 2013].

Louvet, N. (2014) *One-way carsharing: which alternative to private cars?* Available at: http://www.carplus.org.uk/wpcontent/uploads/2014/07/AD_ExecutiveSummary_140708-copie.pdf [Accessed: 14 October 2015].

Løvile, L. (2015) *Interview on The service design project of Streetcar and role of service design in car club*, Interviewed by Roe, J, London. 17 March 2015.

Løvlie, L., Downs, C. and Reason, B. (2008) Bottom-line Experiences:Measuring the Value of Design in Service. *Design Management Review*, 19 (1), 72-79.

Marouf, M., Pollard, E. and Nashashibi, F. (2014) Automatic parallel parking and platooning to redistribute electric vehicles in a car-sharing application. *IEEE* Intelligent Vehicles Symposium, June 2014, 486-491.

Masuda, K., Siddike, A. and Kohda, Y. (2013) Etiquette of Co-production with Customers: A Study of Car Sharing in Self-service. *Journal of Advanced Management Science*, 1(2), 202-206.

McFarland, M. (2015) *For Zipcar, self-driving cars could be the best or worst of times.* Available at: https://www.washingtonpost.com/news/innovations/wp/2015/11/17/for-zipcar-self-driving-cars-could-be-the-best-or-worst-of-times/ [Accessed at: 22 December 2015].

McGrane, S. (2013) *Car Sharing Grows With Fewer Strings Attached.* Available at: http://www.nytimes.com/2013/06/26/business/global/one-way-car-sharing-gains-momentum.html [Accessed: 8 February 2016].

Metz, D. (2014) *Peak Car: The Future of Travel.* London: Transprotxtra.

Michell, M. et al. (2011) *Reinventing the Automobile: Personal Urban Mobility for the 21st Century.* London: The MIT Press.

Moscaritolo, A. (2016) *Uber Using Smartphone Data to Catch Bad Drivers.* Available at: http://www.pcmag.com/article2/0,2817,2498444,00.asp [Accessed: 9 March 2016].

Moss, S. (2015) *End of the car age: how cities are outgrowing the automobile.* Available at: http://www.theguardian.com/cities/2015/apr/28/end-of-the-car-age-how-cities-outgrew-the-automobile [Accessed at: 2 May 2015].

Navigant Research (2013) *Carsharing Services Will Surpass 12 Million Members.* Worldwide by 2020. Available at: https://www.navigantresearch.com/newsroom/carsharing-services-will-surpass-12-million-members-worldwide-by-2020 [Accessed: 16 September 2014].

Neather, A. (2015) *Tech can help cut pollution but London needs a bigger solution*. Evening Standard, 8 May, 14.

Newcombe, T. (2014) *Airbnb given safety standards warning.* Available at: http://buyingbusinesstravel.com/news/1722814-airbnb-issued-safety-standards-warning [Accessed: 14 September 2015].

Newman, D. (2015) *Airbnb renters who trashed Calgary home left biohazards.* Available at: http://www.cbc.ca/news/canada/calgary/airbnb-renters-who-trashed-calgary-home-left-biohazards-1.3057288 [Accessed: 8 September 2015].

Newman, P. and Kenworthy, J. (2011) Peak Car Use: Understanding the Demise of Automobile Dependence. *World Transport Policy & Practice*, 17(2), 31-42.

Newsham, J. (2015) *After Boston success, Zipcar to expand one-way trips.* Available at: http://www.betaboston.com/news/2015/09/10/after-boston-success-zipcar-to-expand-one-way-trips/ [Accessed: 15 October 2015].

Newton, C. (2014) *Uber will eventually replace all its drivers with self-driving cars.* Available at: http://www.theverge.com/2014/5/28/5758734/uber-will-eventually-replace-all-its-drivers-with-self-driving-cars [Accessed: 23 December 2015].

Nourinejad, M. and Roorda, M. (2015) *Carsharing Operations Policies: A Comparison between One-Way and Two-Way Systems.* New York: Springer science & business media.

Orsi, J. (2012) *Practicing Law in the Sharing Economy: Helping People Build Cooperatives, Social Enterprise, and Local Sustainable Economies.* Chicago: American Bar Association.

Ozanne, L. and Ballantine, P. (2010) Sharing as a Form of Anti-consumption? An Examination of Toy Library Users. *Journal of Consumer Behavior*, 9 (6), 485-498.

Pachter, M. (2013) *Airbnb And The Unstoppable Rise Of The Share Economy.* Forbes. 11 February 2013.

Parker, S. and Heapy, J. (2006) *The Journey to the Interface: How public service design can connect users to reform*. London: Demos.

Plan. (2015) *go!drive: Service concept.* London: Plan & Ford.

Polaine, A., Løvlie, L. and Reason, B. (2013) *Service Design: From Insight to Implementation.* Brooklyn: Rosenfeld Media.

Prynn, J. (2015) *The first 10 electric cars of 3,000-strong hire fleet are rolled out in London.* Available at: http://www.standard.co.uk/news/london/the-first-10-

electric-cars-of-3000-strong-hire-fleet-are-rolled-out-in-london-10316382.html [Accessed: 19 November 2015].

Ranchordas, S. (2015) Does Sharing Mean Caring? Regulating Innovation in the Sharing Economy, *Tilburg Law School Legal Studies Research Paper*, June 2015.

Rayner, A. (2011) *The end of motoring.* Available at: http://www.theguardian.com/politics/2011/sep/25/end-of-motoring [Accessed: 14 April 2014].

Reason, B. (2014) *Interview on Role of service design in car club,* Interviewed by Roe, J. London. 14 May 2014.

Reason, B. and Løvlie, L. (2011) *Giving a start-up a head start: Streetcar, United Kingdom*. Available at: http://liveworkstudio.com/client-cases/streetcar/ [Accessed: 14 July 2013].

Reuters. (2015) *Global Carsharing Services Revenue Is Expected to Reach $6.5 Billion in 2024, According to Navigant Research.* Available at: http://uk.reuters.com/article/co-navigant-research-idUKnBw085040a+100+BSW20151008 [Accessed: 26 September 2015].

Rifkin, J. (2000) *The Age of Access: The New Culture of Hyper capitalism Where All of Life Is a Paid for Experience.* New York: Penguin

Ritzer, G. (2010) *Sociological Theory*, New York: McGrawHill.

Robson, C. (1993) *Real World Research*. Oxford: Blackwell Publishing.

Rogers, E. (2003) *Diffusion of Innovations.* New York: Free Press.

Ronald, R. (2008) *The Ideology of Home Ownership: Homeworker Societies and the Role of Housing.* New York: Macmillan.

Rubin, H., and Rubin, I. (2012) *Qualitative Interviewing: The Art of Hearing Data.* London: SAGE Publications.

Samtani, H. (2013) *Hotels seek to file class action lawsuit against Airbnb.* Available at: http://therealdeal.com/2013/08/19/hotels-seek-to-file-class-action-lawsuit-against-airbnb/ [Accessed: 17 November 2014].

Shaheen, S. and Christensen, M. (2014) *Is The Future Of Urban Mobility Multi-Modal & Digitized Transportation Access?* Available at: http://www.newcitiesfoundation.org/future-urban-mobility-multi-modal-digitized-transportation-access-2/ [Accessed: 20 June 2015].

Shaheen, S., Cohen, A., and Martin, E. (2010) Carsharing Parking Policy:Review of North American Practices and San Francisco, California, Bay Area Case Study. *Journal of the Transportation Research Board*, 2187, 146-156.

Shaheen, S., Sperling, D., and Wagner, C. (1999) A Short History of Carsharing in the 90's. *The Journal of World Transport Policy and Practice*, Vol. 5, No. 3.

Shaheen, S., Mallery. and Kingsley, K. (2012) Personal vehicle sharing services in North America. *Research in Transportation Business & Management 3* (2012) 71–81.

Shafi, Q. (2016) *Interview on Hackney's authority's view on car clubs and the role of support in London,* Interviewed by Roe, J. London, 19 February 2016.

Sharman, A. (2015) *London's car-sharing scene gets bigger* Available at: https://www.ft.com/content/4785d51c-0465-11e5-a5c3-00144feabdc0 [Accessed: 15 September 2016]

Shaw, C. (2007) *The DNA of Customer Experience.* Wiltshire: Cromwell Press Limited.

Shipway, V. (2013) *Interview on City Car Club's vision and discussion on proposing a specifically designed car for shared purpose,* Interviewed by Roe, J. Leeds. 1 August 2013.

Skinner, I. et al. (2004) *Mobility Services: Setting the policy framework*. London: Institute for European Environmental Policy

Snare, F. (1972) The Concept of Property, *American Philosophical Quarterly*, 9 (2), 200-206.

Spence, P. (2015) *Why Uber is right to triple its fares during London's tube strike.* Available at: http://www.telegraph.co.uk/finance/economics/11728546/Why-do-economists-support-Ubers-fare-rise-during-the-London-tube-strike.html [Accessed: 2 September 2015].

Starr, B. (2011) *AMSTERDAM'S WITKAR: THE FIRST CAR SHARING?* Available at: https://www.visualnews.com/2011/03/08/amsterdams-witkar-the-first-car-sharing/ [Accessed: 11 September 2016]

Stickdorn, M. and Schneider, J. (2011) This is Service Design Thinking: Basics, Tools, Cases. Amsterdam: BIS Publishers.

Stone, B. (2015) *Exclusive: Google Is Developing Its Own Uber Competitor.* Available at: http://www.bloomberg.com/news/articles/2015-02-02/exclusive-google-and-uber-are-going-to-war-over-taxis [Accessed: 22 December 2015].

Stulle, R. (2015) *Interview on The service design project of Volkswagen Quicar,* Interviewed by Roe, J. London, 12 March 2015.

Taylor, E. (2014) *Daimler's car sharing business car2go to quit UK, London a challenge.* Available at: http://www.reuters.com/article/us-daimler-europcar-carsharing-idUSKBN0E81ZX20140528 [Accessed: 24 June 2014].

Todd, T. (2014) *Paris electric car infrastructure to go nationwide.* Available at: http://www.france24.com/en/20141208-paris-electric-car-infrastructure-go-nationwide/ [Accessed: 21 October 2015].

Topham, G. and Willsher, K. (2014) *Tycoon Vincent Bolloré to back London electric car hire scheme.* Available at: http://www.theguardian.com/uk-news/2014/mar/12/vincent-bollore-london-electric-car-hire-scheme[Accessed: 14 March 2014].

Tovey, A. (2014) *We'll make driving so cheap only the rich will buy cars.* Available at:http://www.telegraph.co.uk/finance/newsbysector/transport/11276872/Well-make-driving-so-cheap-only-the-rich-will-buy-cars.html [Accessed: 5 March 2015].

Transport for London (2008) *A Car Club Strategy for London: Growing car clubs to support London's transport future.* Available at: http://content.tfl.gov.uk/tfl-car-club-strategy.pdf [Accessed 4 May 2015].

Trend, N. (2015) *Why Airbnb shouldn't be stopped.* Available at: http://www.telegraph.co.uk/travel/hotels/11409314/Why-Airbnb-shouldnt-be-stopped.html [Accessed: 28 November 2014].

UK Legislation. (1998) *Data Protection Act 1998: Chapter 29.* Available at: http://www.legislation.gov.uk/ukpga/1998/29/pdfs/ukpga_19980029_en.pdf [Accessed: 22 October 2013].

Vaus, D. (2001) *Research Design in social Research.* London: SAGE Publications.

Vidal, J. (2010) London air pollution 'worst in Europe'. Available at: https://www.theguardian.com/environment/2010/jun/25/london-air-pollution-europe [Accessed: 23 September 2016]

Walker, M. (2014) *Managing director of Zipcar UK.* Car club discussion at Dana Centre. 27 February 2014.

Walsh, B. (2011) *Today's Smart Choice: Don't Own. Share.* Available at: http://content.time.com/time/specials/packages/article/0,28804,2059521_2059717_2059710,00.html [Accessed: 14 November 2014].

Weintrobe, L. (2011) *Q&A round-up: Rachel Botsman on collaborative consumption.* Available at: http://www.theguardian.com/sustainable-business/best-bits-rachel-botsman-collaborative-consumption [Accessed: 3 April 2015].

Wild, J. (2015) B*oris Johnson seeks to curb number of London minicabs*. Available at: http://www.ft.com/cms/s/0/3288ac4a-fb17-11e4-9fe6-00144feab7de.html#axzz3xQLFBdoC [Accessed: 12 June 2015].

Williams, D. (2015) *Why buying a car really is a tough call.* Evening Standard, 16 March, 34.

Withnall, A. (2014) *Uber registrations 'increase 850%' as black cab drivers stage London protest.* Available at: http://www.independent.co.uk/news/uk/home-news/uber-sign-ups-increase-850-as-black-cab-drivers-stage-london-taxi-protest-9530061.html [Accessed: 11 June 2015].

Woolley, F. (2015) *Does 'sharing' mean caring?* Available at: http://www.theglobeandmail.com/globe-debate/does-sharing-mean-caring/article25654509/ [Accessed: 30 August 2015].

Yin, R. K. (2003) *Case study research: Design and methods.* CA: SAGE Publications.

Zeng, H. (2013) *On the move: Car-sharing scales up.* Available at: http://thecityfix.com/blog/on-the-move-car-sharing-scales-up-heshuang-zeng/[Accessed: 20 September 2014].

Zimmerman, E. (2003) *Design Research: Methods and Perspectives.* London: The MIT Press.

Appendix 1.

Questionnaire for in-depth car club user interview

<Screener>

1. Name

2. Where do you live?
   In London□ outside London□

3. How old are you?
   Under 25□ 25-34□ 35-44□ 45-54□ 55 or older□

4. What is your occupation?
   unemployed□ self-employed□ employed□ in education□ retired□

5. Do you own a car?
   Yes□ No□

6. Are you a member of car club?
   Yes□ No□

7. How often do you make your journey by car?
   More than once a week□ Once a day□ Once a week or more□
   Once a month or more□ A few times per week□
   Less than that but at least once every two months□
   Less than that but at least once per year□

8. How often do you use a car club?
   More than once a week□ Once a day□ Once a week or more□
   Once a month or more□ A few times per week□
   Less than that but at least once every two months□
   Less than that but at least once per year□

9. When was the last time you used a car club?
   This week□ Last week□ Two weeks ago□ A month ago or more□

10. Which car club are you a member of?
    Zipcar□ City Car Club□ Hertz24/7□ Car2go□ Other□ ( )

11. Would you recommend the car club?
    Yes□ No□
    If yes/no, why would you recommend/not recommend to others?

Profile questions about joining a car club

- Do you live alone/married/live in a flat share ?
- Do you have children ?
- Do you live in a flat/house/something else ?
- Do you have parking where they live ?
- What specifically do you do as a job ?
- Do you have a standard/typical commute every day from one place to another ?

-Main questionnaire

<General user experience of using the Car club>

1. How long have you been using the car club?

2. Can you recall why you decided to use the car club?

3. Tell me generally about the car club? What do you think of it? Why?

4. What is the most convenient / best aspect of using the car club? Why…?

5. What is the most inconvenient / worst aspect/part of using the car club? Why…?

6. Why have you kept on using the car club/why have you stopped using the car club? Why?

7. Can you tell me about the most memorable moment you have had using the car club? Maybe it could be the most difficult aspect you've experienced.

<Joining a car club> *(Outside the car)*

1. How did you find out about it?

2. Was it easy to understand and join the car club? Can you talk me through that process and what was good/bad or easy/difficult about it?

3. Is there anything about that joining process which you think might put other people off?

4. What made it difficult for you to understand the system and join the car club?

< Reservation& finding the reserved car> (*Outside the car)*

1. How do you normally book your car? (through a Smart phone app/ company web site)

2. What information was the most important/ useful when you tried booking a car?

3. How easy was it to find your reserved car?

4. What are the steps you take when you find your reserved car?

5. Arriving at the shared car

   Does it matter how the shared car looks on the outside?

   -Car clubs cars with logo? or non logo? or rather a radically different look?
   - Whether it needs to be unique or mainstream in appearance?

Fig.1 Two Zip cars with Zip car logo (silver coloured) and non logo (red coloured) of VW GOLF

6. Do you check damage on the exterior or tyres before unlocking the car?/What are the other aspects you check before unlocking the car? (this question is related to no.4)

7. (extra) When you book car club, do you choose the car that is located nearest to you? Or do you seem to choose a specific car depending on their preference? For instance you deliberately bypass Toyota Aygo and choose Fiat 500.

<Inside the car> (usability) (*Inside the car*)

1. Getting into the shared car
   -Experience of getting into the car
   -Opening the other doors for other passengers or opening the boot
   -Frustrated experience of finding the ignition key ->without the ignition key, the customer cannot turn on the in-car computer
   -Logging in experience

   How can we improve this experience?

   -*For example by using fingerprints and touch instead of inputting the PIN number to reduce the process of logging in the shared car.*

   -*Starting the engine, adjusting the seat, controlling the in-car computer (telematics) or HVAC, etc..*

2. Was it easy to understand and control the in-car computer? (Not for Zip car as Zip car does not have an in-car computer)

3. If not, what did you find difficult in using/operating an in-car computer?

4. Is there any additional information or checklist you want to be informed about before driving the car?

5. How long did it take to get used to the unfamiliar dashboard layout (HMI) and actually drive the car?

6. How do you find your way to the destination when the car is not equipped with a sat-navigation?

<Leaving the shared car> *(Inside the car /Outside the car)*

1. When you finish your rental period, what do you check inside the vehicle before you lock the car?

2. Is there any additional information or checklist you want to be informed about before finalising your rental duration?

3. Have you ever left your belongings in the vehicle and accidently locked the shared car? If so, was it easy to retrieve them or not?

4. Paying issue
   -Confidence about paying the fare that the customer owes
   -How did you (corporate) give confidence to the customer?

Miscellaneous questions

1. Have you ever used a car club vehicle for more than 24 hours? If so, how was it? (price vs easy to access when you need a car for a day?)

2. From your experience of using a car club, does it always make sense to do so or does it lead you to cancel your membership and even make you consider buying a car?

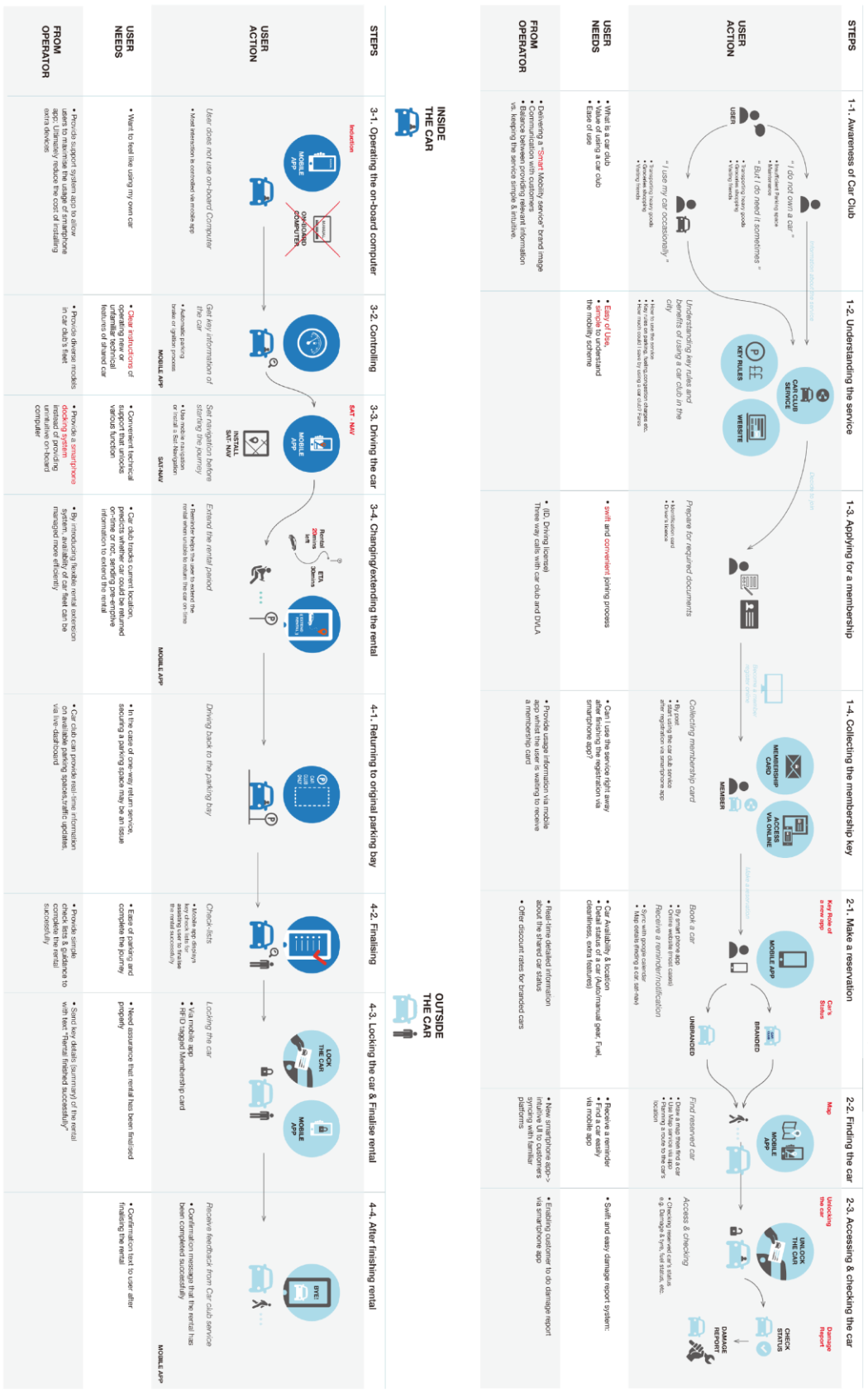
3. Has using the car club changed your mentality towards how you conceive a car?

4. What do you think about a one-way service? Do you think that the system of car clubs works (A to A or A to B) for the journey you make when using a car club?

5. What would be the most important aspect that would make ideal car clubs a from user's perspective?

Appendix 2.

Proposed car club customer journey map



Appendix 3.

Customer journey maps of existing car clubs

Appendix 4.

The interviews were conducted and recorded on video and voice recorder. These are available to listen from separate USB stick.

Interview lists

1. **Car club user interviews**
2. **Participant observations**
3. **Expert interviews**

3.1 Car club fields:

- Alicia Agius, *Project Lead*, GoDrive Ford
- Lim-ban Kim, *Ambassador*, Autolib
- Lyndsey Donald, *Senior brand marketing manager*, Zipcar UK
- Vanessa Colombier, *Communication Manger*, Autolib (Email interview)
- Vicky Shipway*, Head of Marketing,* City Car Club

3.2 City Authority:

- Qasim Shafi, *Transport planner*, the London borough of Hackney

3.3 Service design fields:

- Ben Reason, *Director*, Livework
- Justin Kim, *Senior service designer*, Engine
- Lavrans Løvlie, *Founding partner*, Livework
- Robert Stulle, *Partner*, Edenspiekermann