

Car Clubs Strategy - Evidence Summary March 2015

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1 Background

This evidence summary brings together research gathered through a series of theme-based workshops and follow-up meetings held with the Car Club Coalition, which comprises operators, car club/rental trade bodies, GLA, London Councils and TfL. The purpose of this exercise was to collate the research and data pertaining to car clubs in London and identify knowledge gaps for further research.

Key themes addressed in the evidence review are:

- Impacts of car clubs on the transport network
- Benefits of increasing car club members and use in London
- Challenges and opportunities to/for achieving growth

The aim of this summary is to provide a brief overview of existing evidence on the potential impact of increasing the number of car club members in London on both the commercial industry and on the vitality of London. A list of the evidence collated to date is provided at the end of the paper and it is recommended that this is used for further reading to supplement the excerpts included in this document.

Through this process of gathering the evidence, it has become clear that some pieces of existing research are contentious and areas of concern to members of the Coalition are noted in the footnotes. However, this document seeks to include all pieces of research available without drawing any overarching conclusions. There are a number of questions that remain unanswered, particularly with regards to how the emerging flexible and point-to-point models may operate and impact London. To begin to address this, key gaps in the evidence are highlighted throughout this document. It should be noted that some further confidential data has been provided to TfL by operators, but only publically available reports are included in this summary.

The Car Club Strategy acknowledges the issues with the evidence and puts in place an action to develop a monitoring framework through which to collect further evidence.

The evidence collected by TfL and the industry has been collated and is presented below under key topic headings.

2 Impacts on the Transport Network

2.1 Public transport, walking and cycling journeys

- **Carplus (2014) Annual Survey: London (p. 31):** Table 3.5 indicates that London car club members cycle more and use public transport more than the average Londoner. This shows a correlation but not causation. It also says that car clubs tend to attract those who already use their car less.
- **Frost and Sullivan (2013) Car sharing – The voice of the consumer and potential users:** shows that current car club members live in areas best connected to the public transport network, suggesting that they already walked more and drove less than the average Londoner.

- **Malcolm Fergusson for Zipcar UK (2014) Car-Lite London (p. 2):** states that car club members are “about twice as likely to use the tube, a train or bike as the average Londoner”.

Knowledge gap: Comparing car club members to average Londoners shows correlation in travel behaviour but not causation. Before and after surveys are needed to measure travel behaviour change following joining a car club.

- **6T¹ (2014) One-way car-sharing: which alternative to private cars? (p. 5, Executive Summary):** shows respondents are less likely to take public transport on a daily basis after joining up but later states that round trip users are more likely to use public transport daily.
- **Seattle Department of Transportation (2014) 2013 Seattle Free-Floating Car Share Pilot Program Report (p. 8):** This report states that whilst the data provided about car2go indicates positive effects from free-floating car share, such as fewer miles travelled in private vehicles and lower car ownership rates, the decline in public transit ridership among members is a less desirable trend and should be better understood.
- **Civity Management Consultants² (2014) Urban Mobility in transition: The importance of free-floating car sharing for transport and the economy (p. 21):** states that “free-floating car sharing is to a significant extent ‘motorised convenience mobility in local areas’ by users who previously used means of transportation that are more compatible with the city and environment, such as public transport and bicycles”.
- **TfL (2014) Parking and Car Club Potential Users and Use, Systra (p. 8):** notes that the situation is not clear-cut. Whilst car-owning households could reduce their ownership by replacing private car trips with a combination of car clubs and public transport and “non-car owning households may increase their number of car trips and use car clubs for journeys they may have completed using public transport, walking and cycling, so “an increase in uptake may be at the expense of journeys currently made by other sustainable modes”.

Knowledge gap: Monitoring and evaluation is required to assess the behavioural change triggered by car clubs.

2.2 Traffic congestion

- **Frost and Sullivan³ (2014) Vision 2020 (p. 22-23):** This report compares the household mileage of a car club member with that of an average Londoner and finds that a round trip car club member drives 57 per cent less than an average Londoner, which is then used to calculate the numbers of miles reduced by 2020 if the round-trip membership growth is achieved. However, calculating the reduction in mileage in

¹ Bolloré, who run the Autolib scheme in Paris, do not support the findings of this research as it has not been validated by themselves of the City of Paris.

² DriveNow, who operate in Berlin, were not involved in this research and do not support the data used or its findings. It should be noted that they requested that it is excluded from the evidence summary

³ This report was commissioned by Zipcar and the analysis and findings are not supported by all operators

this way risks over-estimating the mileage reduction. This is because a new car club member is likely to have lower car use than an average Londoner before joining (hence why the car club model appeals) and therefore their mileage won't reduce by this amount, so caution should be used in using this figure in congestion calculations.

- **Carplus (2014) Annual Survey: London (p. 28):** shows that 28 per cent of respondents stated that their mileage had fallen since joining a car club. Car club vehicles in London carry on average 2.28 people, whereas the average car in London carries 1.47 so has better space efficiency.
- **Fergusson (2014) Car Lite London: How Car Clubs will help more Londoners drive less (p. 21):** says that 21 per cent of members said they drove more now they had access to a car club vehicle and would have otherwise not have had access to a car. This is significant when applied to projected membership growth figures. It compares to 28 per cent who said their mileage had fallen and 34 per cent said that their mileage had not changed.
- **ACEA (2014) Carsharing: Evolution, Challenges and Opportunities (p. 15):** states that it can be argued that the tariff structure of car sharing is a particularly pure form of congestion pricing. The more time spent driving in congested traffic, the greater the cost and the more incentive to avoid driving.
- **RAC Foundation (2012) Car Rental 2.0 (p. 26):** This study undertook an analysis which found that with the existence of both the traditional and one-way models "people who would trade in a personal car for a car club subscription would on average drive considerably less (making 11 fewer journeys per week), while those who would otherwise not own a car would only drive a modest amount more (making three more journeys per week). But the latter group is predicted to be several times as large (74% of subscribers vs. 26% of subscribers) – thus the effects roughly cancelled each other out, resulting in a net impact of very little change in the overall number of driving journeys."

Knowledge gap: How can changes in mileage be better measured (i.e. not relying on self-reporting after joining the car club) and how can the resulting impacts on congestion be modelled?

How many members are 'active' members and what defines a member as being 'active'?

How many members are members of more than one car club? What informs these members' choice of which car club to use?

2.3 Parking

- **Carplus (2014) Annual Survey: London (p. 3):** The report states that "For each car club vehicle, 5.8 cars have been removed from the road as a result of car club members who have sold a car - that's almost 13,000 vehicles removed from London's streets. In addition, 30% of car club members have deferred their planned purchase of a car".
- **Fergusson (2014) Car Lite London: How Car Clubs will help more Londoners drive less (p. 15):** points out that parking demand exceeds supply, particularly in inner London and the report poses the problem that those who do give up cars and therefore spaces may end up being used by other private car owners.

- **Civity Management Consultants (2014) Urban Mobility in transition: The importance of free-floating car sharing for transport and the economy (p. 24):** in Berlin, a free-floating vehicle is put to productive use only for 62 minutes a day⁴.
- **TfL (2014) Parking and Car Club Potential Users and Use, Systra (p. 62):** supports the potential for reducing car ownership, stating that “car club membership may prove to be an effective tool in deferring or reducing private vehicle ownership, thus leading to a net reduction in total future car demand” which would have an impact on reducing parking demand.

Knowledge gap: How many parking spaces are needed to support the 1 million members and at what density? Will this have a short-term negative impact on parking demand before the car ownership reduction benefits are realised? If so, how can the short-term negative impacts on parking be minimised?

2.4 Typical types of journeys

- **Frost and Sullivan (2013) Car sharing – The voice of the consumer and potential users:** Existing and potential users are generally young (25 to 34 years), well educated employees with low access or ownership to a car and have already shown a high interest in car sharing.
- **TRL (2012) Rental Customer Survey (p. 25):** found that the most common journey purposes included: visiting friends and family (36 per cent), business (26 per cent), day trips (19 per cent) and general activities (11 per cent)
- **6T (2014) One-way carsharing: which alternative to private cars? (p. 3)** Shows that 32 per cent of Autolib subscribers frequently use the service for commuting. It also shows that the average rental distance for Autolib (one-way) is around 9km and tends to be in a “restricted perimeter” (the downtown area). For Mobizen (round trip) the average rental is further at 40km. This indicates that the one way model may be more likely to replace shorter journeys that could be undertaken by public transport, in the Paris context. The round trip model would have more impact on longer trips switchable from private car.
- **Carplus (2014) Annual Survey: London (p. 4):** commuting makes up 5 per cent of car club journeys and business travel accounts for 8 per cent. “The main journey purposes reported were shopping (29 per cent). Leisure (27 per cent), personal business (22 per cent) and visiting friends and relatives (22 per cent).
- **Civity Management Consultants (2014) Urban Mobility in transition: The importance of free-floating car sharing for transport and the economy (p. s 6 and 23):** Found that “a large share of the trips take place within or between ‘hip’ city districts. It also found that free-floating models tend to be used by more “creative” people, rather than conventional commuters, so won’t have a big impact on commuting in peak hours.
- **RAC Foundation (2012) Car Rental 2.0 (p. 29):** This document reports on a choice survey, undertaken to explore what journeys car clubs might be used for. It found that one way models would be most popular for commuting and round trip for shopping trips.

⁴ DriveNow dispute this and state that their daily usage is around 4 hours

2.5 Inner / Outer London journeys

- **TfL (2014) Parking and Car Club Potential Users and Use, Systra (p. 62):** This study indicates that there may be three main market segments which will have high take-up: non-car households in Inner London where there is high parking pressure; one car and multi-car households in Inner London where there is high parking pressure; non-car households in Outer London where parking pressure is lower but car club vehicles could be attractive for some trips.
- **Carplus (2014) Annual Survey: London (p. 15-16):** Inner London boroughs have the highest response rates to the survey per head of population. Although response rates were generally lower in outer London, Richmond, Haringey and Merton showed highest response rates.

Knowledge gap: Are there opportunities for growth of car club usage in outer London? For example as part of new developments that may be linked to family lifestyle changes. How can car owners in Inner London be targeted?

3 Benefits

3.1 Car Ownership

- **Carplus (2014) Annual Survey: London (p. 25):** the percentage of new joiners reporting owning no car before joining a car club was 58 per cent and after joining the car was 73 per cent.
- **TfL (2014) Parking and Car Club Potential Users and Use, Systra (p. 2):** Research of London license holders identified that household car ownership is not reviewed regularly. When it is, reasons include life events, such as moving house or having a baby and external impacts such as changing parking policy or age / functionality of the car owned.
- **ACEA (2014) Car sharing: Evolution, Challenges and Opportunities (p. 12):** This report highlights a significant change could be seen in net car ownership if it is adopted by young people or new drivers, but that many car clubs currently have age restrictions which could impede this. Reductions in car ownership are seen more in the round-trip model – 67 per cent than point to point – 23 per cent

Knowledge gap: Would new joiners have given up their car anyway, due to a change in situation? Can this be attributed to the availability of the car club? How will this change when car clubs reach a wider audience?

- **Frost & Sullivan (2013) Voice of Future Car Sharing Customer: It's all about wholly sharing or partly pairing (p. 2):** suggests that more urban car owners will give up car ownership after joining car sharing. The report estimates about 40 per cent of current car owners with one car are likely to give it up and about 60 per cent of non car owners will not consider buying one.
- **RAC Foundation (2012) Car Rental 2.0 (p. 58):** This report suggests that being a car club member could lead to people being less likely to purchase a car, though it may encourage it. The report however states that asking people about this retrospectively will be more accurate than asking about peoples future intentions.

Knowledge gap: In depth research is needed on the impacts of car clubs on a) current members b) non-members and c) lapsed members across a range of demographics to understand decisions relating to car ownership and stage of life.

3.2 Impacts on the Environment

- **Carplus (2014) Annual Survey: London (p. 7):** reports that almost 100 per cent of the car club fleet in London is Euro 5 (or Euro 6) compliant – up from 80 per cent in 2011. This is due to the use of newer vehicles, built to comply with higher standards than many older privately owned cars in London. The replacement of more private cars with car club membership could therefore have a significant net impact on the level of emissions in London.
- **TRL (2012) The Emission Impacts of Car Clubs in London (p. 15):** echoes this point around age of car club vehicles, and the higher Euro standards they therefore meet in terms of emissions. The report looked at specific values of average 'real world' emissions from UK 'urban' cars in general but could not make a comparison to car club emissions due to lack of available data. It should be noted that a like for like comparison of average tail pipe emissions of UK cars vs. car club cars would not give a thorough picture of potential change due to other impacting factors: use of other transport modes, lifestyle changes etc.
- **RAC Foundation (2012) Car Rental 2.0 (vi):** there is a need for lifecycle analysis including emissions overheads generated by assets required to deliver the service e.g. staffing, commercial property, vehicle maintenance and advanced information technology systems.
- **Firn Korn & Muller (2011) What will be the environmental effects of new free-floating car-sharing systems? The case of car2go in Ulm, Article in Ecological Economics (p. 7):** indicates a CO₂ reduction per average car2go user of between -312 kg to -146 kg CO₂ per year, taking into account car2go use, public transport, borrowed car and other private car usage. There are limitations of this research on air quality calculations.

3.3 Effects on Land Use

- **Car plus (2010) Car Clubs in Property Developments:** links reduced parking to developments through S106 case studies.

Knowledge gap: What impacts do car clubs have on land use and parking e.g. where it has been introduced in mixed use developments? What impact do Borough best practice documents have?

3.4 Increased Awareness of Electric Vehicles (EVs)

- **Carplus (2014) Annual Survey: London (p. 4):** found that one in five members had tried either electric or hybrid car club vehicles and of those who had, over three quarters had a 'good' or 'very good' experience.

Knowledge gap: Can EV use for business purposes be promoted, particularly for larger public sector businesses such as the NHS or local councils?

Knowledge gap: Can EV car clubs help sustain EV charge point networks across London? What research is required on charge point type and coverage? How can we best future-proof and ensure the reliability of EV charging infrastructure?

3.5 Personal Cost Savings

- **RAC Foundation (2012) Car Rental 2.0 (p. 36):** highlights that whilst the increasing cost of fuel is making the pay as you go element more expensive, costs of ownership are decreasing, quoting a 40 per cent decrease in real terms over the last decade. Car clubs combine the two costs into one pay as you go element without fixed costs. However, for a car club member there will most likely also be other transport costs they will pay such as train fares or season tickets, but also costs they may save through switching some trips to walking or cycling. This makes the comparison in overall transport costs difficult to compare in terms of owning a car vs. not owning one. The RAC report highlights the need for these cost comparisons to be watertight, with additional costs made clear to users.

Knowledge gap: Reliable lifecycle costs of personal travel are needed to enable sound comparisons between a range of travel options.

- **Frost & Sullivan 2014 Vision 2020 (p. 26):** it is suggested that there are economic benefits to users through the net impacts of reduced congestion. This could be a longer term result of mass uptake of car clubs if the overall number of vehicles on the roads reduces. The time saved in traffic could be tracked back to value of time.

3.6 Reliability and Increased Choice

- **ACEA (2014) Carsharing: Evolution, Challenges and Opportunities (p. 6):** discusses availability of cars for users, stating that Cambio car sharing reports that 93% of customer requests for reservations are accommodated – 1 in 15 will not be. As members grow this becomes more important.
- **Carplus (2014) Annual Survey: London (p. 23):** reports improved service standards between 2007-2014 from customer satisfaction surveys.

3.7 Business Use

- **RAC Foundation (2012) Car Rental 2.0 (p. 34):** businesses are generally willing to pay premium prices for services of a very high quality and could be attracted to car clubs but the business and individual market are distinct and the driving force behind these decisions will therefore be different.
- **Fergusson (2014) Car-Lite London (p. 26):** Croydon Council is a good example where commuting is significantly reduced and business travel by car is rationalised.

Knowledge gap: What is the potential to reduce vehicle freight trips and business travel through uptake of car clubs e.g. consolidation between firms of regular deliveries? How does this vary in inner and outer London areas?

3.8 Social Inclusion

- **RAC Foundation (2012) Car Rental 2.0 (p. 41):** Car club members tend to have middle to upper incomes and be well educated. They are generally a different group of people from those discussed in the context of transport poverty and social exclusion.

Knowledge gap: What lessons have been learned about the impacts of targeting lower income groups for uptake and where this has or hasn't been successful?

3.9 Maintenance of current benefits

Knowledge gap: Robust data is required on the impact of car clubs in London as the industry grows.

4 Challenges and Opportunities

4.1 Parking policy

- **RAC Foundation (2012) Car Rental 2.0 (p. 23):** shows that the traditional business model fares best where parking is limited and which have good walking, accessibility and transport links. Limiting parking would therefore be good for the industry.
- **Firnborn and Muller (2009) What will be the environmental effects of free floating car-sharing systems? The case of car2go in Ulm, Ecological Economics:** The report discusses the static space used by cars for parking and the emissions caused by driving time looking for a space, noting that providing specified places for car clubs to park reduces this.
- **Frost and Sullivan (2013) Car sharing – The voice of the consumer and potential users:** Consumers are most attracted by an all inclusive offering, including parking anywhere in the city with dedicated spots near transport stations.
- **TfL (2014) Parking and Car Club Potential Users and Use, Systra (p. 26):** there is evidence that car clubs are seen as part of the parking problem, taking spaces away from private car users.
- **TfL (2014) Parking and Car Club Potential Users and Use, Systra (p. 63):** considers “local parking policy, alongside other factors which affect car ownership, as an indirect influence on car club membership via ownership levels, as opposed to a direct influence to membership.”
- **ACEA (2014) Carsharing: Evolution, Challenges and Opportunities (p. 9):** Many car sharing services require privileged access to on-street space that is managed by the municipalities. This can create vulnerability in certain areas as access to parking is directly linked to commercial success. There is political sensitivity around local residents and parking.
- **Frost and Sullivan (2014) Vision 2020 (p. 10):** states that one way, point to point models require 2-3 times as many spaces as cars. The report sets a vision for growing car sharing in a market where, theoretically, sufficient parking permission is facilitated (which is not currently the case).
- **Civility Management Consultants (2014) Urban Mobility in transition (p. 25):** The importance of free-floating car sharing for transport and the economy: with current

utilisation, free-floating car sharing models need almost as much parking space as privately owned cars and hence have no positive impact on inner-city space consumption.

- **6T (2014) One-way car-sharing: which alternative to private cars? (p. 3, Executive Summary):** states that Autolib is a substitute to private cars without the parking constraint due to provision of reserved parking spaces for Autolib cars. However in the short-term this may increase the stress on bays for car owners

Knowledge gap: What does the parking situation look like if car clubs saw the projected growth envisioned? What proportion of spaces per street in London would need to have a dedicated bay?

- **Carplus (2014) Annual Survey: London (p. 33):** shows that 11 per cent of members and 5 per cent of new joiners stated that they have problems parking locally and this is why they joined a car club.

Knowledge gap: A review of scrappage schemes, graduated parking, permit surrender schemes and other incentive schemes is needed.

4.2 Political Complexity

- **RAC Foundation (2012) Car Rental 2.0 (v):** Recommends that management of on-street parking spaces should in general be designed to result in multiple operators competing in the same neighbourhoods. Reduced direct subsidy to car clubs is seen as an issue for access to on street space. The report states that the public sector should preserve its flexibility at this point in the market and not rush into long term contracts.
- **ACEA (2014) Carsharing: Evolution, Challenges and Opportunities (p. 9):** In contrast to higher levels of government, local governments have a monopoly on on-street parking space. These local governments represent small geographic areas, subject to changes in policy direction, under pressure to deliver conflicting outcomes and under no obligation to work with car sharing companies. The report suggests that it would be appropriate for national governments to provide overarching policy advice to local governments to help steer car club growth.

Knowledge gap: Inclusion of car sharing into national data collection e.g. National Travel Survey.

4.3 Levels of Public Awareness

- **Frost and Sullivan (2013) Car sharing – The voice of the consumer and potential users:** Level of familiarity and level of interest should be carefully considered. Suggests going back to the basics of marketing to drive familiarity.
- **TfL (2014) Parking and Car Club Potential Users and Use, Systra (p. 26):** the research found that lack of awareness was one of the main reasons that car clubs are not considered in the decision making process for acquiring a car. 37 per cent of respondents had never heard of a car club. Only 13 per cent were found to have considered it in any detail. Three target markets were identified from the research: 1) non-car households in inner London; 2) one car and multi-car households in inner London; 3) non-car households in outer London

Knowledge gap: What are the most effective ways of reaching those who have never heard of car clubs?

4.4 Car clubs as a public transport mode

- **6T (2014) One-way car-sharing: which alternative to private cars? (p. 3 Executive Summary):** From user surveys, 25 per cent deem Autolib to be more practical and comfortable than public transportation. In addition, it states that they (Autolib users) have a more negative perception of public transportation than other car sharing users, separating the two as different transportation concepts.
- **Firnkorn and Muller (2011) What will be the environmental effects of free floating car-sharing systems? The case of car2go in Ulm, Ecological Economics (p. 3):** The article, using the example of Ulm, describes how car sharing and public transportation should complement each other. In Ulm, information is provided about car2go by the local public transport provider and public transport maps shown in cars, but no interoperability. It discusses a holistic approach to assessing a car sharing system that takes into account all transport options for users. The report supports integrated mobility systems that satisfy the variety of individual transportation needs to encourage large scale reduction in private vehicle usage. This includes pricing and infrastructure.
- **Frost and Sullivan (2013) Car sharing – The voice of the consumer and potential users:** This report also supports car sharing co-existing with public transport, stating that consumers are most attracted by an all inclusive, convenient car sharing offering with public transport style operation. It states that people are most likely to adopt car sharing if it is part of the full transport offering.
- **Civity Management Consultants (2014) Urban Mobility in transition: The importance of free-floating car sharing for transport and the economy (p. 29):** This report highlights the difficulty of including car sharing within a public transport offering due to its high marginal costs.

4.5 Multi-operator models

- **Firnkorn and Muller (2011) What will be the environmental effects of free floating car-sharing systems? The case of car2go in Ulm, Ecological Economics (p. 9):** To facilitate the transition away from private cars to car sharing, the complex organisational problems resulting from multiple free-floating fleets must first be solved.

Knowledge gap: Is there sound evidence that car sharing operators can integrate to offer a more varied range of options to customers?

4.6 Fraud, theft and crime

- **RAC Foundation (2012) Car Rental 2.0 (p. 9):** The report states that it is difficult to determine responsibility for damage to a car club, such as minor body damage or

engine wear from aggressive driving. There is no mention of geographical areas being more at risk.

Knowledge gap: Is there a business case for expansion into lower income areas?

4.7 Appealing to business users

- **Frost and Sullivan (2013) Car sharing – The voice of the consumer and potential users:** This report states that for business use to be most effective, it would be important to have the service available as a countrywide offering.

Knowledge gap: There is a need for more case studies showing business use of car clubs and the reasons for their choice.

4.8 Demographics of car club users

- **RAC Foundation (2012) Car Rental 2.0 (p. 47):** The report notes that initially car clubs were viewed as a way to provide car access to people for whom ownership was not financially practical. In practice, car clubs are often not located in these areas and it is not known whether they are affordable to this demographic.

Knowledge gap: Are car clubs a good economic alternative to privately owning a car for lower income groups? Would this encourage more car use among a group currently with lower car ownership?

- **Frost and Sullivan (2013) Car sharing – The voice of the consumer and potential users:** The highest level of car interest is shown to be well educated employed people between 25 and 34 with no children.
- **TfL (2014) Parking and Car Club Potential Users and Use, Systra (p. 24):** For car clubs to make an impact, with regards to reduction in private car ownership, it is important that they are placed in a position where they can be considered as a feasible alternative whenever this event takes place in the household.
- **ACEA (2014) Carsharing: Evolution, Challenges and Opportunities (p. 14):** suggests that insurance pricing could be individually tailored to enable use by younger markets to enable more growth in the market.

4.9 Planning policy

- **Firnkorn and Muller (2011) What will be the environmental effects of free floating car-sharing systems? The case of car2go in Ulm, Ecological Economics (p. 9):** discusses market penetration in new development areas that could mean fewer parking spaces per new building.
- **TfL (2014) Parking and Car Club Potential Users and Use, Systra (p. 63):** Results from stated intention research indicates that local parking policy may not have the potential to significantly impact on membership, however the difficulties expressed by some drivers suggests that there is an opportunity for car clubs to be sold as the enabling solution.

4.10 Rapid charging

- **RAC Foundation (2012) Car Rental 2.0:** There is tension to be managed between recharging requirements and the utilisation levels required for them to be economic to operate. Wear and tear of frequent charging on batteries presents a challenge.

Knowledge gap: What are the potential requirements for rapid charging infrastructure and what are the feasibility requirements and capabilities of such a network?

5 References

1. 6T (2014) One-way car-sharing: which alternative to private cars?
http://6t.fr/download/AD_ExecutiveSummary_140523.pdf
2. ACEA (2014) Car-sharing: Evolution, Challenges and Opportunities
<http://www.acea.be/publications/article/sag-report-22-carsharing-evolution-challenges-and-opportunities>
3. Carplus (2014) Annual Survey: London
<http://www.carplus.org.uk/resources/annual-survey-of-car-clubs/annual-survey-201314/>
4. Car plus (2010) Car Clubs in Property Developments
<http://www.carplus.org.uk/resources/best-practice-guidance/>
5. Civity Management Consultants (2014) Urban Mobility in transition: The importance of free-floating car sharing for transport and the economy
http://www.civity.de/en/news/2014/08/matters_no_1_%E2%80%93_urban_mobility_in_transition_1
6. Fergusson for Zipcar UK (2014) Car Lite London: How Car Clubs will help more Londoners drive less
<http://www.zipcar.co.uk/car-lite-london-policy>
7. Firnkorn and Muller (2011) What will be the environmental effects of free floating car-sharing systems? The case of car2go in Ulm, Ecological Economics
Article available from TfL on request
8. Frost and Sullivan (2013) Car sharing – The voice of the consumer and potential users
<http://www.frost.com/sublib/display-market-insight-top.do?id=273488817>
9. Frost and Sullivan (2014) Vision 2020
http://dru-cdn.zipcar.com/sites/default/files/pdfs/car-sharing_in_london_-_vision_2020_-_final.pdf?_ga=1.26641598.260003760.1400514471
10. RAC Foundation (2012) Car Rental 2.0
<http://www.racfoundation.org/research/mobility/car-rental-2>
11. Seattle Department of Transportation (2014) 2013 Seattle Free-Floating Car Share Pilot Program Report
http://worldstreets.files.wordpress.com/2014/04/2013_free_floating_car_share_report.pdf
12. TfL (2014) Parking and Car Club Potential Users and Use, Systra
Unpublished. Executive Summary available from TfL on request
13. TRL (2012) Rental Customer Survey
<http://www.trl.co.uk/reports-publications/trl-reports/report/?reportid=6823>