



Accessing Cars

Different ownership
and use choices

Sally Cairns
February 2011



RAC
Foundation

The Royal Automobile Club Foundation for Motoring Ltd is a charity which explores the economic, mobility, safety and environmental issues relating to roads and responsible road users. Independent and authoritative research, carried out for the public benefit, is central to the Foundation's activities.

RAC Foundation
89–91 Pall Mall
London
SW1Y 5HS

Tel no: 020 7747 3445
www.racfoundation.org

Registered Charity No. 1002705
February 2011 © Copyright Royal Automobile Club Foundation for Motoring Ltd

This report has been prepared for the RAC Foundation by Dr Sally Cairns and is based on research completed in November 2010. The report content is the view of the author and does not necessarily represent the views of the RAC Foundation. Dr Sally Cairns can be contacted at scairns@trl.co.uk.

Accessing Cars

Different ownership
and use choices

Acknowledgements

Grateful thanks to all the authors of the material used here, and to:

Marcus Jones	Transport Research Laboratory (TRL)
Clare Harmer	TRL
Ronit Tong	TRL
Elizabeth Box	RAC Foundation
Stephen Glaister	RAC Foundation
David Quarmby	RAC Foundation
Jo Abbott	RAC Foundation
Luca Lytton	RAC Foundation
Philip Gomm	RAC Foundation
Jillian Anable	Aberdeen University
Toby Poston	British Vehicle Renting and Leasing Association (BVRLA)
John Lewis	BVRLA
Henry Ashworth	Cabinet Office
Richard George	Campaign for Better Transport
Antonia Roberts	Carplus
Chas Ball	Carplus
Gordon Stokes	Commission for Rural Communities
David Brown	Department for Transport
Nigel Dotchin	Department for Transport
Graham Riley	Highways Agency
Scott Le Vine	Imperial College London
Jon Parker	Integrated Transport Planning
Tim Dixon	Leeds City Council
Ali Clabburn	<i>liftshare</i>
Marcus Enoch	Loughborough University
Graham Simpkins	Milton Keynes Council
Paul Paton	North Somerset Council
Stephen Potter	Open University
Peter Headicar	Oxford Brookes University
Mark Shearman	South Gloucestershire Council
Bethan Morris	South Gloucestershire Council
Emma Blackham	South Gloucestershire Council
Rebecca Price	South Gloucestershire Council
Chris Miles	South Gloucestershire Council
Peter Sadler	Transport for London
Carey Newson	Transport for Quality of Life
Lynn Sloman	Transport for Quality of Life
Graham Parkhurst	University of the West Of England
Kiron Chatterjee	University of the West Of England
Vinay Gupta	WhipCar
Tom Wright	WhipCar
Dave Gillett	Wiltshire Council

Contents

	Foreword	iii
	Executive summary	v
1	Introduction	1
2	Alternative Ownership / Drive Yourself Solutions	5
	2.1 Overview and summary	5
	2.2 Vehicle rental	8
	2.3 Car clubs	11
	2.4 Neighbour car rental – WhipCar	18
	2.5 Mu and other manufacturer rental models, in association with electric cars	21
3	Lift-Sharing / Drive-Sharing Solutions	25
	3.1 Overview and summary	25
	3.2 National data about car sharing	29
	3.3 Regional assessment of car sharing in Yorkshire and Humber	32
	3.4 <i>liftshare</i>	36
	3.5 Area schemes	39
	3.6 Company and school share schemes	40
	3.7 High occupancy vehicle lanes	48
	3.8 Shared parking schemes	54
4	Taxis / Expert Driver Solutions	57
	4.1 Overview and summary	57
	4.2 Taxis and minicabs	59
	4.3 Shared taxi schemes	63
5	Discussion and Research Recommendations	67
	5.1 Conceptual model for alternative car options	67
	5.2 Research themes	72
	5.3 Research possibilities	77
6	References	79

Foreword

It is often said that the cost of motoring in the UK has fallen considerably over recent years. It is not quite that simple. While purchasing a new or second-hand car has become considerably easier in financial terms because of falling prices, the cost of running a car has soared way above inflation. Maintenance, insurance, and of course fuel, all contribute to make conventional car ownership a burden on the wallet.

Many people do not feel that they currently have much choice about running a vehicle. Very few of us would today claim to drive for pleasure – going out for a Sunday drive is a concept from a different century – but that does not mean our need for mobility has decreased, and for many people, for much of the time, the car is the main way of achieving this. Even in those places where there are reliable and regular bus and train services, these too have often become increasingly expensive.

It is therefore no surprise that a family expenditure survey by the Office for National Statistics shows that transport (and, for many people, that means motoring) is now the single biggest area of household spending, above even food, housing and heating, and recreation.

There is evidence that, as a product of the recession, we have all been driving less, but looking ahead there are forecasts that traffic will rise by a third by 2025, not least because of a large growth in the population. Clearly this is not good for the environment.

Therefore we have two imperatives driving the need to investigate other ways in which we might access motorised transport: meeting targets for cutting CO₂ and preserving the financial wellbeing of the public. Allied to this second point is the need to ensure the least well-off in society retain reasonably priced options that enable them to access the same opportunities as everyone else.

In this report Dr Sally Cairns considers a variety of schemes which are already up and running, including: vehicle rental, car clubs, leasing, lift-sharing and taxis.

While a consumer's decision to use any of these alternatives will primarily be made on the basis of personal factors such as cost and convenience, from a



supplier's point of view it is all about sustainability – financial sustainability. We live in straitened times. There is unlikely to be much, if any, public money to create and operate these models, so they will need to pay their own way. Policy makers will want to see large-scale private sector involvement. Conversely, commercial organisations will demand local and national government get fully behind the businesses they try to establish.

If we really are to see a meaningful shift towards new ways of owning and using cars, then the public and the private need to work together with a long-term and coherent view. This, in itself, will be a challenge.



Professor Stephen Glaister
Director, RAC Foundation

Executive summary

This report examines a range of alternative ways to access cars other than by households simply owning and using their own vehicles – including renting vehicles, getting a lift and taking a taxi. Some or all of these alternative car options potentially offer a number of benefits for sustainable transport policy, such as:

- moving people away from habitual car use, and increasing the incentive for people to consider car use in conjunction with other modes;
- improving social inclusion by providing greater choice to those without access to a car;
- increasing choice and flexibility by providing people with occasional access to cars (or to second cars) on a cheaper basis than personal ownership, which brings particular benefits in areas which have few other options or parking scarcity;
- encouraging more efficient use of road space and/or parking land by reducing the space needed for cars, yielding benefits such as reduced congestion and improved streetscape in urban areas, and helping to improve quality of life;
- both directly and indirectly facilitating the take-up of electric vehicles and other new vehicle technologies;
- enabling people to become non-car-owners, to remain as non-car-owners for longer, or to reduce the number of cars in their household;
- encouraging or enabling people to own or use smaller or cleaner cars where larger, more fuel consumptive ones are not needed;
- providing improved access to rail for longer journeys;
- reducing the resources consumed, or the emissions created, by transport;
- offering relatively popular and cost-efficient alternatives to mainstream car use.

This report is based on an initial, informal assessment of the readily available national literature, discussions with some of those involved in innovative schemes, and feedback from an expert seminar. It examines various specific options, including the following.

Alternative ownership / drive yourself solutions – such as conventional vehicle rental; car clubs (where customers rent vehicles parked locally); ‘WhipCar’ (where customers rent a neighbour’s car); and rental from vehicle manufacturers – possibly in relation to having purchased an electric vehicle, enabling the purchaser to hire a conventional vehicle when needed.

Lift-sharing / drive-sharing solutions – including informal car sharing, formal matching schemes, HOV (high occupancy vehicle) lanes and shared parking schemes.

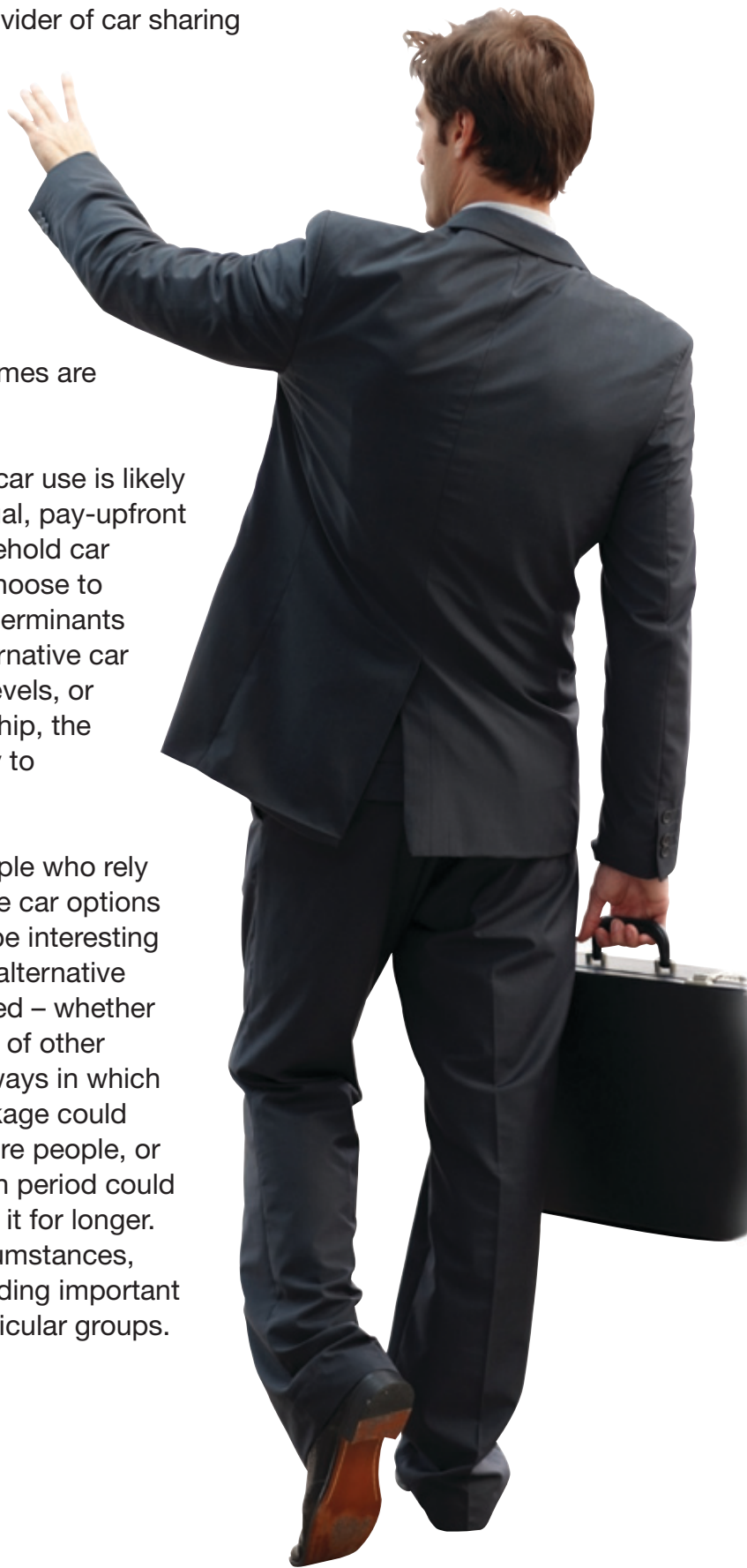
Taxis / expert driver solutions – specifically taxis, minicabs, and shared taxi schemes.

In all cases, there are examples of successful schemes, and many report on substantial growth over time. Notably, there are approximately ten million car rents a year; 23% of all trips are travelled as a car passenger; and 28% of people report that they use a taxi or minicab at least once a month. *liftshare*, a national provider of car sharing matching services, reports that over 399,000 people have registered on its site, whilst Carplus reports that there are approximately 146,000 UK car club members (RAC Foundation expert seminar).

In examining the literature on particular initiatives, various themes are found to emerge.

The first is that ‘pay as you go’ car use is likely to be more ‘rational’ than habitual, pay-upfront car use, and that levels of household car ownership shape how people choose to travel, over and above other determinants of travel choices – hence, *if* alternative car options reduce car ownership levels, or help to prolong non-car-ownership, the environmental impacts are likely to be positive.

Second, there is a group of people who rely on some, or all, of the alternative car options as a matter of choice. It would be interesting to understand further how this ‘alternative car options’ package is perceived – whether it is seen as essential to the use of other modes, and whether there are ways in which an ‘alternative car options’ package could be successfully marketed to more people, or people who adopt it for a certain period could be encouraged to continue with it for longer. It is also clear that in some circumstances, alternative car options are providing important social inclusion benefits for particular groups.



Third, the various alternative car options are potentially synergistic in terms of offering an alternative to mainstream car use. However, it seems likely that those running them are more likely to see themselves as being in competition with each other. A town- or city-wide trial of all of the alternative car options could be valuable in many ways, including the development of collaborative relationships between the providers themselves, and with a public transport operator.

Fourth, the relationship between alternative car options on the one hand, and public transport, walking and cycling on the other, is complex. It seems likely that alternative car options may be the only realistic travel option for people in some circumstances; that they may be cheaper and more environmentally beneficial for the public sector than trying to provide buses in circumstances where ridership would be relatively low; that they will be used relatively rationally, given the 'pay as you go' element; that they may sometimes provide the key access/egress link to public transport; and that they may encourage people to adopt more multi-modal travel patterns. However, it is equally the case that price will be a key determinant and (artificially) cheap alternative car options may undermine public transport; fully loaded cars will still be less environmentally beneficial than walking, cycling or a fully loaded bus or train; and the existence of alternative car options may reduce the incentive for people to try other means of travelling. One route into the balance between these arguments is to consider the questions 'what would people do otherwise?' and 'what did people do before these options existed?'. In many cases, the literature is remarkably silent on these two points.



Finally, the relative lack of public support for – or even discussion about – the promotion or implementation of alternative car options is striking in comparison to the situation with many other areas of transport policy. It is unclear to what extent this relates to a lack of belief that they represent a viable alternative to mainstream car use, and to what extent it is because of concerns about their sustainability credentials. At the expert seminar, a number of ways in which policy could either support or undermine these options were discussed. It seems that more understanding of the appropriate role for the public sector in this area would be beneficial.


This also appears to be an area where further research could be fruitful, given the currently limited nature of the existing knowledge base. Activities could include:

- further review of the literature, including international experience;
- further analysis of existing data sets – for example, the Carplus surveys, the *liftshare* database, or data held by vehicle rental or taxi companies;
- analysis of National Travel Survey data, obtaining special tabulations of information about particular groups of interest;
- more evaluation and monitoring of some of the existing schemes;
- analysis of the household surveys database created for the Sustainable Travel Demonstration Towns, to assess whether there was any difference in the average behaviour change which depended on car ownership levels;
- analysis of the DVLA and VOSA databases of car ownership and typical mileages;
- analysis of fuel consumption per capita in different areas, and the impacts of encouraging car sharing;
- interviews and/or focus groups with those who choose to be non-car-owners or those who are using alternative car options;
- interviews and/or focus groups with the general public – or particular sectors thereof – looking at the potential interest in alternative car options;
- an assessment of the policy support that would help to mainstream these options in a way which optimises their sustainability credentials.

1. Introduction

Across the world, there is increasing interest in reducing car use and car dependency, in order to achieve a range of social and environmental objectives. At the same time, the widespread adoption of car ownership, linked with the evolution of land-use patterns and of social and cultural norms, means that those unable to use a car may suffer various forms of social exclusion. There are a number of powerful arguments in favour of developing, as a society, in a way which is less dependent on cars. However, if cars are going to be an inevitable part of the transport mix, there are also various obvious flaws with the current paradigm of individualistic car ownership and use.





Currently, access to a vehicle relies primarily on personal ownership, with the vehicle then being used mostly for personal needs and those of the owner's immediate family. There are three types of problems created by this approach:

- *Inefficient pricing*: this model of car ownership involves large 'pay-upfront' costs, including a substantial initial purchase price, and large annual payments (road taxes and insurance and annual tests of vehicle roadworthiness such as the UK's MOT). This means that, for any particular journey, car use can seem artificially cheap, compared with means of transport that use 'pay as you go' pricing (such as bus and train fares), potentially 'locking' car owners into a predisposition to use a car (with knock-on effects on their knowledge of and attitudes towards alternatives). This pricing structure also provides less incentive for maximising the efficiency of journeys (for example, through trip chaining or choosing local destinations) compared with the theoretical situation where all costs are reflected in the price of an individual journey. Large pay-upfront costs also cause problems of social equity, potentially excluding those who cannot afford them.¹
- *Inefficient vehicle choices*: the current model means that people often buy vehicles which can fulfil the maximum requirements that they may have, as opposed to those for each trip. For example, they buy a vehicle which is large enough to seat four or five people, with enough space to accommodate the luggage for a family holiday, and which is able to travel at high speeds and for long distances. In practice, for the majority of trips, these specifications are higher than necessary. For example, according

¹ Partly on this basis, Norwich Union offered a 'pay-as-you-drive' insurance policy, with a two-year pilot between 2004 and 2006 and then a formal scheme, which was dropped in 2008. Those involved had a black box fitted in their car, and were billed according to the risk of the mileage that they drove. The scheme was expected to produce savings for low-mileage and younger drivers, and to encourage driving behaviour at less dangerous times (i.e. off-peak daytime). Over 10,000 drivers joined. Discontinuation of the scheme was attributed to two factors: the installation of black boxes by car manufacturers was considerably slower than Norwich Union had predicted (meaning that they had to pay for installation); and, separately, take-up was slower than expected, as many customers were reported to be unwilling to be tracked via the black boxes (Press Association, 2008; Howard, 2008).

to the 2008 National Travel Survey (DfT, 2009a), 60% of journeys are made as a solo driver, average car occupancy is 1.6 people per vehicle, and 93% of car driver trips are less than 25 miles long. This model of car purchase works against the take-up of alternative vehicle technologies, in particular electric vehicles. In addition, larger, heavier vehicles use more fuel and take up more road space than smaller, lighter ones.

- *Inefficient land use*: the current model means that large areas of land are dedicated to parking, with many vehicles being used for a relatively small proportion of the time. Again, this is a relatively inefficient use of space, and is a potential hindrance to designing attractive places to live, work, shop and so on. For example, Europcar (2010) report on research by OnePoll, involving interviews with 3,000 people living in British cities, which found that the average city dweller's car is used for only 4.6 hours a week, meaning that their vehicle is parked for 97% of the time. Equally, low car occupancies represent a relatively inefficient use of road space.

Given these issues, the focus of this paper is the investigation of answers to the following questions.

- Are alternative models of car ownership and use feasible and realistic – if so, what types, for whom, and in what circumstances?
- What are the social, economic and environmental consequences of adopting alternative models of car ownership and use? How will this vary with circumstances?
- What policy measures would lead to the take-up of alternative models of car ownership and use, and optimise the outcomes of their adoption?

To address these issues, the paper explicitly reviewed the available evidence about:

- **alternative ownership / drive yourself solutions** – such as vehicle rental, car clubs, 'WhipCar' and new models of ownership associated with electric cars;
- **lift-sharing / drive-sharing solutions** – including informal sharing, car-share matching schemes, high occupancy vehicle (HOV) lanes and shared parking schemes; and
- **taxi / expert driver solutions** – specifically taxis, minicabs and shared taxi schemes.

Throughout this paper, these are collectively referred to as 'alternative car options' – used as a shorthand to indicate the range of alternative models of car ownership and use that exist, in contrast to the current model of owning and using one's own household vehicle.

In principle, some or all of the alternative car options have the potential to offer a number of benefits to encourage a more sustainable transport policy, such as:

- moving people away from habitual car use, and increasing the incentive for people to consider car use in conjunction with other modes;
- improving social inclusion by providing greater choice to those without access to a car;
- increasing choice and flexibility by providing people with occasional access to cars (or to second cars) on a cheaper basis than personal ownership, which brings particular benefits in areas which have few other options or parking scarcity;
- encouraging more efficient use of road space and/or parking land by reducing the space needed for cars, yielding benefits such as reduced congestion and improved streetscape in urban areas, and helping to improve quality of life;
- both directly and indirectly facilitating the take-up of electric vehicles and other new vehicle technologies;
- enabling people to become non-car-owners, to remain as non-car-owners for longer, or to reduce the number of cars in their household;
- encouraging or enabling people to own or use smaller or cleaner cars where larger, more fuel consumptive ones are not needed;
- providing improved access to rail for longer journeys;
- reducing the resources consumed, or the emissions created, by transport;
- offering relatively popular and cost-efficient alternatives to mainstream car use.

To examine these issues, this paper has been based on an informal, initial review of the readily available national literature on the topic, together with some informal discussions with those responsible for innovative schemes and feedback via an expert seminar on a draft version of this paper, which was held at the RAC on 27 October 2010 (all contributors are listed in the acknowledgements). It is not intended to be a comprehensive literature review – it does not include an assessment of the wide range of relevant international experience, and there are a number of cases where there may be more information or additional UK initiatives that could be included. It is clear that this is a potentially fruitful area for research – there is a growing body of experience, but relatively little formal assessment.

In terms of report structure, Chapters 2, 3 and 4 discuss each of the types of alternative car options listed above. The main findings are summarised at the beginning of each chapter.

Chapter 5 then summarises some of the principal issues and themes that emerge, together with a set of potential research priorities.

2. Alternative Ownership / Drive Yourself Solutions

2.1 Overview and summary

2.1.1 Types of schemes

This section of the report looks at a series of different models of vehicle ownership. They are all effectively different forms of vehicle rental. Specifically, they include:

- conventional car rental (from a vehicle rental company);
- car clubs (rent a vehicle located nearby, via a local club²);
- WhipCar (rent a neighbour's car);
- Mu and similar schemes (rent from a vehicle manufacturer – possibly in relation to having purchased an electric vehicle, enabling the purchaser to hire a conventional vehicle when needed).

Moreover, there are some overlaps between them – for example, a number of rental companies are involved in car clubs.

² Car clubs initially began by offering vehicles close to people's homes. However, they now operate according to a number of different business models, including offering vehicles at employers' premises and at transport hubs.



2.1.2 Findings

Some tentative conclusions from the existing evidence are as follows:

Potential for mainstreaming

Scale and nature – there are 10 million ‘rental acts’ from vehicle rental companies each year. Meanwhile car clubs still comprise a niche market, but a fast-expanding one (with currently around 146,000 UK members). WhipCar and Mu are recent innovations, so likely take-up is uncertain.

Types of users – with most rental models, there are some limits on those allowed to join (for example, those under 21 are often excluded or need to pay more), though these exclusions will not affect the majority of the population. Evidence about users of car rental is limited. Currently, the largest group of car club users are young, male professionals, though other groups are also represented. There is a general belief that car clubs are most successful in dense urban areas with parking scarcity, though also with scope for more informal models in rural areas (partly to combat accessibility problems). Some work in Camden and Islington has suggested that 20–30% of the population there are potential members – and that the profile of car club users may be relatively similar to the profile of those most likely to adopt electric cars. There is scope for considerably more research to establish more information about potential target markets.

Social, economic and environmental implications

Costs – in all cases, for infrequent users, the costs of using any of these models is likely to be lower than owning one’s own vehicle, potentially leading to social inclusion benefits. However, the entry costs may still be non-trivial. It is unclear whether reducing the entry costs would be desirable or not, since undercutting public transport could lead to negative effects; nevertheless, in order to start competing with mainstream vehicle ownership, costs may need to be cheaper.

Cleaner driving – with the exception of the ‘WhipCar’ solution, rental vehicles are typically newer and better maintained than the typical vehicle on the road, so emissions per mile driven are likely to be less. (Even with WhipCar, cars in the scheme must be less than nine years old.) In relation to mainstream vehicle rental, there is a specific argument that the existence of the rental market helps to keep the overall UK car market younger and cleaner, though this needs further consideration.

Effects on use of land – given higher levels of use than for private vehicles (which remain parked unused for large periods of time), all of these solutions are likely to be more efficient in terms of land-take per vehicle-mile travelled.

Effects on vehicle choice (both levels of ownership and types of vehicle purchased) – in relation to car clubs, there is substantial evidence that, whilst some people may be using a club simply as an ‘insurance policy’, on average, the club leads to a substantial proportion of members reducing the number of vehicles owned, or not buying one (with 2009/10 data indicating 85% of members not owning a car, compared with 63% prior to joining). The impacts of the other three initiatives on overall ownership levels are currently unclear. Vehicle rental provides some evidence that the ‘try before you buy’ aspect of renting can affect subsequent vehicle choices, which may be relevant if rental companies pioneer new technologies such as electric vehicles. It is plausible that the existence of rental could encourage people to buy a vehicle more suited to their ‘average’ requirements, rather than their ‘maximum’ requirements, but there is no evidence that this is actually the case.

Sustainable travel habits – research by car clubs suggests that their existence helps to maintain or encourage more sustainable travel habits – car club users make significantly more use of alternative options, and have dramatically lower annual mileages – i.e. access to a car does not turn people into ‘typical car drivers’. However, it is plausible that some forms of rental will compete with public transport – this will depend partly on the relative balance of costs and inconveniences involved in renting a car (in some form) compared with using public transport. Moreover, unless rental vehicles are located in the immediate locality, there may be some access/relocation travel (i.e. people travelling to reach vehicles, and/or vehicles being moved around to match demand and supply). It is unclear whether the scale of this travel is significant or not. It is unlikely to be relevant to car clubs, but may be more important for more mainstream vehicle rental activities.

Role of the public sector

Policy measures – apart from very limited national funding for Carplus, some more substantial support for car clubs from Transport for London (TfL) and some other local authority involvement in promoting car clubs, the public sector’s role in this area has been minimal.

2.2 Vehicle rental

2.2.1 Overview

TRL is currently involved in some research on behalf of the car rental industry, through its trade association, the British Vehicle Rental and Leasing Association (BVRLA). The BVRLA represents three sectors – short-term self-drive rental ('rental'), leasing hire, and commercial fleet management services. TRL's research is focused on the first of these, which is also the sector that is of relevance to this paper.

Rental companies provide cars and vans on short-term hire, for periods from as little as one hour to as much as a month or more. The BVRLA has 300 rental members, though the majority of the market comprises a smaller number of companies (in particular, Enterprise, Europcar, Avis, Hertz, Sixt, Thrifty, Budget and Arnold Clark). According to the BVRLA there are approximately 212,000 rental vehicles in the UK, and approximately ten million 'rents' a year. Vehicle rental is an area in which vehicle manufacturers occasionally get involved, as discussed further in section 2.5.

The rental market is divided into a number of segments – the corporate/personal split is about 60:40. Demand is relatively 'peaky' around Christmas, Easter and the summer, when personal rental rises sharply, although business rental drops off somewhat. The overall increase can be as much as 30%. On an annual basis, the UK market is relatively stable. There are various rental models, including one-way and two-way rents, and services where vehicles are delivered to people's homes. There is also some overlap with car clubs – for example both Hertz (who run the 'Connect' car club) and Streetcar are members of the BVRLA.

2.2.2 Social and economic implications

Costs for participants

Hiring a car on an infrequent basis would usually be cheaper than owning one's own vehicle. However, the costs may still be substantial. In terms of not undercutting public transport, this is probably desirable. In terms of social inclusion, it is likely to be less so (though it is still more inclusive than personal car ownership, not least as it is 'pay as you go').

Effects on vehicle utilisation

It is probable that rental vehicles are parked for less time than average, and that they have higher-than-average occupancy rates, meaning that they represent relatively efficient use of road and parking space.

Effects on vehicle choice

First, it is plausible that knowing that they have the option to rent a (larger) vehicle may affect the type of vehicle that people choose to purchase (i.e. they may purchase a smaller, more fuel-efficient vehicle than they otherwise would have done).

Second, rental vehicles tend to be cleaner in terms of emissions than the average vehicle. According to data recently collected by the BVRLA and covering approximately 70% of rental vehicles, average emissions from these vehicles are of the order of 140–150 g/km CO₂. In contrast, the emissions from the average British car are 176 g/km CO₂, as outlined in section 2.3.

Third, the average rental vehicle is only retained on fleet for seven months, meaning that the existence of the rental market potentially helps to keep to whole car market younger and cleaner than it would otherwise be, since most rental vehicles are then sold into the private car market. The environmental credentials of this claim need some further consideration, since it is important to include the implications of vehicle production in any overall assessment of environmental impacts. However, given that the majority of emissions from cars arise from the use phase (SMMT, 2009), it is plausible that this is a positive impact.

Fourth, there is some survey work suggesting that vehicle rental can affect vehicle purchasing decisions – meaning that where people renting are encouraged to try smaller, cleaner or alternative technology vehicles, this could have positive knock-on effects on purchasing decisions. Specifically, Vacher and Hiptmair (2006) report on some research involving 2,500 telephone interviews with rental customers in 2005, across the UK, Spain, Italy, Germany and France, with the sample balanced to reflect the overall rental market (it should be noted that there is some controversy surrounding this research; nevertheless, the broad thrust of the results is consistent). In relation to the UK sample, they found that 48% expected to buy a vehicle within 12 months, with a further 30% expecting to do so within one to two years. From the whole sample, as a result of renting:

- 74% agreed that the rental experience was a useful way to decide about a potential purchase;
- 43% said that their opinion of the make, and separately, the model had improved (compared with 9% who said it had got worse in both cases);
- 54% were more likely to recommend the make to others (compared with 9% who were less likely to do so); and
- 43% were more likely to add the make to their own shopping list (compared with 16% who were less likely to do so).

Levels of car use and/or car ownership

It is plausible that some people see vehicle rental as an alternative to owning their own vehicle (or having a second vehicle), although there is currently no evidence on this. Where businesses use rental as an alternative to providing people with a company car, this may also have effects on overall ownership levels.

Where rental vehicles need to be relocated to match up supply and demand, the mileage travelled for this relocation process needs to be considered in any overall environmental assessment (and should include movements both of individual vehicles, and of multiple vehicles on transporters). Travel for people to access rental vehicles also needs consideration (for example, people getting a lift from a neighbour).

Links to other forms of transport

There is a non-trivial amount of rental from train stations, indicating the potential for some synergy. LeasePlan in The Netherlands has a vouchers scheme, where vouchers can be used for vehicle hire or public transport. However, it is also possible that vehicle rental means that people travel by car when they would otherwise have used public transport.

To assess this issue properly, more information is needed about the types of journeys that vehicle rental is used for, and how those using rental perceive their options.

2.2.3 Policy measures

The industry perceives that it does not receive any public support. It believes that it has a potential role to play in a more sustainable transport future, and would welcome a more positive public image. For example, the BVRLA argues that possible policy measures that would provide support for vehicle rental include:

- access for rental companies to the incentive/subsidy scheme for low-carbon vehicles;
- access to grants for electric charging points;
- further government tax incentives to give up car ownership, such as reduced VAT on car rental;
- better promotion of / access to car rental facilities at UK airports;
- exemption from the London Congestion Charge;
- inclusion in local and national government travel planning strategies;
- access to the same parking bays/slots as car sharing and car club vehicles.



2.2.4 Conclusions and research priorities

Miles driven whilst in rental vehicles are likely to be less polluting than if they were driven in a personal vehicle, and rental is also more socially inclusive than personal car ownership (since the upfront costs are less). It is plausible, moreover, that there is a group of users who would otherwise buy their own vehicle, or a second vehicle, if rental was not an option – though the data are not readily available to assess this. The biggest environmental concerns probably relate to whether vehicle rental is being used as an alternative to using public transport options, primarily on long-distance trips, and to understanding the scale of access/relocation travel undertaken in relation to rental vehicles.

TRL currently has some ongoing research with the BVRLA, seeking data held by BVRLA members, which will help to inform future research priorities.

However, this work will not cover the views of members of the public – in particular, why people do or do not see vehicle rental as an option for them, what would encourage people to see vehicle rental as a viable option, and so on.

Further investigation of the LeasePlan model in the Netherlands might also be useful. More information is available at <http://www.leaseplan.nl/>, but this has not at the time of writing been analysed.

2.3 Car clubs

2.3.1 Overview

Car clubs provide a form of neighbourhood car rental. Typically, car club members pay an annual membership fee to an operator (of the order of £50 to £100) who provides and maintains a number of vehicles in their locality. Members then pay by time and mileage when they use a vehicle.

The concept of car clubs was imported into the UK from Switzerland and Germany in the late 1990s. (At about that time, they also took off in North America.) The first formal UK car club began in Edinburgh in 1999. Since that time, despite some hiccups, there has been exponential growth. According to Carplus, a charity supporting ‘a rethink in car use’ (including the development of a national network of car clubs), there were approximately 32,000 members of car clubs in the UK in December 2007, 64,000 by December 2008, 113,000 members by February 2010 and 146,000 members by November 2010. Globally, the World Car Share Consortium estimates that there are over 1,000 cities where car clubs are established. Zipcar, a US-based organisation that is currently the world’s largest car club company (and which recently bought Streetcar, the UK’s largest company) has approximately 400,000 members.

In the UK, there are clubs in over 40 locations, though the majority of car club members (87% as of February 2010) are based in London, partly due to support for car clubs from TfL.

In 2004, the existing evidence about car clubs was reviewed in Cairns et al. (2004b). Carplus subsequently began a series of annual surveys in the UK. The first was analysed internally (Carplus, 2008), with the two subsequent waves being analysed by TRL (Myers & Cairns, 2009; Harmer & Cairns, 2010). In 2007, TfL also supported some research on car club membership (Synovate, 2006). The Synovate work included 1,375 online interviews with car club members, whilst the Carplus surveys generated replies from 1,141 respondents in 2007, 5,924 respondents in 2008/9 and 5,328 respondents in 2009/10. Most of the Carplus survey work was also undertaken on line.

Both the Synovate and the Carplus work indicate that car club members are more likely to be male than female (with approximately two thirds of members being male). There is also a predominance of younger people. The 25–34 age bracket accounted for 50% of members in the Synovate work (Synovate, 2006) and for 42% of those joining in 2009/10 (Harmer & Cairns, 2010), whilst only 6% of members in both sets of survey data were aged 55 or over. Comparing survey results over time suggests that the dominance of young male drivers is reducing somewhat, though this is still the main profile. The Synovate work also suggested that car club members were likely to be relatively highly educated (85% or more having a degree); working (92%); and relatively well paid (42% earning £50k or more). With all of this information, it should be noted that the fact that the surveys were conducted online may have affected the results. At the Carplus 2010 Annual Conference, Clark (2010) reported on analysis in Camden and Islington showing that the 'Mosaic' segments 'city adventurers', 'cultural leadership', and 'global connections' were those that were the most likely to join a car club, and estimating that 20–30% of the population of Camden and Islington could potentially become car club members.

In terms of location, there seems to be general agreement that the most fertile territory for car clubs is dense urban areas with parking scarcity. However, Carplus also report on particular interest in including car club vehicles in new developments (sometimes as part of a residential travel plan aimed at fostering more sustainable travel habits), and – based on somewhat different models of operation – in rural areas, where access to cars may constitute a particular social need.

It should also be noted that there are somewhat different models of car club operation. For example, rural models often involve more communal ownership of vehicles and more informal booking systems. In the US, car clubs have often been targeted at university campuses. One new scheme 'Car2Go' has been developed by Daimler. It began in Ulm, Germany and is now operational in three cities in Texas. It is set up such that cars can be hired by the half-hour

and left anywhere in an operating zone, meaning that people can hire them for one-way trips. The environmental implications of the different models may be different. One emerging theme in research being undertaken by Le Vine et al. (2009) is that people dislike having to predict how long they are going to spend at a location – or pay for time when they are not using a vehicle – implying that if car clubs in the UK start to offer one-way services, this could have a significant impact on take-up, and how the vehicles are used.

2.3.2 Social and economic implications

Costs for participants

Joining fees are typically £50–£100. Hourly hire rates typically start at £4–£5. Daily hire rates typically start at £30–£50. Costs tend to be higher for larger vehicles. Informal community clubs tend to have somewhat lower rates.

Impact on vehicle choice

For the 2009/10 survey report, five clubs provided data about the average emissions from car club vehicles. These are summarised in Table 2.1.

Table 2.1: Data about car club vehicle emissions

	Details about emissions
Club i	Average is 110 gCO ₂ /km excluding vans.
Club ii	Average is 136 gCO ₂ /km excluding vans.
Club iii	Standard cars are 98 or 99 gCO ₂ /km, plus some community member cars.
Club iv	10 vehicle types; emissions range from 109 gCO ₂ /km to 150 gCO ₂ /km; unweighted average is 138.9 gCO ₂ /km.
Club v	17 vehicle types; emissions range from zero (electric vehicles), to 182 gCO ₂ /km (including vans). The average, weighted for fleet composition, is 135.2 gCO ₂ /km.

Source: Harmer & Cairns (2010: 20)

Taken together, this implies that typical emissions per car club vehicle range from 99 gCO₂/km to 138.9 gCO₂/km. The midpoint is 119.0 gCO₂/km.

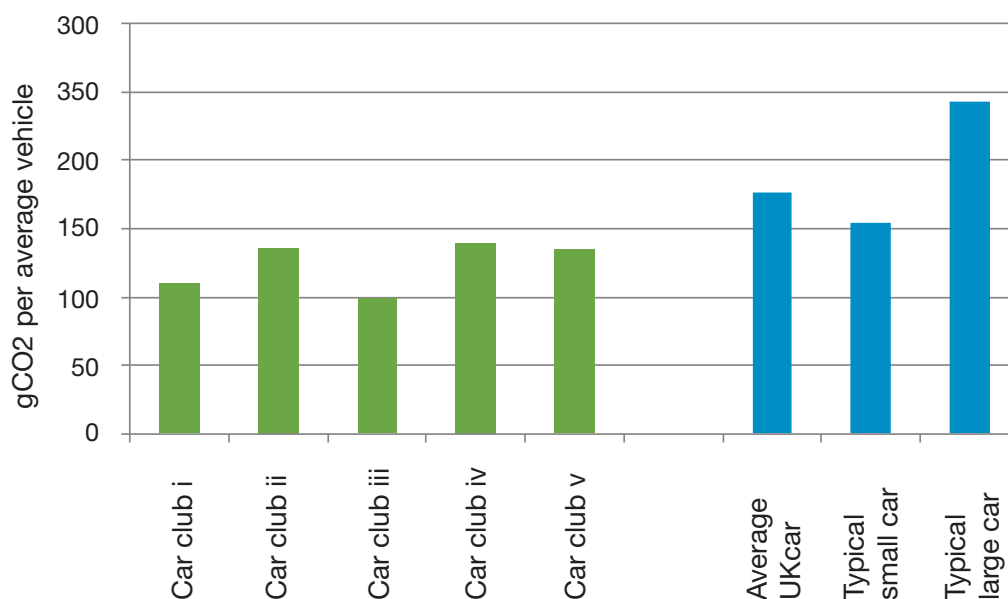
Current Defra/DECC emission factors suggest that average emissions for a UK car are at present 202.8 gCO₂/km, ranging from 177.5 gCO₂/km for a small car to 280 gCO₂/km for a large car.³ It should be noted that these figures include

³ Taken from Defra/DECC (2009) *Guidelines to Defra/DECC's GHG Conversion Factors for Company Reporting. Version 2.0*, <http://snipurl.com/1ujtth> [www_defra_gov_uk]. Produced by AEA for the Department of Energy and Climate Change (DECC) and the Department for Environment, Food and Rural Affairs. These figures are estimated average values for the UK car fleet in 2008 travelling on average trips in the UK. They are calculated based on data from SMMT on new car CO₂ emissions from 1997 to 2008 combined with factors from TRL. These factors are a function of average speed of vehicles derived from test data under real-world testing cycles and an uplift of 15% agreed with DfT to take account of real-world driving effects on emissions relative to the test-cycle based data.

a 15% uplift to take account of the effects of real-world driving conditions on emissions relative to the test-cycle based data. Without this uplift, the figures would be 176.3 gCO₂/km, 154.3 gCO₂/km and 243.5 gCO₂/km respectively.

The data are illustrated in Figure 2.1.

Figure 2.1: Comparing emissions from car club vehicles with average emissions from UK cars



Source: Harmer & Cairns (2010: 21)

On the basis of these data, Harmer and Cairns (2010) argue that car club vehicles are typically 10% to 33% more efficient than the average car.

Impact on personal car ownership

The 2009/10 data suggested that:

- 85% of respondents reported that their household did not own a car after joining a car club, compared with 63% prior to joining.
- 25% of respondents reported getting rid of a car (with very few reporting any increase in ownership), and
- about 30%⁴ reported that they would otherwise have bought a car.

Allowing for potential double-counting and some overlap between those saying they got rid of a car, and that they would otherwise have bought a vehicle, the data implied that about 0.42 cars are disposed of, or not purchased, for every car club member.

⁴ There is a lack of precision in relation to this number, as some clubs offered respondents a 'not sure' option, whilst others didn't.

The 2008/9 data showed similar results – 85% of members not owning a car; an increase in the number of people not owning a car after joining; and a large number of vehicles either disposed of, or not bought, but with a slightly different balance. Specifically, 39% of respondents reported getting rid of a car, whilst about 25% reported that they would otherwise have purchased a vehicle, possibly suggesting some shift in membership profile over time.

In the 2006 Synovate research, the results were, again, similar. The proportion of non-car-owning households rose (from 55% to 76% in inner London); 19% of respondents reported selling a car; and 29% claimed to have deferred purchase.

Impact on car use

Asking about overall car use has proved to be one of the harder issues to address through surveys.

In 2009/10, data from the car club operators were obtained about use of *car club vehicles*, relating to use by 97% of all car club members. The data showed that:

- on average, car club members hire vehicles less than once a month; less than 4% hire vehicles on a weekly basis or more frequently;
- the average mileage driven by a car club member in car club vehicles is of the order of only 290 miles a year (or roughly 400 miles a year if those who never use vehicles are excluded from the calculations of averages).

Meanwhile, the survey of members also asked about *general car use* and found that:

- 79% of members reported travelling by car less than once per week;
- on average, car club members reported making 5 or 6 car driver trips of less than 25 miles each month, compared with 56 for the average licence holder (equivalent figures for London are 4 to 5 trips per month compared with 33);
- implied annual mileages being reported by car club members were relatively low – with the average being 1,500 miles p.a. for 95% of members, 1,900 miles p.a. for 99% of members and 2,400 miles p.a. for all members.

In brief, then, the data suggest that car club vehicles are typically used for relatively low mileages, and that, in general, car club members travel relatively low mileages compared with a typical driver.

Interactions with other forms of transport

In both the 2008/9 and 2009/10 surveys, responses suggested that car club members were more likely to use public transport, walk or cycle than the

general public. Specifically, in 2009/10, for London members:

- 75% reported using a bus at least once a week (compared with 54–56% of London residents);
- 41% reported using a train at least once a week (compared with 16% of London residents);
- 78% reported using the underground at least once a week (compared with 30% of London residents);
- 31% reported using a bike at least once a week (compared with 11–13% of London residents);
- 81% reported walking for 20+ minutes at least once a week (compared with 65% of London residents);
- 39% reported using a taxi or minicab at least once a week (compared with 4–9% of London residents).

Data for London residents were taken from the National Travel Survey and the London Travel Demand Survey. Data for London members are given here, as this is the most meaningful comparison, given the high proportion of car club members in London. The implication of the results is that car club members have relatively mixed mobility strategies. There is also some evidence suggesting that, after joining, on average, members make more use of non-car modes than before. (In practice, of course, there will be substantial variation in the results – with some car club members reducing their public transport use to take advantage of the new car options, whilst others do the opposite – particularly those who reduce their personal car ownership. However, the overall balance of these different choices appears to be broadly positive.)

2.3.3 Policy measures

Car clubs often depend on support from the relevant local authority, in terms of providing on-street spaces in which to park the car club vehicles, or asking developers to make provision for car club vehicles as part of residential travel plans for new developments. In some cases, the local authority is also relatively proactive in promoting car club services. For example, car clubs have been promoted through Richmond's 'Smarter Travel Richmond' project (and this has proved to be one of the more successful elements of their work).⁵ Local authorities are also, in some cases, users of car club vehicles for staff business travel. For example, at Edinburgh City Council, over 600 staff have access to car club vehicles for local trips.

⁵ As part of assessing the first year of the 'Smarter Travel Richmond' initiative, 1,500 Richmond residents and 500 residents in Raynes Park (a control area) were surveyed. The work showed that, after the first year, 61% of Richmond residents were aware of the car club, compared with 12% in the baseline year. (In the control area, the proportion increased from 8% to only 32%.) In addition, the proportion reporting that it was 'very likely' that they would join a car club doubled, from 2% to 4%, compared with no change in the control area. Membership of the club actually grew by 41% (compared with 15% and 27% in two control boroughs) (MVA Consultancy, 2010).

National support for car clubs has involved some funding for Carplus, but has otherwise been limited. Carplus would like to see:

- an extension to local schemes throughout Britain of the type of support given by TfL to London boroughs (TfL partnership funding helps boroughs to establish parking infrastructure, expand awareness at a local level and promote innovation);
- a recognition of the environmental benefits of car club vehicles in the London Congestion Charge, by creating a partial exemption; and
- support for inter-operability in design and operation of public transport, to encourage the integration of car clubs with public transport options.

In terms of synergy with public transport, there have been a number of examples of bus companies and Passenger Transport Executives like West Yorkshire Metro providing ticket discounts or 'trial tickets' to new car club members, though this has largely been on an ad hoc basis. Relative costs of public transport and car club vehicles will obviously be key to their relative attractiveness – though it should be noted that at least one car club operator has argued that good public transport is necessary for car club membership (presumably because the assumption is that otherwise people will just buy their own vehicle, particularly if they do not have a non-car option for their commute to work). Equally, ITP et al. (2004b) concluded that 'joining a car club as a substitute for an existing car or as an alternative to purchasing a car is likely to mean participating in a multi-modal lifestyle if this decision is to be a success'.



Enoch and Taylor (2006) provide a review of the support mechanisms used to encourage car club development worldwide, which identifies many of the measures described above, and gives a number of international examples of the different types of support that clubs have benefited from.

2.3.4 Research priorities

The 2009/10 research identified a number of key issues relating to car clubs. These included the following questions.

- What would have happened next, had the car club not been available? (In particular, how many non-car-owners buy a car earlier than they otherwise might, because they have tried one, and where people say that they would otherwise have bought a vehicle, is purchase delayed or obviated by the presence of the club?)
- How long do people stay members, and what travel habits do they adopt when they leave the club?
- How does joining a club affect travel decisions at particular stages of life? For example, how does joining a club in one's early twenties then impact travel choices later in life?
- Does the car club market comprise particular market segments (e.g. non-car-owners; people wanting access to a second vehicle)?
- Why do some people (about a third of members) join a club but make very little use of vehicles?
- What is the scope for car clubs becoming more mainstream?

Some of these issues – notably 'what would people do otherwise' – will be addressed in the next annual Carplus survey. There are also various types of further analysis that could be performed on the existing data that might provide some useful insights. In addition, it could be valuable to undertake some more in-depth work, looking at the motivations and perceptions of car club members and/or members of the public. Some of this type of work is currently being taken forward by Le Vine et al. (see, for example, Le Vine et al., 2009) and as part of the Civitas Renaissance project in Bath (Chatterjee, 2010; City Car Club, forthcoming).

2.4 Neighbour car rental – WhipCar



2.4.1 Overview

WhipCar was launched in London in April 2010 but now has cars available across the UK. It acts as a mediator between people wanting to borrow a car and people wanting to loan their car. Car owners register their car on the WhipCar website and set rental fees and lease times that they are comfortable with. Eligible drivers can browse the site for a car and a rate that best suits them. A particular feature of the initiative is that WhipCar has negotiated

a special insurance policy that temporarily replaces the owner's existing insurance for the duration of the hire, and provides a replacement vehicle if there are problems. WhipCar also carries out checks on both potential drivers and potential vehicles to ensure eligibility.

Insurance provides some limitations on those allowed to join. Drivers have to be aged between 21 and 70; have held a full driving licence for 12 or more months; have no more than six penalty points on their licence; have no drink driving convictions in the last five years; have no convictions for driving without insurance; and have had no more than two accidents in the previous three years. Owners cannot rent out vans or motorbikes, or cars over eight years old, and vehicles must have valid road tax, MOT (where applicable) and insurance. Vehicles in the highest insurance groups are also excluded, with the *Financial Times* (Bradshaw, 2010) reporting that:

'Whipcar has had to turn away a surprisingly large number of sports car owners. Drivers of Porsches, Jaguars, Ferraris and a Maserati had all hoped to take advantage of Whipcar's system, which lets them set their own price before lending their pride and joy to fully insured and vetted neighbours.'

Clearly, these criteria provide some limits on those able to participate in the scheme. Otherwise, the WhipCar marketing suggests that the promoters are aiming at a broad spectrum of users, and there is a large variety of cars available to hire on the website.

So far, information about the scheme is available from the WhipCar website (www.whipcar.com), and there has been substantial media coverage (including in the *Financial Times*, 2 May 2010; the *Sunday Times*, 25 April 2010; *The Times*, 22 April 2010; *The Economist*, 22 April 2010; *Which?*, 22 April 2010; the *Guardian*, 22 April 2010; the *Independent*, 5 May 2010; and the *Telegraph*, 21 April 2010).

2.4.2 Current levels of activity

As of 13 October 2010 (i.e. within six months of its launch), there were over 1,000 cars registered on the WhipCar system, including 40 different types of vehicles, located in over 300 different towns/cities across the UK.

Data taken from the public website also imply that use of cars is growing. As of 10 June 2010, 9% of cars in London had been reviewed by users, whilst by 12 October 2010, this was the case for 20% of cars in London. (The definition of 'London', it should be noted, has changed over time. In June 2010, vehicles within 120 miles were being identified as being 'in London', whereas by October 2010, the search range had been reduced to 20 miles. As of 12 October, 277 vehicles were identified as being in London.) By October 2010, 29 of these cars had been hired on more than three occasions. It should

be noted that website figures do not include data for people who choose to participate via the 'private' setting, where car profiles are only shared with a closed set of associates. WhipCar also note that once people rent a vehicle, this often becomes a relatively regular behaviour, such that regular users may hire vehicles considerably more than three times.

2.4.3 Social and economic implications

Costs

There are no membership fees for either owners or drivers. Car owners set their own price for renting their vehicle (with WhipCar's Rental Price Guidance™ (RPG) Tool offering recommended prices – based on make and model and on where the car is located.) WhipCar takes a success fee when cars are rented out (15% including VAT of the rental price) and charges the driver a £2.50 booking fee. Drivers also have to pay a charge for fully comprehensive insurance on the vehicle, which is typically £5–£10 a day, depending on the type of car and age of driver.

Current rates for vehicles seem to be between £21 and £99 per day. According to the *Financial Times* (2 May 2010), typical rates in Central London for all types of vehicles are £30 to £40 a day.

WhipCar has a cancellation and fines policy. In addition, it holds £250 excess on the driver's credit card, until the vehicle is returned in a satisfactory state.

Sustainability implications

Data about the impacts of the initiative are inevitably limited, as the scheme has only just started. Part of the rationale is to provide a more efficient model of car ownership. Tom Wright, co-founder of WhipCar, said (in the launch press release):

'We want to make car usage in the UK more efficient and provide a way to reward owners who want to minimise waste and still enjoy the benefits of owning a car. For drivers, we want to evolve the status-quo model of traditional car clubs and rental schemes to provide a local, cost-effective and accessible rental solution.'

Vinay Gupta, the other co-founder of WhipCar, is reported in the *Telegraph* (21 May 2010) as saying (Williams, 2010):

'The number of relatively unused cars on the road has become a real problem for many neighbourhoods. Research has shown that many cars in the UK today are used on average less than an hour per day. Our research also showed that there are many potential renters who would be happy to pay for services if they could be delivered locally.'

If the concept takes off, potential issues include the following:

- How do people access vehicles if they are some distance away?
- Does the scheme have any impact on ownership (for example, people deciding that they do not need their own vehicles; people holding onto vehicles as they become an asset; people choosing to buy newer vehicles so that they can be rented out)?
- How does the scheme affect the overall travel habits of the renters?

2.5 Mu and other manufacturer rental models, in association with electric cars

2.5.1 Overview

One possible development in relation to electric cars could be that vehicle manufacturers start to sell people packages, whereby ownership of the electric vehicle comes with preferential options to rent a conventional vehicle, to allow for the fact that the electric vehicle might not be ideal for, say, a long-distance holiday, due to limitations of size, speed and range.

The Peugeot 'Mu' initiative provides an example of this model, as described below.

2.5.2 Mu

The 'Mu' mobility scheme was launched in France. The scheme allows users to exchange credits (or 'points') for hire of a range of vehicles and accessories (including scooters, bikes, roof boxes and child seats) available from Peugeot dealerships. Following trials in a number of French cities, and in Berlin, Milan and Madrid, it launched in the UK in 2010 at two dealerships in London and Bristol (see www.mu.peugeot.co.uk).

Users pay a membership fee of £10. Typical costs are then £10 for a bike for a day, £40 for a Peugeot 308 for a day, and £140 for a Peugeot RCZ for the weekend. All prices include insurance. Drivers (of cars and scooters of 125cc or more) must be aged over 21, but flat rates then apply regardless of age.

The scheme will be synergistic with Peugeot's iOn electric car, to be launched at the end of 2010 with a range 80 miles and costing approximately £20,000. Reporting is not unambiguous, but it appears that purchasers of the iOn will automatically become members of Mu and may receive credits that can be used to rent vehicles through Mu.



2.5.3 Likelihood of scaling up of this model

The first family-sized electric car on sale in the UK will be the Nissan Leaf, which will be available in limited volumes from about 2011 onwards. The price is £28,990 for an outright purchase – which falls to £23,990, given the current £5,000 consumer discount from the government. In theory, Nissan – or any other future company selling electric vehicles (EVs) – could include a package in a leasing deal which provided for a certain numbers of days' use for a conventional vehicle. However, discussions with those involved in electric cars suggest that there are various issues which may, in practice, make this unlikely in the near future. These are as follows:

- Offering this option will increase the monthly/annual costs of any leasing deal – and the more conventional car days needed, the higher the price. As EVs are already considered relatively expensive, something that makes them even more expensive by comparison with traditional cars is going to be relatively unattractive.
- The limited current range of EVs will still be a problem for a lot of people. For example, the range of the Nissan Leaf will be 80–100 miles, which would not be adequate for many people making weekend trips to visit family or friends. Hence, they would need a deal incorporating both weekend hire as well as hire for occasional holidays – again, a relatively expensive leasing deal could be the outcome.



- There are a quite a lot of potential EV buyers who would not need this kind of deal and would not therefore need to incur its additional costs – two-car families could use an EV for short journeys and daily commutes, keeping the traditional car for weekends and holidays. Meanwhile, company fleets (a major part of the new car market) could have some EVs on their fleet while again keeping traditional cars for longer journeys. So, arguably, there is a big enough potential market for EVs in the early years (given that initial production volumes will be modest) for manufacturers not to need to offer this kind of package to the ordinary motorist.

These issues are undoubtedly significant. However, it is interesting to speculate on the potential development of this model, perhaps initially as the development of a series of niche markets. For example, it could be that those who initially become owners of electric vehicles as second vehicles like them enough (for example, due to the reduced running costs) to make them their main car, and they then start considering other options, such as vehicle rental, for longer-distance trips. Alternatively, there may be particular groups of people who do not make many long-distance journeys a year, who would find such an offer attractive; or employees, who are given an electric car as their company vehicle, and who would then want to rent a conventional vehicle for non-business use.

Halsted (2010) comments that, in relation to trials of an electric car club vehicle in Camden, ‘range anxiety’ is already an issue, and that people are choosing not to hire the vehicle for journeys where it would actually be adequate, just in case there are problems. Carroll (2010) also reports on similar evidence emerging from a six-month electric vehicle trial.

One interesting finding is that, as noted in section 2.3.1, the profile of early adopters of electric vehicles may be similar to that of those most likely to join car clubs.

2.5.4 Conclusions and research priorities

In theory, there are potential synergies between electric vehicles and new models of ownership. The types of people attracted to both may be similar. In addition, the limitations of electric vehicles may mean that people need to look at other types of vehicles for certain types of journey, potentially promoting more ‘rational’ car use. However, the current relatively high purchase costs of electric vehicles may make people reluctant to pay upfront for options that are add to the expense; furthermore, if electric vehicles are largely purchased as second vehicles or pool cars, their impact on current patterns of ownership and use is likely to be limited. Ironically, the model whereby people buy a package of a specific vehicle with extra leasing options might be more appropriate for an existing small car. However, we are not aware of any manufacturers that currently offer this option.

There are a number of general issues that are of relevance. Amongst the questions arising are the following:

- How important is size when people decide what to buy? Do they go for maximum or average requirements? This issue is receiving increasing attention in relation to discussions about the market for electric vehicles.⁶
- Is it possible to segment the population by their patterns of car use (for example, numbers of short versus long trips; city dwellers versus other)?

6 Anable and Schuitema (forthcoming) recently reviewed the literature about the attributes that people consider when they buy a car, including an assessment of five studies which had ranked the different attributes. Two of these included a measure of 'size/practicality'; this attribute was ranked first in one study, and second (after price) in the second.



3. Lift-Sharing / Drive-Sharing Solutions

3.1 Overview and summary

3.1.1 Types of schemes

This section looks at people sharing cars for particular journeys. This can occur in a range of formats, and may be promoted in a variety of ways. Informal sharing has always taken place, particularly between family members, but also through people helping others out, including, at the extreme, the now dying practice of hitch-hiking.⁷ Meanwhile, there is a long history of observing that typical car occupancy is relatively low, and that measures to increase it could lead to more efficient use of road space. Specifically, for example, the company *liftshare* has defined its aim as being to increase occupancies from 1.6 to 2.0 people per vehicle.

⁷ Chesters and Smith (2001) attribute this decline to the rapid growth of car ownership and access (leading to the increasing perception of hitch-hikers as deviant and dangerous); the enhancement of the privacy of car driving by new safety and comfort technologies; an erosion of a sense of obligation and reciprocity amongst former army conscripts and people sympathetic to them (including ex-hitch-hikers-turned-drivers); and a more general increase in the perception of other people as risky.



liftshare also highlights the scale of impacts that a small increase in car sharing could have – noting that between 2007 and 2008, vehicle occupancy increased from 1.56 to 1.60, which, if car passenger kilometres had remained unchanged, would have been equivalent to a saving of 11 billion passenger kilometres, the same reduction as would be caused by a 20% increase in rail use.⁸

Attempts to encourage sharing fall typically into two main categories. These are:

- Measures to directly encourage people to share, including:
 - schemes run nationally or internationally to encourage sharing for specific journeys;
 - schemes run at a local or regional level to encourage people in the same locality to share;
 - schemes run by employers or schools to match up their employees or pupils.

- Measures to provide preferential conditions for sharers, including:
 - high occupancy vehicle lanes; and
 - sharer parking.

Many of the issues associated with lift sharing were discussed in the 2004 Smarter Choices report (Cairns et al., 2004b), and the material reported here draws particularly on that report, as well as on newer research, including several reports by ITP (ITP et al., 2004a; 2004b; ITP, 2010).

As well as the types of initiatives described above, there are also specialist sharing schemes – such as community-organised schemes to give lifts to elderly people needing to get to hospital. The evidence about those sorts

⁸ Specifically, in 2007, according to DfT (2009a) there were 685 billion kilometres travelled as a car driver or car passenger, which would be equivalent to 439 billion vehicle kilometres with an occupancy of 1.56, and 428 billion vehicle kilometres with an occupancy of 1.6 – a difference of 11 billion. In 2008, there were 51 billion passenger kilometres travelled by rail. In practice, between 2007 and 2008, the data indicate a fall in total kilometres travelled as a driver or passenger of 2.9% (to 679 billion passenger kilometres), albeit that this was smaller than the decline in the distance travelled as a car driver (which was 4.0%). Total motorised vehicle kilometres reduced by 4.1 billion over the period.

of schemes is not reviewed here, although could potentially form a useful extension to this study.

3.1.2 Findings

Some tentative conclusions from the existing evidence are as follows.

Potential for mainstreaming

Scale and nature – nationally, a large proportion of trips (23%) and distance (29%) is travelled as a car passenger. Work in the Yorkshire and Humber region suggests that 68% of people share a lift with someone who does not live in the same household at least once a month. In terms of membership of formal schemes, *liftshare*, which provides many schemes nationally, reports that over 399,000 people have registered, representing about 1% of the UK population of working age. Meanwhile, some formal schemes report on significantly higher levels of participation. One case study of promoting car sharing through the workplace found that the company had encouraged nearly 70% of staff to register for its schemes, with a number of other workplaces reporting involvement of 20–30% of staff; one successful school had managed to get 16% of pupils to formally car share; and reports of the Milton Keynes scheme have suggested that 8% of those parking in the central area were part of the formal scheme. Evidence from many of the company schemes, *liftshare*, Car Share Devon, the HOV lanes in Leeds and South Gloucestershire, and the Milton Keynes parking scheme all also show ongoing growth over time. It is also clear that there must be considerable potential for further growth, since 68% of journeys registered on the *liftshare* website and 75% of members of formal schemes surveyed in the Yorkshire and Humber schemes have not been matched. According to reports from Yorkshire and Humber, company schemes, and the South Gloucestershire HOV, sharing in groups of three or more is also reasonably common.

Types of users – informal sharing is more common amongst the young, the old and women. Whilst more informal sharing is done by people within the same household – and is therefore more common in households which own a car – when sharing with people from other households, levels of sharing are higher amongst those in households without a car. The Yorkshire and Humber study also found different patterns of sharing by different age groups – younger people were more likely to share with friends; older people were more likely to share with neighbours; whilst those without a car were more likely to be sharing with relatives. Moreover, informal sharing is more likely to be for shopping or leisure, on a relatively infrequent and unpredictable basis. In contrast, the largest membership of formal sharing schemes comes from the 25 to 44 year-old age group, with a high proportion of shared journeys being a regular arrangement for the commute to work. It seems that formal car-share schemes may be particularly appropriate for employers located on sites with poor public transport and large catchments, and that there is a niche role for schemes

for private schools with large catchments. Bonsall et al. (2002) also identify a number of other specific situations where car sharing could be successful.

Social, economic and environmental implications

Costs – most of the car-sharing literature highlights that sharing can ‘halve your car costs’, although Bonsall et al. (2002) argue that sharing petrol costs has relatively little impact on overall costs, given the high proportion of car costs which are fixed. They also argue that car sharing is usually more expensive than taking public transport when the fixed costs of car use are taken into account – whilst also clarifying that this conclusion may be dependent on the methodology used for calculations.) There is also a strand of work indicating high benefit–cost ratios for car-sharing schemes. Notably, Fellows and Pitfield (2000) report that, if a scheme were to be set up in the West Midlands, ‘even with the most conservative estimates of car-share participation, net benefits would be comparable to those produced by major road schemes’. *liftshare* also quote recent work evaluating 21 public schemes, from which they estimated an average benefit–cost ratio of 72:1. Forthcoming research from the Department for Transport (DfT) is also expected to give positive benefit–cost ratios for car sharing (see <http://snipurl.com/1v29ec> [www_its_leeds_ac_uk]). *liftshare* also highlight that car-sharing schemes may represent a relatively cheap policy option – quoting one scheme which has involved a total investment of £25,000 and which has generated 142,000 shared trips in the last 12 months.

Environmental and social impacts – car sharing will, almost always, lead to environmental gains, *if the alternative is two single-occupancy car journeys*. However, there is a relative scarcity of evidence in the literature about what people were doing before they car-shared, or what they would do otherwise. The work by ITP (2004a; 2004b) about car sharing at employers suggests that car sharing is sometimes synergistic, but at other times in competition, with other means of transport. Equally, the *liftshare* data highlight that new sharers may be either people who were previously single occupancy drivers, or people who were previously using other modes. It could be valuable to understand how the balance changes with circumstances and scheme details – and how the policy context, or supporting measures, can help to maximise the likelihood of positive outcomes. The work by Smith and Emmerson (2009) particularly highlights the potential value of car sharing in situations where more sustainable transport options are not available. Meanwhile, it is notable that both the Leeds HOV lane and the Milton Keynes parking scheme report on increases in bus patronage associated with their schemes.

A number of those involved in promoting car sharing also report on a number of social benefits – such as reduced social exclusion in rural areas; enhanced community cohesion; and improvements in quality of life for participants. One seminar participant



reported that some of those involved in schemes go from being ‘suspicious’ to ‘evangelistic’ about the benefits of car sharing, as a result of positive experience from being involved in schemes.

Role of the public sector

Policy measures – formal promotion of car sharing through matching schemes is becoming increasingly widespread – although the Yorkshire and Humber work suggests that the local authority input to such schemes, in terms of staff time and resources, is often very little. Meanwhile, the implementation of priority road space or parking regimes is remarkably limited. In a recent meeting at the DfT, representatives of the car-sharing industry argued for:

- higher-profile inclusion of car sharing in guidance to local authorities, including more emphasis on marketing the schemes rather than just setting them up;
- changes to TransportDirect, to include car-sharing schemes (thereby providing a single platform for integrating information about car sharing, without individual operators needing to directly share data, and providing a ‘one-stop-shop’, with more critical mass, for the public);
- funding for an accreditation body for the car-sharing industry;
- more national marketing about the value of car sharing;
- more HOV lanes, sharer parking schemes and, perhaps, a ‘car-share demonstration town’; and
- more research on the impacts and benefits of car sharing, to help make the case to sceptics.

It was also argued that concerns about ‘liability’ are often a major issue for public organisations interested in promoting car sharing – although there is no experience of a public organisation being found liable for a problem resulting from a car-share scheme; and that government would need to avoid introducing excessive regulation before being prepared to increase its promotion of car sharing – for example, *liftshare* report that new rules on child booster seats reduced the number of parents interested in their school car-sharing scheme, and that subsequent proposals for more vetting of those involved made the scheme unviable.

3.2 National data about car sharing

3.2.1 National Travel Survey information

According to the 2008 National Travel Survey (DfT, 2009a), car occupancy rates have remained fairly stable since 1995/97 at around 1.6 occupants per car stage. Occupancy rates vary considerably by purpose of journey, being lowest for commuting and business (1.2) and much higher for holidays / day trips and education (2.0). Data for different journey purposes are given in Table 3.1.

Table 3.1: 2008 National Travel Survey data on vehicle occupancy

	Average occupancy	Single occupancy rate (%)
Commuting	1.2	84
Business	1.2	84
Education	2.0	36
Shopping	1.7	48
Personal business	1.5	67
Leisure	1.8	51
Holiday / day trip	2.0	40
Other	2.0	33
Total	1.6	60

Source: Department for Transport (2009a: 60)

On average, 23% of trips and 29% of distance travelled are travelled as a car passenger. The average car passenger trip is 8.7 miles long, compared with 8.5 for a car driver trip, and the distribution of trip lengths is relatively similar.

The proportion of trips made as a car passenger is higher for younger and older age groups, and for women (28% of trips) compared with men (18% of trips). These data are shown in Table 3.2.

Table 3.2: 2008 NTS data about the percentage of trips made as a car passenger in different age groups

	All	Men	Women
<17	55	55	56
17-20	27	23	31
21-29	15	12	18
30-39	12	8	15
40-49	12	7	16
50-59	14	6	22
60-69	18	7	30
70+	23	9	36
All	23	18	28

Source: Department for Transport (2009a: 35)

On average, those in households without a car make 99 trips as a car passenger each year, compared with 255 for those in households with a car. Meanwhile, in relation to income, those in the third and fourth income quintiles make more journeys as a car passenger (252 and 240 trips per year, respectively), than those in the lowest, second and top income quintiles (199, 219 and 218 trips per year, respectively). However, the distance travelled as a car passenger increases straightforwardly from those in the lowest income quintile (1,466 miles a year) to those in the highest income quintile (2,268 miles a year).

3.2.2 Review by Bonsall et al. (2002)

In 2002, Bonsall et al. reviewed the viability and potential scope for car clubs and car sharing in England, for the DTLR and the Motorists Forum. One interesting feature of his work was the identification of those most likely to be engaged in car sharing. Specifically,

‘The populations which are most likely already to be engaged in informal car sharing are:

- Close-knit communities (well-established networks, stable populations, large families, high proportion of people employed by one employer);
- Areas with low car ownership which have poor public transport and an absence of local facilities (making it difficult to function without a car);
- Areas where trip patterns are amenable to lift giving (significant amount of travel from areas with a relatively dense pattern of origins to other areas with a relatively dense pattern of destinations);
- Areas where high parking charges, or HOV facilities, offer an effective incentive for car sharers.

The populations which offer the greatest scope for organised car sharing are:

- Areas which have the characteristics noted above, but which do not already have a well developed network of informal car sharing. Potential reasons for there being no established networks include:
 - the population includes a large proportion of newcomers or visitors;
 - the travel patterns are relatively new (e.g. new development, changed patterns of employment, recent loss of local facilities); or the public transport services have only recently been withdrawn.
 - Areas where a change in transport policy is likely to favour car sharing (e.g. introduction of HOV facilities, reduced availability of cheap parking facilities).
- Areas where an employer, or group of adjacent employers, is motivated to encourage car sharing (e.g. to reduce the need for on-site parking spaces, to attract non-car-owning employees, or to comply with planning regulations).’

3.3 Regional assessment of car sharing in Yorkshire and Humber

As an overview assessment of the potential for car sharing, a major study has recently been undertaken in the Yorkshire and Humber region by ITP (ITP, 2010; Parker et al., 2010).

The study found that there were approximately seventy schemes in the region, mostly run under ten major 'umbrella' schemes. They were mostly run by *liftshare*, and with a total of about 18,000 members (representing 0.5% of the 16- to 74-year-olds in the region). The amount of evaluation evidence from any of the schemes was limited. The study therefore involved surveys with formal sharers, informal sharers, and some focus groups with non-sharers. It also involved an assessment of the marketing and promotion of schemes, and ways in which that could be improved.

3.3.1 Survey results from formal and informal sharers

As part of the research, 594 interviews were undertaken with those living in rural parts of the region. Of these, 0.5% of the interviewees were a member of a formal car-share scheme, 68.2% (405 in number) reported that they shared a journey at least once a month with at least one other person that did not live in the same household, whilst 31.3% reported that they did not do so. Further questions were then asked of the 405 informal sharers.

Meanwhile, an online survey of members of formal car-share schemes was also undertaken, resulting in 370 respondents, of whom 91 either were formally sharing or had done so in the past.

The responses from the two sets of surveys can be compared, and show marked differences between formal and informal sharers, as illustrated in Table 3.3.

In particular, informal sharers were more likely to be female; there were a significant proportion aged 55+ and who were not working who were regularly sharing; shopping and leisure were the most common journey purposes; sharing was of variable frequency; two thirds had a 'usual driver'; arrangements were usually made by phone or face-to-face; dominant reasons were 'makes sense as making the same journey', 'convenient' and 'cheaper'; and three quarters were 'very satisfied' with their arrangements.

In contrast, formal sharers were predominantly under 55; 90% were in full-time work and 92% were sharing for the journey to work; most were sharing at least once a week (and usually more than this); 52% shared the driving; 55% had a set routine; principle reasons were 'makes sense as making the same journey', 'cheaper' and environmental/congestion concerns; and whilst most were satisfied, less than half were 'very satisfied'.

Table 3.3: Comparing results for formal and informal sharers

		% active informal sharers	% active formal sharers
Gender	Male	39	52
	Female	61	48
Age	16-24	6	9
	25-34	9	33
	35-44	18	26
	45-54	20	21
	55+	46	12
	Employment status	Full-time	35
	Part-time	15	9
	Retired	33	0
	Other	17	1
Journey purpose	Work	22	92
	Education	6	1
	Shopping	33	0
	Leisure	27	1
	Visiting friends or relatives	6	5
	Other*	7	0
	Journey frequency	5+ days a week	16
	2-4 days a week	24	47
	About once a week	26	9
	Less than that but at least once a month	28	3
	Less than that	5	7
Driving arrangements	Take it in turns	35	52
	'Usual' driver	65	47
Lift arrangements**	Set routine	24	55
	Telephone	50	31
	Face-to-face	34	47
	Text	9	40

	Email	1	25
Main reasons for sharing**	No alternative	10	18
	Makes sense as we make the same journey	24	75
	Less stressful	1	16
	Enjoy the company	13	21
	Cheaper	33	73
	Faster	3	19
	More convenient	24	27
	Parking provided for me	1	20
	Environmentally better	5	57
	Important to reduce no. of cars on the road	1	48
Satisfaction levels	Very satisfied	76	47
	Satisfied	19	43
	Neutral	2	10
	Dissatisfied	1	0
	Don't know	1	0

* Includes medical visits and church.

** These categories do not sum to 100% as more than one answer was permissible.

Source: Parker et al. (2010)

3.3.2 Further details on informal sharing

Levels of informal sharing with people from another household were greater in the more remote rural areas surveyed (71%), compared with the accessible rural areas and urban hinterlands; they were also greater amongst those without access to a car than in the case of those who did.

Informal sharers reported that they usually shared with friends (49%), relatives (37%), work colleagues (20%), neighbours (11%) and schoolchildren (2%). Further analysis showed that those without access to a household vehicle were more likely to share with relatives (62%) and less likely to share with friends (38%) and neighbours (0%). Higher proportions of people in the youngest age group (16–24) were informally sharing with friends (74%) and relatives (52%), whilst car sharing with neighbours peaked in the oldest age group (24% in the 75+ age group). Sharing with work colleagues was greatest in the 25–34 and 35–44 age groups (33% in each case).

The majority (63%) of respondents either approached, or were approached by, the other sharer. However, in 30% of cases, the initial suggestion was made by a third party (usually a friend, relative or work colleague). Those without access to a car were *less* likely to initiate the initial approach.

Only 8% of informal sharers reported that they were interested in making additional journeys as a sharer. Of these, the two main purposes for which respondents would like to make journeys as a car sharer were work (37%) and leisure (31%).

Only 13% of informal sharers reported that they were aware of formal car-share schemes in the local area, and even 30% of these could not actually recall the name of the scheme in question. The three main sources of information about formal schemes were word of mouth (21% – mostly from work colleagues); newspaper articles and advertising (20%); and roadside/billboard advertising (15%). Respondents who rated their chances of using a formal scheme as likely or very likely amounted to 15%, with 70% rating them as not likely. The main barriers were reported to be: ‘happy with current arrangements’ (32%); ‘concerns about sharing with someone you don’t know’ (18%); and ‘unlikely to find a suitable match due to diverse destinations’ (13%). However, 16% stated that ‘nothing’ would discourage them from using a formal scheme.

3.3.3 Further details on formal sharers

Of formal sharers, 90% belonged to only one scheme, whilst 10% belonged to two or more. Membership of open schemes (52%) was slightly higher than of closed schemes (45%), with the nature of some schemes not known. Membership of closed schemes was more common by older age groups (54% of 55- to 64-year-olds), whilst the converse was true for open schemes (56% of 16- to 24-year-olds). Of closed scheme members, 69% found out about it through promotion at work. This was also the most common means for open scheme members (39%) and was followed by road signs (21%) and the internet (21%).

The proportion of all members reporting that they had never formally car shared was 75%. Only 17% were currently actively car sharing, whilst 8% had previously car shared, but had stopped doing so. Gender and age made little difference to levels of take-up. Members were more likely to arrange partnerships through an open scheme, but those organised through a closed scheme were more likely to persist, resulting in similar levels of current sharing (i.e. 17–18%).

Of those who had, or were, sharing, 90% had one car-share arrangement, whilst 10% had more than one arrangement. The majority, 77%, were sharing with one other person, whilst 23% were part of a group of three or more. The proportion of journeys that involved a car sharer who was not a work colleague, friend or relative amounted to 45% of those made in an open scheme and 22% of those in a closed scheme.

Of those who had stopping formally car sharing, 47% said that it was because they 'lost their car sharing partner'; 23% because it became inconvenient to do so; 13% changed employment; 13% moved house; and 13% changed to walking or cycling. (Giving multiple reasons was possible.)

The principle reasons given for not sharing, or not sharing more, were lack of suitable partners (cited by 76% of non-sharers) and variability of work hours (74% of those currently sharing). Interestingly, the group most concerned about sharing with someone they did not know were those who had stopped sharing (of whom 15% cited this reason). Those who were currently sharing were much more satisfied with their scheme than those who had registered but never car shared, indicating that a lack of matches was the main cause of dissatisfaction with schemes.

3.3.4 Focus groups with non-sharers

A final strand of the research involved four focus groups with car drivers who usually travelled alone, to explore what would encourage them to car share. The study found that this group was willing to share when it suited them, or to help out those in the community without access to a car. However, the biggest barrier to more sharing was perceived to be loss of convenience, combined with concern about becoming locked into an arrangement 'forever'. Other major concerns related to safety and insurance. There was little awareness of the online schemes in the region, and they were generally perceived negatively, although some participants said that they would consider joining a workplace scheme. There was also some interest in safe and cheap places where car sharers could meet and leave one of the cars.

3.3.5 Other study recommendations

Other findings of particular interest from the study included recommendations to consolidate the operational schemes in the area (on the grounds that it affects customer recognition, and because people were failing to find matches despite making the same journey – for example, two commuters would fail to find a match if one joined a scheme based on their home, whilst another did so based on their workplace); and to develop the skills and expertise of staff involved in operating and promoting the schemes (not least since car sharing forms often only a small part of the roles of those currently responsible for it).

3.4 *liftshare*



liftshare is only one of a number of car-sharing software and service providers (with others including CarShare Online, Jambusters and RideShark). However, it has a particular status in being the largest car-share network in the UK, dating back to 1997, and operating a number of strands. These include its general international *liftshare* database; separately branded schemes for particular

communities or organisations or events, including some where access is restricted ('closed schemes'); and a range of 'BUDi' schemes (which match people for walking, cycling and taxi use). High-profile branded schemes include those for Glastonbury, Heathrow Airport, Cambridge University Hospitals Trust and Devon County Council (discussed separately in section 3.5.1).

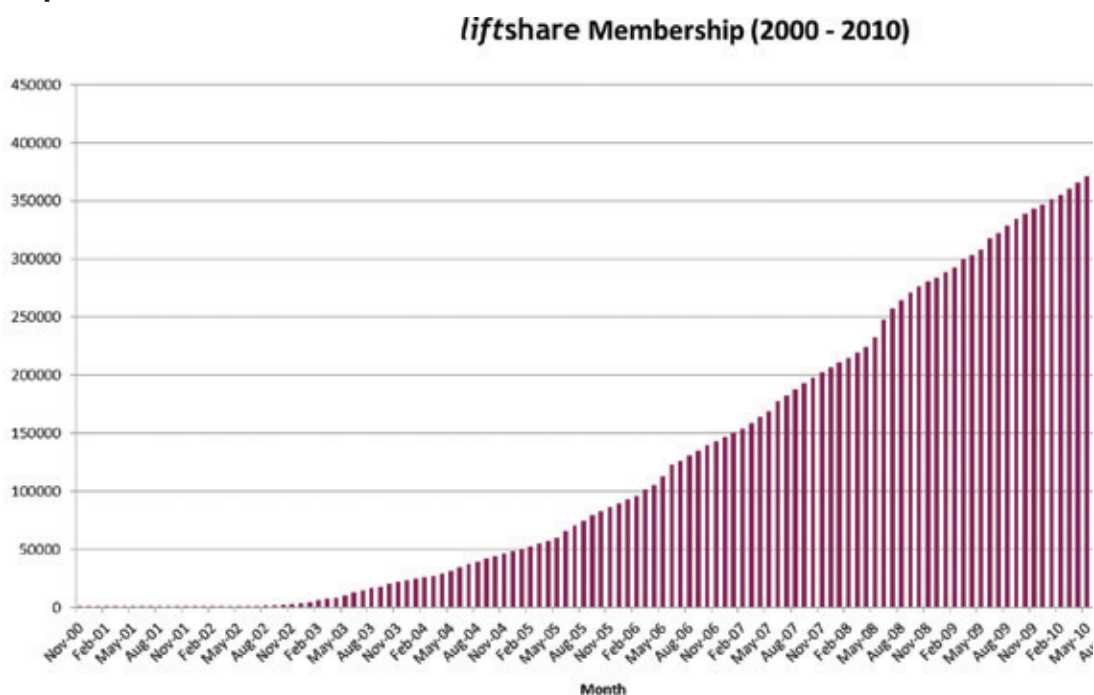
Through *liftshare* websites, people register if they want to share particular journeys (as either passengers or drivers). The scheme is free to both parties (since *liftshare* is non-profit making, and funding is generated through payment for the branded schemes that it creates for particular organisations.) However, participants are encouraged to share the costs of the journey they make, thereby usually providing cheaper travel for all involved, compared with the situation where journeys are made separately.

As of 15 October 2010⁹, *liftshare* was running approximately 1,300 specific schemes for employers and communities. Over 399,000 people had registered on the site since 1998, of which about 259,000 were currently using the system to find a partner. In general, the proportion of registered journeys resulting in a match being contacted was 32% (which is remarkably similar to the figure – 34% – given in 2004). Of those, 45% of those journeys (14.4% of the total) were then being shared. For the next 12 months, there were nearly 75 million one-way trips registered on the system (note that one regular shared commuting trip would be recorded on the *liftshare* system as 472 one-way trips, or two trips every day, five days a week, for 47.2 weeks). In the next year, based on current levels of sharing, *liftshare* were estimating that 324 million miles of travel will be avoided, and that this would save up to 106,000 tonnes of CO₂ (assuming that all shared trips replace single occupancy vehicle trips, with an average of two sharers). In personal correspondence, *liftshare* quote recent work evaluating 21 public schemes, in which they estimated an average benefit–cost ratio of 72:1 (based on reductions in congestion, CO₂ and NO_x).

Growth in membership is shown in Figure 3.1. *liftshare* also report on particular surges of growth following the 2005 London bombings, the recent volcanic ash problems and increases in train prices.

9 Data taken from 'live stats' on www.liftshare.com and correspondence with *liftshare*.

Figure 3.1: Growth in *liftshare* membership between January 2001 and September 2010



Source: *liftshare*

liftshare ask all people adding a journey about how they would otherwise make that journey. For Q1, 2010, the results were as given in Table 3.4.

Table 3.4: *liftshare* data about how people would otherwise make their journey (Q1 2010)

	Number of journeys	% of sample
Drive on my own	14266	63
Drive 1+ passengers	982	4
Get a lift with someone	549	2
Bus	2309	10
Train	2557	11
Cycle	495	2
Walk	227	1
No other options, other options too expensive, or other options would take too long	929	5

Source: Cairns et al. (2004b); *liftshare.com* and private communication

It is likely that these figures could vary for closed versus open schemes, by journey purpose, and by other characteristics; further exploration of these data could generate useful insights.

The information in this section is taken from Cairns et al. (2004b), the *liftshare* website and personal correspondence with *liftshare*. In addition, there have been several pieces of research undertaken on the *liftshare* data. For example, Richards et al. (2008) report an analysis of data from the 37,000 subscribers to *liftshare* in 2006. Key findings were as follows:

- *liftsharers* were most commonly young adults (with 49% being aged 26–40), with 95% aged between 20 and 60; 47% were female and 16% did not hold a full driving licence.
- 40% were seeking a lift, with 45% looking to share, whilst only 15% were offering a lift. However, commuters, education and business travellers were more likely to be looking to share, whilst event or leisure travellers were more likely to be seeking a lift.
- 76% were sharing for the commute journey, with 94% of this group making journeys daily or weekly, having an average trip length of 37.1 miles.
- Younger people (aged 16–25) were more likely to be using the service for event or leisure travel, over longer distances, and as a one-off or occasional journey.
- Men were more likely to lift share over longer distances, whilst women were more likely to lift share for regular (daily/weekly) journeys over shorter distances.
- 64% of members heard about the service through online services, whilst 15% heard through word of mouth.

3.5 Area schemes

Many local authorities have set up schemes specifically branded for their area, sometimes county-wide, sometimes focused on particular towns or cities. In this paper it has not been possible to review all of these schemes, and data about impacts are often very limited. However, one of the larger examples is given below, as the information was readily available. (The car-sharing scheme for South Gloucestershire is also discussed in section 3.7.2.)

3.5.1 Car Share Devon

As reviewed by Cairns et al. (2004b), Car Share Devon was launched in March 2003. It is provided by *liftshare*, and covers the whole of Devon. It is run by Devon County Council, in collaboration with Plymouth City Council and Torbay Council. It includes a number of public access sub-sites, and a number of closed sub-sites, relevant to particular interest communities or organisations in the area.

At launch, it was extensively marketed by various means including 40 temporary road signs on regular commuting routes; 'saucy' radio adverts; 116

bus-back adverts; adverts on the back of car park tickets; 5,000 leaflets sent out with NHS Trust wage slips; leaflets sent to all staff at Plymouth University; contact with 511 larger employers each having more than 50 staff; publicity on all outgoing council-franked mail; displays at the Devon County Show and in large libraries; and a message from the Chief Executive of Devon County Council placed on the bottom of wage slips for all 24,000 staff.

By May 2003, 388 members were registered. This was seen as being rapid take-up, partly attributed to the marketing work. Most of those registering seemed to be interested in finding matches for regular trips to work and further education. The TravelWise officer reported that it was one of the most effective things she had done, and that she felt car sharing was particularly appropriate for large rural local authorities such as Devon. By June 2004, 1,673 members had registered. In February 2010, there were reported to be more than 7,300 members, with about 120 people joining in January 2010 following a free prize draw for new registrants, (Devon County Council, 2010).

3.6 Company and school share schemes

3.6.1 Company car-share schemes (2002 evaluation)

Employer-led sharer schemes represent a major segment of formal schemes. Anecdotal reporting of success is common, although formal evaluation reports are sparse.

One evaluation was undertaken for the DfT in 2002 (Newson, 2002; Cairns et al., 2002). Specifically, this study reviewed the success of 20 organisations in encouraging car sharing, as part of broader work that those organisations were undertaking on travel plans aimed at encouraging more sustainable commuting patterns. The results are shown in Table 3.5, ordered by the number of active car-sharers in each scheme.



Table 3.5: Monitored levels of car sharing for commuting

Organisation	Overall % of staff car sharing		% -point change	Active car- sharers in formal scheme
	Before	After		
Computer Associates	6	12	6	34*
Marks and Spencer Financial Services	--	--	--	31*
Egg	20	26	6	26
Pfizer	18	20	2	20
AstraZeneca	--	--	--	18
Addenbrooke's NHS Trust	--	16	--	16
Government Office for the East Midlands	--	10	--	10
Boots	--	--	--	8
Plymouth Hospitals NHS Trust	--	--	--	7
University of Bristol	12	14	2	6
Vodafone	8	--	--	6
Agilent Technologies	26	26	0	4
Wycombe District Council	15	17	2	2
Buckinghamshire County Council	16	18	2	1
Nottingham City Hospital NHS Trust	2	11	9	--
Orange (Almondsbury Park)	6	14	8	--
Bluewater	20	24	4	--
Oxford Radcliffe Hospitals NHS Trust (JR site)	17	18	1	--
BP	4	4	0	--
Orange (Temple Point)	14	8	-6	--
Stockley Park	--	--	--	--
Average	13	16	3	14
National travel survey comparison	22			

Source: Cairns et al. (2002)

Notes for Table 3.5

- For the organisations with *, this was the proportion of staff who registered to car share one or more days per week.
- -- means that the information was not available, or was not appropriate.
- From staff travel surveys, overall levels of car sharing have sometimes been calculated by doubling the number of car passengers (since each must arrive with a driver), and including them in addition to staff who officially identify themselves as car sharers. An alternative approach would have been to try and get comparable proportions of car passengers for each organisation. The former approach was adopted for ease of comparison with proportions of staff in formal schemes (where there are usually few measures of car-sharer occupancy rates), and because some staff travel surveys did not ask about car passengers, but only about car sharers and single occupancy vehicle drivers.
- The number of sharers in a formal scheme may be significantly lower than the total proportion of staff arriving at the site in a shared vehicle, if many do not join the official scheme.

Scale of sharing

At the time of the research, the NTS suggested that 22% of journeys to work were probably shared (based on an 11% car passenger modal share). The current figure is 19% (based on a 9.6% car passenger modal share, DfT (2009a)).

For the organisations involved in the research reported above, where *overall* levels of car sharing (including formal and informal sharing) were measured, the overall proportion of staff sharing increased from 13% to 16% – a relative increase of about 25%. This is probably a relatively conservative figure for overall change, since six of the ten organisations that had been most successful in encouraging people to actively share through formal schemes were, of necessity, excluded from the analysis, as they did not have data about overall levels of car sharing by their staff. The specific impact of formal schemes is described next.

Success in promoting sharing

Of the 14 companies with schemes that enabled them to identify formally registered active sharers, on average, 14% of staff became active sharers. Schemes asking people to car share on an irregular basis achieved the highest levels of take-up – with both Marks and Spencer Financial Services and Computer Associates persuading about a third of their staff to become active sharers.

The analysis also showed that:

- The ratio of registered sharers to active sharers ranged from 11:1 to 1.5:1 – a very substantial difference. A high ratio was assumed to be due to software problems with matching people, or lack of critical mass, or a lack of incentives for existing car sharers to join.
- It was common for car sharing to encourage more than two people to share a car, with one scheme specifically targeting three or more sharers.

- Most schemes reported growth over time – from 2% to 8% of staff in one case, and from 5% to 18% in another. However, the length of time a scheme had been running for did not seem to be a particularly important determinant of its overall success.

In terms of determining how many people registered to car share, the study suggested that the most important factors were:

- specific incentive payments and/or direct relief from parking charges;
- events to encourage car sharers to meet, particularly major launch events;
- dedicated parking spaces in the most attractive spots.

In addition to key success factors, many organisations highlighted a few other factors which they felt were important to encourage people to join, although they were unlikely to guarantee success by themselves. These were:

- a guaranteed ride home;
- a small gift such as a voucher for registering;
- publicity.

Impacts on other forms of transport

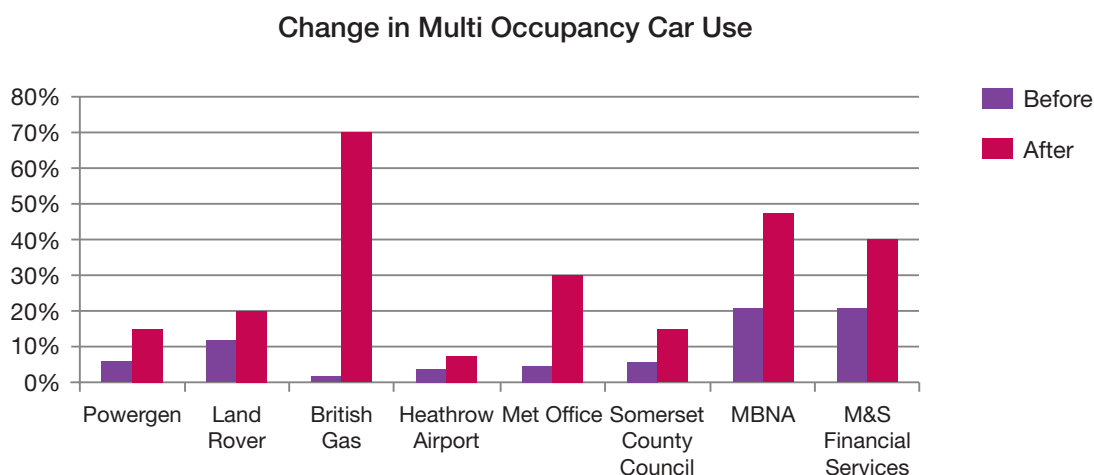
The study was unable to reach conclusions about whether car sharing was potentially undercutting public transport. However, car sharing did emerge as one of the few sustainable transport options that employers may be able to promote if they are located in an out-of-town location with few public transport options. Car sharing also seemed to be potentially more relevant to organisations where employees had relatively long commute journeys. At one organisation, car sharing had reduced, as a result of the company relocating to a more central city site with better alternative transport options. One concern expressed during the study was that the opportunity to offer car sharing should not be used to justify development decisions which would otherwise conflict with sustainable transport policy.

3.6.2 Company car-share schemes (2004 evaluation)

In 2004, the DfT commissioned a specific assessment of car sharing and car clubs from ITP and partners (ITP et al., 2004a; 2004b). This work included 16 case studies of car-sharing schemes.

Of these, eight workplaces were able to provide data about changes in levels of car sharing before and after the implementation of car-sharing schemes, as shown in Figure 3.2.

Figure 3.2: Proportion of staff sharing before and after car-sharing interventions

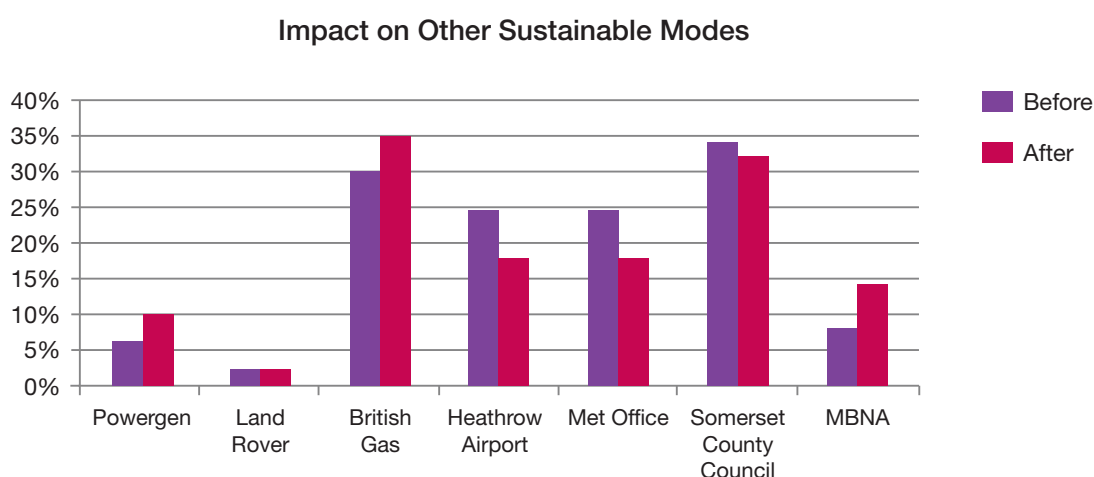


Source: ITP et al. (2004b: 24)

At all eight workplaces, the proportion of staff sharing for the journey to work had increased, by between 3% and 68%, with an average of 21% of staff being persuaded to start sharing their journey to work.

The study also examined the impacts of the car-sharing intervention on travel by alternative modes, as shown in Figure 3.3.

Figure 3.3: Proportion of staff travelling by train, bus, walk or bike, before and after car-sharing interventions



Source: ITP et al. (2004b: 34)

At two sites, travel by alternative means increased; at two, levels remained static; whilst at three, levels reduced. The biggest impact was at British Gas, where 10% of staff stopped travelling by bus – however, this was largely due to office relocation, which changed the bus routes available to staff. The study concluded that there was insufficient evidence to assess the issue fully.

The study argued that the most important factors for success in promoting car sharing were an effective enforcement policy; a well motivated and influencing administrator (with time and budget); full support from the senior management team; and priority parking for sharers (with parking restrictions for single occupancy vehicles). It also reported a general view amongst car sharing administrators that marketing activities have a direct impact on uptake levels, and that anecdotal evidence suggested that higher quality marketing and promotion had tended to achieve the greatest degree of modal shift. Marketing which focused upon the financial savings was considered to be particularly effective.

In relation to addressing perceptual barriers to sharing amongst employees, the study found that the most effective tools were:

‘personal involvement in the matching process by an administrator, offering ‘one week trial sharing’, utilising corporate databases to offer added information about potential sharing, stressing the security of the data held within the scheme, encouraging sharing amongst known groups/departments, and providing adequate filtering information to ensure compatible matches.’

3.6.3 Highways Agency travel plans



The Highways Agency has a specific programme to encourage workplaces near congested parts of the highway network to adopt travel plans, as a way of trying to reduce congestion. Smith and Emmerson (2009) reported results from three plans which the Highways Agency had supported. These were shown to have produced trip reductions of 52–88 car trips in the peak hour at the nearest relevant highways junction, together with a 1%, 10% and 12% reduction in single occupancy driving. In all three cases, a large component of the behaviour change achieved was through an increase in car sharing, resulting from the locations of the businesses, and the relative lack of alternative transport options.

3.6.4 Vanpooling

In addition to the general work on employer car-sharing schemes, there has also been research on vanpooling by Enoch (2003). He defines vanpooling as being the situation where a group of 7 to 15 people commute together on a regular basis in a minibus, driven by a voluntary driver from the group, with expenses shared amongst the group and/or sometimes partially paid for by their employer. Enoch reports that such schemes have been very successful in the US and were taking off in the Netherlands. However, he expresses reservations about their suitability for the UK, because:

- a special licence is required to drive a van carrying more than 8 passengers (compared with 14 in the US);
- employer-supported vanpools would be taxed as a benefit-in-kind, and the main driver would be considered, for tax purposes, to be allocated a company car (and would therefore have to pay tax accordingly);
- insurance companies seem reluctant to back schemes (although their accident record is generally good);
- both the public, and policymakers, are relatively uninformed about the concept;
- vanpools in the US appear to work best where employees for the same company live relatively close to each other but more than 25 km from their workplace, and it is unclear how often this situation would apply in the UK.

At the time of Enoch's paper, Vipre were running an initiative of this nature called 'Driveshare', although this does not seem to be in operation any longer.



3.6.5 School car sharing

Between 2002 and 2004, a major study of school travel work was undertaken for the DfT (Newson et al., 2010; Cairns et al., 2004a). This involved an assessment of 30 schools considered to have 'good' school travel plans, including detailed consideration of the strategies that they had adopted to change pupils' travel habits. The main conclusion was that encouraging car sharing is not likely to be the most appropriate solution for the majority of schools, though it can be successful at some – particularly at secondary level, at private schools, and at schools where pupils are travelling some distance. The study also highlighted the problems of data collection, since all pupils under the age of 17 will be travelling as passengers, and many share with siblings.

Of the 30 schools, the breakdown was as follows:

- 17 had not seriously considered car sharing;
- one sixth form college had promoted a scheme but become concerned about liability and insurance, and suspended it;
- one secondary had introduced a scheme but was finding administration complex;
- one school had abandoned a car-sharing scheme following introduction of a new bus, whilst another had specifically not introduced one to avoid undercutting their walking bus;
- two schools had considered introducing schemes but not done so due to lack of interest;
- two schools were still considering introducing schemes;
- one school promoted sharing for staff but not pupils;
- three had promoted car sharing, but it had not proved as popular as hoped – though two reported positive results;
- one school considered car sharing to have been a major success.

In other words, of the 30 schools, the majority were not promoting sharing, though there were three schools with positive results.

These were as follows:

- *The Royal School in Hampstead*: here, car sharing was seen as critical to the overall success of the travel work. The scheme was set up in 1996. All pupils' home postcodes (drawn from the SIMS school administration database) were used, at the beginning of each academic year, to identify clusters of addresses. The parents in these clusters were then contacted by the school and invited to exchange phone numbers with others living nearby, in order to come to an informal car-sharing arrangement. At the time of the interview, 28% of pupils travelling by car (i.e. 16% of all pupils) were considered to be car sharing.



- *Lingfield Community Primary School in Surrey*: here, a formal meeting was arranged to start the scheme, followed by identifying clusters of homes. Arrangements were then made informally between parents. Local authority officers led the set-up of the scheme, and 2% of pupils were sharing at the time of the latest survey.
- *The Perse School in Cambridge*: here, the school had promoted an independent, web-based scheme for parents, set up for all independent schools in Cambridgeshire by the county council. Car sharing had increased from 7% to 13% of pupils. Although involvement in the web scheme had not been as high as hoped, it was felt that it had prompted some increase in informal sharing, and, moreover, that it would become more established over time.

3.6.6 Conclusions

There is evidence that employer-led car-sharing schemes can be successful at encouraging employees to share the commute journey – particularly when they contain key success factors, such as dedicated parking, appropriate marketing, incentive payments or relief from parking charges, trial offers, adequate staff time and management support, and not requiring those receiving these benefits to share all of the time. Vanpooling – i.e. sharing in larger groups – is conceptually feasible, but we are not aware of any examples where this happens (although it seems highly unlikely there are none). Meanwhile, formal car-sharing schemes for the school journey may have a niche market at private secondary schools. In all cases, formal promotion of car sharing is likely to be more appropriate when employees or pupils are making relatively long journeys, and where location dictates against the use of public transport options.

3.7 High occupancy vehicle lanes

Despite some enthusiasm for the concept¹⁰, there has been relatively limited introduction of high occupancy vehicle (HOV) lanes in the UK.

The main HOV lanes currently in place are as follows:

- on the A647 in Leeds;
- on the A63 in Leeds;
- on the A4174 Avon Ring Road in north Bristol;
- on the hard shoulder of the M606 and M62 near Bradford;
- on the A370 in North Somerset; and
- on the A47 in Birmingham.

There are also some future plans to implement high occupancy vehicle lanes, in particular, on Roundhay Road in Leeds, on the A45/A428 interchange in

¹⁰ For example, LTT (28 March 2006) reports on positive statements about HOV lanes from the Highways Agency, as part of maximising their workplace travel plan strategy.

Northampton, on the A369 in North Somerset, on the A90 in Aberdeen (Parking Review, 22 December 2009) and, potentially, on a number of key corridors in Newham (LTT, 9 October 2009).

There are also a number of examples where plans for HOV lanes have been scrapped. The most significant of these is probably the planned HOV lane on the M1 between junctions 7 and 10, between Luton and St Albans, originally proposed in 2004 (LTT, 27 September 2007; 6 March 2008). The final feasibility study argued that provision for high occupancy vehicles in the outside lane would cause safety concerns, provision in the inside lane would create problems for traffic leaving or joining the motorway, and that the greatest potential for HOV lanes was as 'gateway bypass schemes' similar to the M606/M62 scheme. (The HOV scheme was originally part of the justification for widening the M1 along that section. Critics of the feasibility study argued that the 'inside lane' concerns could have been overcome, and that the scheduling of the introduction of the HOV lane needed better planning.) A proposed lane on the Stockton South Link Road was deferred after public protest, and because the newbuild carriageway worked well without the lane. Meanwhile, plans to introduce an HOV lane on the East Kent Access Road – to support the travel plan at Pfizer in Sandwich – were scrapped on the basis that limited congestion meant that sharers would enjoy few benefits; that there were safety concerns about interaction with other traffic; and that there were also concerns about enforcement (LTT, 15 March 2007). Enforcement remains an issue. There has recently been a short trial on the A647 in Leeds in January 2010 of two occupancy cameras.

Given the limited experience of implementation, it is no surprise that evidence of HOV lane impacts in the UK is also limited. The main available findings are given below.

3.7.1 Leeds HOV lanes

The first Leeds HOV lane was initially introduced as a trial scheme as part of the EU ICARO (Increasing CAR Occupancy) project. The lane was introduced in two sections in May 1998, over a stretch of about two kilometres, on a major dual carriageway into central Leeds from the north-west of the city. It is primarily for use by buses, coaches, and cars carrying two or more people. A partnership with the police was developed to ensure enforcement. The scheme was made permanent in November 1999. During the trial period, the effects of the lane were extensively monitored over an area of 15 km².

Results showed that there was a significant initial reduction in traffic on the A647, and a small decrease across the whole of the area during the first few months of the scheme. However, a year after introduction, traffic had returned to above pre-scheme levels. This was partly because of improved traffic signal efficiency, which returned additional capacity to general traffic. Journey times for both HOV and non-HOV traffic improved, with gains being 4 minutes and

1.5 minutes respectively for the 5 km trip from the Leeds Outer Ring Road to the Inner Ring Road. Monitoring across a cordon of four inbound routes showed that vehicle occupancy was virtually unchanged, although there was some redistribution of vehicles between the routes, with more HOVs using the A647 and choosing to travel at peak time. Specifically, the average car occupancy rate on the A647 increased from 1.35 (before the scheme) to 1.43 in June 1999. Meanwhile, bus operators increased the number of morning peak hour services using the route from 20 (in 1997) to 33 (in 1999), and were reporting some increases in patronage.

Survey results from 2002 then showed that bus occupancy had risen by approximately 20% since June 1999. Unfortunately, journey times had also risen, caused in part by a 9% traffic increase on the A647 since opening. However, HOV journey times remained 2.5 minutes faster than non-HOV times for the 5 km journey, and the scheme was considered successful on this basis.

Most of the material about the Leeds HOV lane reported here is taken from council data, as reported in Cairns et al. (2004b) and DfT (2006). However, there is also some additional material from a Leeds website. This suggests that average car occupancy had increased to 1.51 in 2002, and that, although initial monitoring of the HOV lane and parallel routes suggested that HOVs had simply redistributed, at roadside interviews in 1999, '26% of HOV interviewees were apparently new car pools, and cited the HOV lane as the reason for forming them' (see www.konsult.leeds.ac.uk/private/level2/instruments/instrument029/l2_029c.htm, accessed 30 June 2010).

The scheme manager reports that there has been no further monitoring activity. However, in February 2009, Leeds opened a new HOV lane, as part of a newbuild dual carriageway on the A63. In November 2010, there are also plans to open a third lane, on Roundhay Road, which will involve the conversion of a bus lane. In total, the extent of HOV lanes in Leeds is of the order of three miles.

3.7.2 South Gloucestershire HOV lanes

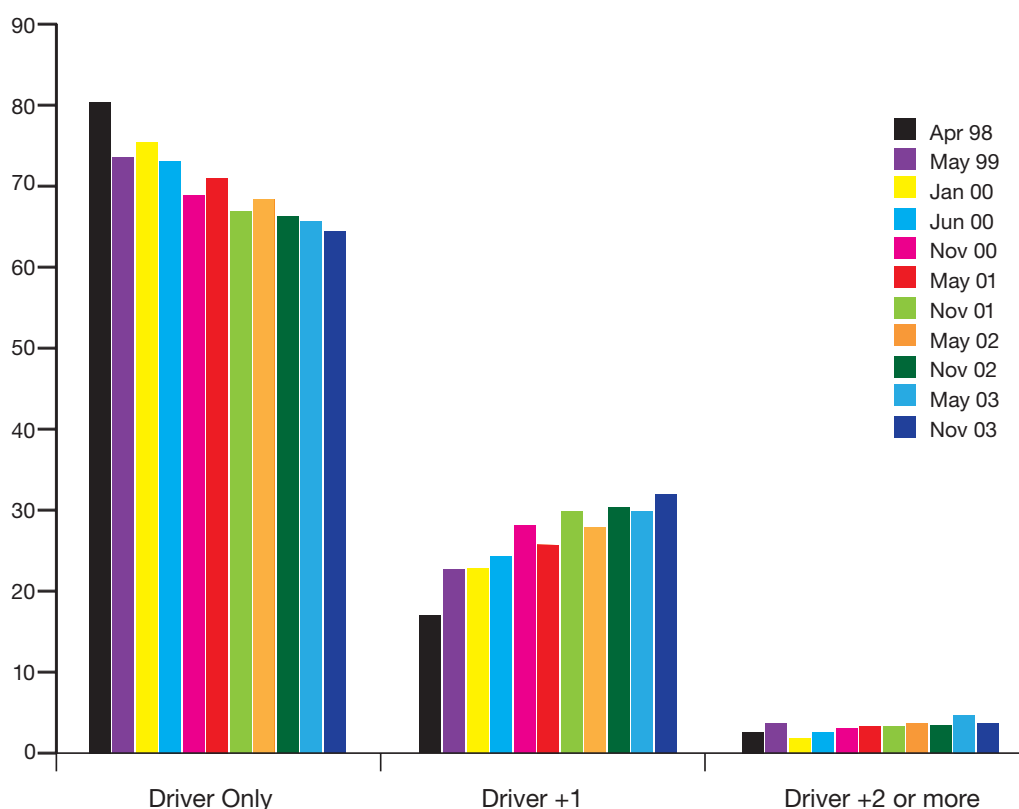
Two lengths of HOV lane were introduced on the A4174 Avon Ring Road north of Bristol in October 1998, as part of the EU INTERCEPT (Intermodal Concepts in European Passenger Transport) project. Part of the rationale was to address congestion arising from substantial ongoing development in the area. They were initially introduced on a trial basis, and subsequently made permanent.

According to DfT (2006), following the introduction of the HOV lane, traffic increased on both the A4174 and three parallel roads, with at least part of the increase being due to new residential and retail developments. The number of cars carrying two or more occupants increased from 20% to 27%, shortly after HOV introduction. Comparing the situation one year before and one year after, morning peak journey times for HOVs reduced from 21 minutes to 4 minutes (whilst the same figure for non-HOVs reduced from 21 minutes to 5 minutes).

Given other improvements, only part of these savings would be due to the HOV lane. Overall, there were no significant changes in accidents. The overall violation rate was reported to be 7%.

Meanwhile, the 2004 South Gloucestershire Local Transport Plan Annual Progress Report indicates that there have been further increases in car occupancy, to 35% of vehicles along that stretch of road by 2003, with the data given in Figure 3.4. The same report also links the HOV lane with the 2001 launch of a '2carshare' formal matching scheme, and a 'Park & Share multi-modal interchange' at a local leisure complex.

Figure 3.4: Changes in occupancy on the South Gloucestershire HOV



Source: South Gloucestershire Council (2004: 7)

(Further data have been supplied which would enable updating of this graphic, though not without considerable processing.)

The 'Park and Share' site was launched at Aspects Leisure Park, Longwell Green, in 2003. It was intended to intercept commuters travelling on the A4174 to the North Fringe employment area. The council leased 200 spaces in an existing car park from the park landlords, new signing was put in, and there was extensive marketing. However, on average, the scheme attracted only two cars a day, and was subsequently discontinued. (It should perhaps be noted that the traffic impact assessment for the scheme by Atkins estimated that, typically, there were only 413 cars passing the site between 7 a.m. and 9 a.m. heading to the North Fringe, meaning that the target market was always somewhat limited.)

Those managing the HOV lane report that encouraging workplaces to offer sharer parking has proved to be one of the most successful ways to encourage sharing. Notably, the University of the West of England, located just off the ring road, has recently increased the number of dedicated sharer spaces from 70 to 270, accessed via innovative barrier controls which require both the driver and passenger to operate the entry device.

Changes have been introduced recently that have delayed the starting time of the HOV lanes, giving solo drivers greater opportunity to stagger their travel times to avoid the morning peak. To be consistent with bus lanes, driver-only taxis are now permitted to use the HOV lane. HGVs have been permitted to use the HOV Lane in order to discourage them from using inappropriate alternative routes during the peak period and reduce the need for HGVs to change lanes on the approach to and end of the HOV lanes. These changes were introduced in September 2010 and their effects are currently being monitored.

3.7.3 North Somerset HOV lanes

In March 2005, a 2 km HOV lane was introduced on the eastbound carriageway (towards Bristol) of the A370 Long Ashton Bypass. Monitoring suggested that journey times for HOV lane users were significantly improved, whilst the impact on single occupants was largely neutral. Specifically, in the morning peak (7.30–9.00 a.m.), the average journey time saving for vehicles using the HOV lane was recorded as being 4.3 minutes, rising to almost 7 minutes at times of greatest congestion. The HOV lane and the bus priority measures enabled the major bus operator to reduce timetabled bus times along the A370 by six minutes (without risking being fined for late running). Introduction of the HOV lane has not had an adverse effect on the vehicular capacity on the Long Ashton Bypass, whilst the number of people carried showed its highest recorded value in April 2006, more than a year after the introduction of the HOV lane. Since the monitoring, overall declines in traffic volumes have led to smaller differences in the travel times of the high occupancy and general purpose lanes.

Given the success of the A370 HOV lane, two further HOV lanes have been considered, both on the A369, as part of the Greater Bristol Bus Network. One was dropped on the grounds of cost. The other is an 800m westbound stretch, between Bristol and Junction 19 of the M5. Formal consultation on the scheme will start soon, with potential construction in summer 2011.

3.7.4 Birmingham HOV lane

An HOV lane was introduced on the A47 in November 2007, over a stretch of approximately 2 km, heading towards Birmingham city centre, initially on a trial basis. Monitoring over the first 12 months (as reported at www.birmingham.gov.uk/cs/Satellite/carsharelane) indicated that:

- the car-share lane had successfully moved more people along the route in the same number or fewer vehicles than before – i.e. car occupancy increased;
- the number of vehicles did not reduce as much as expected, because new developments opened near the A47 after the car-share lane started;
- journey times along the route were relatively unchanged, although car sharers were enjoying slightly quicker journeys than other traffic;
- because more people were travelling in the same number or fewer vehicles, emissions of carbon and other pollutants per person reduced;
- there was no change in the number of people or the number of vehicles on nearby roads – implying that changes on the A47 were due to the car-share lane rather than other things that might affect all roads;
- infringement was relatively low, and concentrated in particular locations; and
- some negative comments about the scheme were received, but compared with the number of people using the route every week, the number of people complaining was very small.

3.7.5 M606–M62 HOV lane

The first motorway HOV lane has been introduced on the hard shoulder of the M606 and M62 near Bradford, allowing sharers to bypass congestion at Junction 26 of the M62. It opened in April 2008, over a distance of 1.7 km (LTT, 3 April 2008). To monitor the effects of the M602–M62 scheme, according to the Highways Agency (2009), surveys were carried out in July 2007 and April 2009, in the morning peak, midday and the evening peak. These showed journey time savings for users of the car-share lane and also for users of the adjacent non-car-share lane. Compared with a previous journey time of 12 minutes in the morning peak, car sharers were receiving an 8-minute journey time saving. Non-car-sharers were receiving a journey time saving of 5 minutes for the same journey. During the evening peak, car-sharers enjoyed a 2-minute saving on this journey compared with a 1-minute saving for non-car-sharers. No other information is reported, except that further monitoring was planned.

3.7.6 Conclusions

Both experience and impact reporting of HOV lanes is limited. In all cases, the HOV lane introduction is associated with journey time savings for sharers; and Leeds, South Gloucestershire and Birmingham report on increases in vehicle occupancy, which, in the case of the two former schemes, have become greater over time. The increases in bus patronage (reported in Leeds) and bus performance (reported in North Somerset) are also notable. Initially, therefore, HOV lanes appear to be a relatively successful policy tool. However, further understanding of their impacts would be valuable, together with an assessment of the situations where they are likely to be most appropriate. (For example, it seems unlikely that turning all bus lanes into HOV lanes would be desirable.) There is also a wider conceptual and international literature which could be

summarised (see, for example, www.vtpi.org/tdm/tdm19.htm), including some negative reports of US experience (see Kwon & Varaiya, 2008).

3.8 Shared parking schemes

Offering preferential parking options for those who share vehicles is often a feature of employer-led car-sharing schemes. However, preferential parking does not have to be linked to a formal matching scheme, and can be introduced on a relatively large scale. As outlined in the 2004 Smarter Choices report, Milton Keynes has introduced a large-scale parking scheme for those who share vehicles, branded 'CARSHAREMK'. More details are given below, taken from Cairns et al. (2004b), several web pages (<http://snipurl.com/1trbbd> [www_miltonkeynes_libdems_org_uk], accessed 30 June 2010, and <http://snipurl.com/1truak> [www_milton-keynes_gov_uk], accessed 30 June 2010) and discussions with the scheme manager.

3.8.1 Milton Keynes scheme

Overview

CARSHAREMK was launched in October 2002. Members of the scheme can park free in central Milton Keynes, if they car share. To qualify, two registered sharers must display their individual but linked permits together in the windscreen of the vehicle. There are 400 designated car-sharer parking bays distributed around the town centre in prime sites, and sharers can also park free in the standard bays. Sharers also receive discounts on the bus services.

The scheme was launched on the same day as a major expansion of parking charges across the town centre, with substantial publicity. The scheme was initially open to everyone, but primarily targeted at commuters. However, now only those employed in Milton Keynes, or commuting out from the rail station, can become members.

Over time, the scheme has been expanded geographically, to take in the station, and from 1 April 2010, annual membership fees were introduced of £30 for CMK (Central Milton Keynes) employees and £60 for outward rail commuters. The scheme is now also linked with a formal matching service, and where applicants do not already have a car-share partner, the joining fee is taken as a deposit until a match is found.



Scale and impacts

The feasibility study for the scheme (Stirling Maynard Transportation, 2000) identified that there were 11,658 people coming into central Milton Keynes by car in the a.m. peak hour, of whom 10,050 were car drivers and 1,608 were car passengers (making an average car occupancy of 1.16). These people formed the target group for the initiative.

By August 2003 (i.e. ten months after launch), there were about 1,200 members, with membership growing by about 100 people per month. Of those 1,200 members registered, over 90% were routinely using the scheme, and one count suggested that 8% of central parking was by official car sharers, which would represent the majority of the membership. Members were coming from a broad social and economic spectrum, involving a full range of car types. Average car occupancy amongst those sharing was 2.25. The majority of share journeys were for commuting, but there was also some use for other purposes at weekends. Some non-drivers were known to have joined the scheme as a way of reducing transport costs. Some people were car sharing in only one direction.

Other reported benefits of the scheme included increased use of buses in response to the reduced fares for car sharers, though the data to support this claim are limited.

The provision of high-profile dedicated parking bays in prime sites was reported to have been critical to the scheme. In the first few months, some users did not realise that they could park (almost) anywhere for free in addition to parking in the dedicated bays. Once this was established, the scheme began to run more smoothly.

Since that time, the manager of the scheme reports that there has not been any more in-depth monitoring of the scheme, though from April 2006 onwards, basic counts of membership and levels of sharing have been recorded. In April 2006,



there were 2,841 registered members. Membership peaked at 4,673 members in October 2008, with some subsequent decline. As of August 2010, there were 3,422 registered members. However, the number *actively* sharing has remained relatively constant over the period, changing from 1,263 in April 2006, to 1,228 in October 2010. Approximately 8% of those registered are shift workers.

The system also enables some calculations to be undertaken about environmental savings, using details of the actual journeys that are shared – though based on the assumption that all shared trips are replacing single occupancy trips. *Using this assumption*, in August 2010, for that month, the scheme was resulting in a reduction of 10,197 trips; 288,768 kilometres driven; 20,503 litres of fuel; and 50,093kg CO₂. Per person, it was estimated to be saving £18.40 per month. The implied average return trip length of scheme members is 28 km, a figure which has reduced somewhat over time (from 36 km in April 2006).

The scheme manager argues that similar types of scheme have not been adopted by more local authorities because they require local authority set-up (there is no ‘off-the-shelf’ product for local authorities to purchase) and ongoing management (albeit at a relatively low level – perhaps 0.5–1 person days per week).

Partly to maximise the use of the car-sharing scheme staff and software, Milton Keynes is also in the process of introducing a shared taxi scheme – aimed at people travelling to and from the train station to commute into London, with a relatively early start (7 a.m.) and/or late finish (7 p.m.). The logic is that the substantial parking charges at the train station (up to £8 per day) and the limited bus services at those times will make the costs of a taxi each way relatively attractive.

3.8.2 Conclusions

At face value, the Milton Keynes scheme appears to be a success, in that it is a relatively simple scheme and has attracted a substantial number of participants. There are two concerns. First, one weakness of the 2004 assessment of the scheme (as identified by the authors at the time) was that it was not possible to get data to assess whether participants were already sharing, or were new sharers. Even if the scheme only encouraged existing sharers to keep sharing, this could still be of benefit. However, it would be of value to assess the extent to which this was the case. Second, the relationship with the buses is complex. If the claim that giving car sharers discounted tickets has boosted patronage by these groups can be substantiated, this is clearly desirable, although some social equity implications remain – i.e. why should those who use the bus full-time have to pay more? If these concerns can be addressed, it seems that there could be substantial potential to roll the scheme out in more locations. Further monitoring and evaluation of this initiative could therefore be of value.


4. Taxis / Expert Driver Solutions

4.1 Overview and summary

4.1.1 Types of schemes

This section looks at taxis and minicabs, and potential extensions to mainstream operations. This topic area shades into the more general area of demand-responsive transport and/or more flexible bus services. This has its own, wide literature (see, for example, Enoch et al., 2006¹¹) – much of which was summarised for the Commission for Integrated Transport (CfIT) work described in section 4.3. This work has tended to focus on issues such as the appropriate balance between conventional bus services and more demand-responsive solutions; their relative cost-effectiveness; and the operational issues involved in making demand-responsive schemes successful.

¹¹ Loughborough University are currently starting a three-year EPSRC-funded project on demand-responsive transport, which will include some focus on shared taxi schemes. This is due to report in 2013. See www.drftfordrt.org.uk/index.php



There has also been particular interest in these solutions as a way of addressing social exclusion – that is, concerning people who are elderly, or disabled, or living in remote rural areas. In order to keep this paper focused, this material is not reviewed in detail here, although greater understanding of this literature might usefully inform this topic area in the future.

4.1.2 Findings

Some tentative conclusions from the existing evidence are as follows:

Potential for mainstreaming

Scale and nature – approximately 10% of people use conventional taxis or minicabs on a weekly basis, whilst a further 18% use them at least once a month. UK experience of shared taxi schemes is limited, though there are some successful examples – in particular, schemes which are aimed to addressing social exclusion issues for particular groups (notably the elderly and those living in remote areas). Wiltshire’s ‘Connect2’ scheme is notable for its scale (25,000 passengers p.a.), and its integration of taxi provision with other forms of public transport.

Types of users – there are higher levels of taxi and minicab use amongst those aged 17–29 and 70+; by women (compared with men); and by households without a car. Data for the Devon and Cumbria shared taxi schemes in the UK imply that schemes are used primarily by elderly women for shopping and personal business. However, this may be a particular characteristic of those schemes.

Social, economic and environmental implications

Social inclusion – it is clear that a number of shared taxi schemes have been set up explicitly to provide travel options for people who might otherwise be relatively isolated, with specific evidence from Devon Fare Car of social

inclusion benefits; for example, 18 users reported that they would give up a job if the service were stopped, and 26 reported that they would not be able to go out on a regular basis.

Emissions – evidence about emissions from taxis suggests that they are not typically cleaner than the average car. However, there are two issues. First, initiatives to encourage the development of cleaner taxi fleets report some success, not least since regulatory arrangements enable public sector involvement. Second, the most important factor in determining relative emissions is passenger loadings. Currently, available data about typical taxi occupancy levels appear to be remarkably limited. A theme of the CfIT work on shared taxis is that, in environmental terms, taxis may be preferable to bus services if bus loadings are going to be very low (for example, in remote rural areas).

Effects on wider travel habits – in this review, it has not been possible to identify any information about how the availability of taxis and other private hire vehicles affects people's broader decisions about personal car ownership and use. However, there is some evidence that they can provide a key access/egress mode for rail stations.

Role of the public sector

Policy measures – the public sector's involvement with the taxi industry is greater than is the case with some of the other alternative car options, on account of regulatory arrangements, and (for example) decisions about whether taxis should be allowed to use bus lanes. The CfIT report indicated a number of potential public policy barriers to the development of shared taxi schemes – including financial levers which are geared towards bus services; local authority reluctance to consider taxis or shared taxi options; and the current practice (outside London) of regulating taxi operations at district level rather than at a larger geographical scale. It is clear that if greater government support were to be given to taxis and minicabs, it could be made subject to certain conditions (for example the lowering of average emission profiles of the vehicles used), or directed toward the situations in which these vehicles would provide the most suitable complement to conventional public transport.

4.2 Taxis and minicabs

Taxis and minicabs are a relatively mainstream part of the UK transport mix. According to the DfT (2009b), in 2006/7, there were a total of 203,700 taxis and private hire vehicles operating in Britain. Of these, approximately 32% were based in London. (The two are distinct in that a taxi is usually defined as a vehicle with fewer than nine passenger seats, which is licensed to 'ply for hire' – i.e. stand at ranks or be hailed in the street by members of the public – though it can also be pre-booked. In contrast, a private hire vehicle must be booked in advance through an operator.)

4.2.1 Current scale and nature of taxi and minicab use

The NTS provides some information on patterns and levels of taxi/minicab use (DfT, 2008). Specifically, in 2008, the average British person made 11 trips and travelled 54 miles by taxi/minicab each year (1.1% of their total trips and 0.8% of their total mileage). Levels of use appear to have been roughly stable over the last ten years. The average taxi/minicab trip was 4.4 miles and took 18 minutes. In terms of trip length distribution, approximately 9% of taxi trips were under one mile; 27% were 1 to <2 miles; 45% were 2 to < 5 miles; 18% were 5 to <10 miles; and 9% were 10 to <25 miles.

Frequency of use is shown in Table 4.1. Notably, 58% of people use a taxi/minicab only once or twice a year at most. Meanwhile, there is a small group – 10% of people – who use a taxi on a weekly basis, or more frequently. (In research terms, it might be particularly interesting to speak to this group – or to obtain a special tabulation of data relating to their travel habits.) A further 18% of people use a taxi at least once a month.

Table 4.1: Frequency of use of taxis/minicabs in 2007

	%
Three or more times a week	2
Once or twice a week	8
Less than that but more than once or twice a month	5
Once or twice a month	13
Less than that but more than once or twice a year	14
Once or twice a year	15
Less than that or never	43

Source: Department for Transport (2009a: 24)

A breakdown of journey purpose for taxi/minicab use is not given, presumably due to relatively small sample sizes – although this information could probably be obtained from the NTS, if data from individual years were combined.

In terms of who is using taxis and minicabs, there are higher levels of use amongst those aged 17–29 and those aged 70+ (in both cases, 2% of trips per year as opposed to 1% for the other age groups – though it should be noted that data are rounded to the nearest whole percent). Levels of use are also higher for women than men (13 versus 9 trips per year). Levels of use are also much higher in households without a car compared with those with a car (28 trips versus 7 trips per year), and are slightly greater amongst ‘non-drivers’ or ‘other drivers’ in households with a car, than ‘main drivers’ (9, 8 and 6 trips per year respectively). The relationship with income is complex. Per year, by taxi/

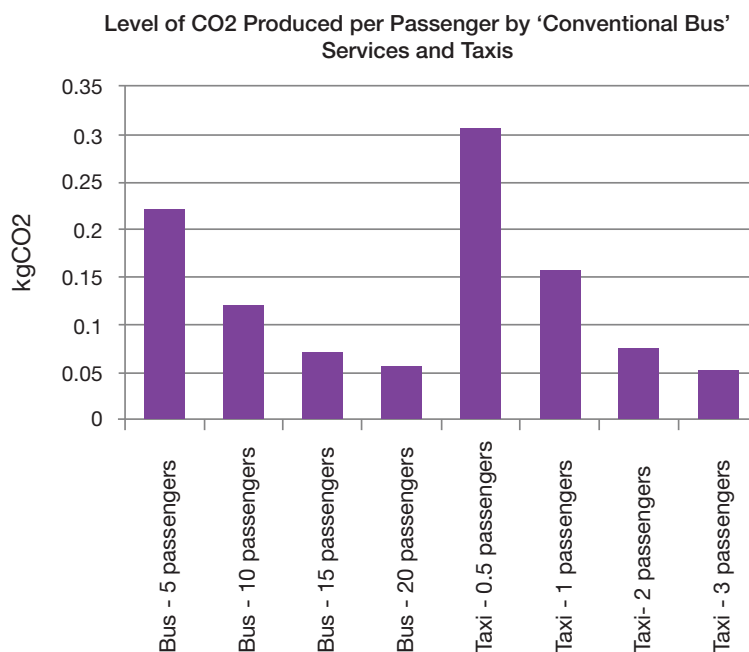
minicab, those in the lowest and second income group (of five groups) make 13–14 trips, and travel 52–55 miles; those in the third and fourth income groups make 9 trips and travel 40–45 miles; whilst those in the highest income group make 11 trips and travel 79 miles.

4.2.2 Environmental impacts of taxi use

According to the UK Environmental Accounts (DfT, 2009b), in 2007, taxis were responsible for 2.5 million tonnes of CO₂-equivalent greenhouse gas emissions, which was equivalent to 2.8% of those emissions from the transport industries; to 1.6% of the emissions from transport, including household use of private vehicles; and to 0.4% of emissions from all sectors included in the UK Environmental Accounts.

Mott MacDonald (2008) gives the data in Figure 4.1, as a comparison of the emissions from taxis with that from buses.

Figure 4.1: Mott MacDonald comparison of taxi and bus emissions



Source: Mott MacDonald (2008)

Note: Mott MacDonald report that the data used are taken from the EU CIVITAS (City-VITALity-Sustainability) project

Meanwhile, the latest Defra/DECC guidelines on emissions factors for different forms of transport are given in Table 4.2. These suggest a slightly different 'equivalence' point – i.e. to compete with an averagely-loaded bus, a typical taxi (i.e. not a black cab) would need to carry an average of just over 2 passengers, whilst to compete with a bus carrying 20 passengers, a taxi would need to carry an average of just over 4 passengers. Meanwhile, to be

equivalent to the average taxi, a bus would need to carry an average of just over 6 passengers.

Table 4.2: Greenhouse gas emissions (gCO₂ equivalent) for different modes of transport

Average car	Per vehicle km	204.9
	With average occupancy of 1.6*	128.1
Average taxi	Per vehicle km	223.5
	With average occupancy of 1.4	159.6
	With occupancy of 2*	111.8
Average black cab	Per vehicle km	257.6
	With average occupancy of 1.5	171.7
	With occupancy of 2*	128.8
Average bus	Per vehicle km*	983.2
	With occupancy of 2*	491.6
	With average occupancy of 9.4	104.6
	With occupancy of 20*	49.2

Source: Defra (2009)

* These figures are not given in the guidance, but have been interpolated. They refer to the gCO₂/km per person.

In generating the taxi emission factors, Defra/DECC report that they have used an average of the emissions for medium and large cars to give the taxi figure, and large car emission factors for the black cabs, which are consistent with the Vehicle Certification Agency car fuel database. Unsurprisingly, therefore, taxis do not compare particularly well with the average UK car in terms of emissions.

There are two issues with this approach. The first is that there has been a reasonable body of work looking at encouraging taxi companies to use cleaner vehicles (see, for example, Latham et al., 2008; GLA, 2010). Moreover, there is some reported success – for example, the Mayor of London’s emissions strategy for licensed London taxis was reported to be bringing about emissions reductions of the order of 40% (ITM, 2007). This is not to suggest that the current emissions factors given by Defra/DECC are wrong. However, it may be that the potential to reduce emissions from taxis and minicabs is greater than for private vehicles, owing to the regulatory processes in place.

Second, one of the main conclusions from Table 4.2 is the importance of occupancy levels (of all types of transport). The occupancy figures used by Defra/DECC to generate the taxi emission figures are taken from two sources

– a CfIT report which is no longer available, and an industry press release (ITM, 2007) – which actually give an occupancy of 2.5, but have been interpreted to mean 1.5 passengers by Defra/DECC (though it is unclear whether this is an appropriate interpretation of the original source or not).

Hence, more detailed information about occupancy levels would be of value – perhaps in terms of different categories and types of taxi trips. Clearly, the amount of travel undertaken without any passengers would also need to be factored into calculations.

The data also highlight the potential environmental benefits of policy measures to encourage more shared use of taxis, as also mentioned in several reports. For example, Latham et al. highlight the potential emissions benefits from introducing ‘a formal and co-ordinated system of passenger sharing to reduce overall vehicle mileage’ (though this report does not include any other material relating to this topic). This issue is discussed in the next section of this paper.

4.2.3 Impacts of taxis and minicabs on travel choices

In general, the readily available literature does not provide any insights into whether the availability of taxis and minicabs has any wider implications for people’s patterns of car ownership and use, or what people would do otherwise were these options not available.

However, various studies do highlight the importance of taxis as an access/ egress mode from train stations – and the general importance of being able to access stations as a key determinant of rail use (see, for example, Brons et al., 2009; McDonald et al., 2003; RSSB, 2010).

4.3 Shared taxi schemes

In 2008, CfIT commissioned a report (CfIT, 2008) into the scope for shared taxis – or what they called ‘TaxiPlus’ – to define the concept of:

‘large-scale shared taxi-based operations, involving a fleet of small vehicles, which, in addition to core operation, operate a bookable, shared, demand-responsive public transport service. [TaxiPlus would] utilise a centrally operated call centre to take passenger bookings, integrating with local bus, rail, and other transport networks to ensure connectivity and seamless travel.’

This study included a review of previous literature, such as Enoch et al. (2006) – who reported on a number of failed shared-taxi schemes, such as those to match up passengers arriving at certain train stations (where lack of critical mass, and/or lack of public sector support, were often important issues).

4.3.1 Scale and nature of existing schemes

The CfIT work identified a number of existing successful schemes, and chose to focus on ten particular case studies, of which five were from the UK. The UK case studies were:

- *Connect2 Wiltshire* – the new name for all bookable public transport covering bus, taxi and community transport in the county, co-ordinated and marketed by Wiltshire County Council, with 25,000 passenger trips p.a. in the four service areas studied.
- *Devon Fare Car* – a network of timetabled shared taxi services for communities in 11 areas of Devon. Each service was being provided by a local taxi operator under contract to Devon County Council. There were 17,000 passenger trips p.a.
- *Rural Wheels, Cumbria* – a taxi management network providing door-to-door demand-responsive transport within selected parts of rural Cumbria, using smartcard (as opposed to cash) payment technology, with 5,000 passenger trips p.a.
- *North Sutherland Taxis* – an open-access, heavily discounted taxi service providing key transport links in a sparsely populated area of the Scottish Highlands with limited public transport provision, with 1,800 passenger trips p.a.
- *BilliLinks, West Sussex* – a local shared taxi service providing demand-responsive transport through two routed services for communities around the town of Billingham. The service was being provided by West Sussex County Council and Horsham District Council through the Billingham Community Partnership, with 350 passenger trips p.a.

The case studies provided some (albeit limited) information about patterns of use, as given in Table 4.3. For the Devon and Cumbria schemes, this indicated high levels of use by elderly women, using shared taxis to go shopping or to undertake personal business such as medical visits. However, it is also clear that the profile of some of the international schemes was rather different, perhaps because they were set up or marketed with different intentions. It is also clear that the available data were extremely limited.



Table 4.3: Available data about the users of shared taxi schemes reviewed for CfIT, taken from Mott MacDonald (2008)

	Annual trips ³³	Percent elderly	Percent female	Percent disabled	Principal purposes
Rural Wheels	5,477	77%	79%	32%	Shopping, social, medical
Devon Fare Car	17,332	57%	73%	n/k	Shopping, GP, transport links
Connect2 Wiltshire	25,234	>65%	n/k	n/k	n/k
Billilinks	290	“majority”	n/k	n/k	n/k
North Sutherland	1,785	Approx 50%	n/k	n/k	Employment shopping
PubliCar	112,506	60%	“majority”	n/k	Leisure, commuting
TaxiTUB	41,982	12%	n/k	0%	n/k
TreinTaxi	2.2m	n/k	n/k	n/k	n/k
RegioTaxi	-	<30%*	n/k	<30%*	n/k
AST	17,350	n/k	n/k	Approx 10%	n/k

Source: Mott MacDonald (2008)

Subsequent contact with Wiltshire’s Public Transport Development Manager, who runs Connect2Wiltshire, indicates that in 2009/10, the scheme was supporting 188,500 passenger trips p.a., of which 85,000 were in shared taxis. Specific use of the four service areas studied in the 2008 CfIT report had risen to 35,380 passenger trips per year (albeit that most of this growth took place between 2006/7 and 2007/8, and involved particular growth in one area, partly counterbalanced by the closure of services in another). He reports that there has not been any formal monitoring of the scheme. However, his impression is that services are being used mainly by those without a car, including younger people and those eligible for concessionary fares. This partly relates to the nature of the area and the scheme. Wiltshire is a relatively rural area, with a dispersed, relatively affluent population, meaning that car ownership levels are high – but with pockets of deprivation, which is where services have been targeted (not least due to funding limitations making it difficult to provide services more widely).

More information about Devon Fare Car is available from Devon County Council (2007). This report indicates that the scheme is run primarily to provide an alternative form of public transport in deep rural areas without a daily bus service. Fares are set at equal to, or slightly above, the normal bus

fare for the distance travelled, resulting in an average subsidy per passenger journey of over £8 in 2006. In early 2006, 262 people were regular users of the service, which represented about 0.8% of the eligible population, and the average load factor per car was only 1.2 people. In 2005, a survey of users was conducted, leading to 280 responses. This is the basis for the data given in the table above. As highlighted there, shopping (156 responses), visiting the GP (113 responses) and gaining access to bus/train (80 responses) were the most frequently mentioned reasons for using the scheme, together with other medical purposes (hospital – 64; dentist – 60; other medical –39); visiting friends (62) and leisure (55). Of users, 118 reported that they used the service at least weekly; 35 said monthly; and 127 said less frequently than that. If the service stopped, 22% of respondents said that they would ‘stop travelling’. Of those who would still travel, just under 70% would rely on a lift as their next option. In addition, if the service stopped, 18 people reported that they would have to give up their job; 7 would have to discontinue their education or after-school activities; 3 would reduce contact with member(s) of their family; and 26 would not be able to go out on a regular basis. A cost–benefit analysis suggested that discontinuation of the service would result in costs of over £4,000 per month, through additional Jobseeker’s Allowance or Social Services costs. One conclusion of the report was that ‘there is a very low demand for transport in deep rural areas, but the service is vital for those who use it’.

4.3.2 Policy issues involved in developing shared taxi solutions

The CfIT work identified a number of important policy issues preventing the wider set-up and adoption of shared taxi services. These were grouped around three issues:

- the perceptions and attitudes of local authorities and the taxi trade – for example, concerns about engaging in anti-competitive activities, lack of understanding of current legislation, and unwillingness to take advantage of certain permits available;
- taxi licensing rules – in particular, the current practice of licensing at district level, which militates against the development of organisations which would be large enough to run such operations;
- funding issues – for example, concessionary fares and the Bus Service Operators Grant are both tied to bus operations, whilst smaller vehicles are not exempt from VAT; hence, shared taxi operations may be at a competitive disadvantage compared with conventional public transport.


The manager of Connect2Wiltshire also commented on the large amounts of unnecessary regulation involved in running shared taxi schemes.

5. Discussion and Research Recommendations

5.1 Conceptual model for alternative car options

This paper has looked at a range of alternative models of car ownership and use, attempting to synthesise the available evidence about their current scale and viability, their impacts on travel habits, and the policy attention that they receive.

A key issue is how far such options are used as an 'emergency back-up plan' or 'for extremely rare occasions', as opposed to starting to affect people's decisions about their (more) regular habits. Where only providing an emergency back-up plan, there may still be some benefits – for example, where vehicles are cleaner than personal vehicles or lead to higher-than-average vehicle occupancies – and such options may be fulfilling a socially useful role (though at the same time, they could be deterring people from trying other transport options). However, the main benefits are likely to arise where the existence of such options has an impact on everyday travel behaviour.



In thinking through the implications of alternative models of car ownership and use, it seems pertinent to consider different groups, and different stages of life.

For *non-car-owners*: the impact could be to delay/obviate purchase of a personal vehicle, but to increase personal car use.

For *car owners*: the impact could be to alter the type of vehicle purchased, and to stabilise or reduce household car levels, and thereby reduce household car use.

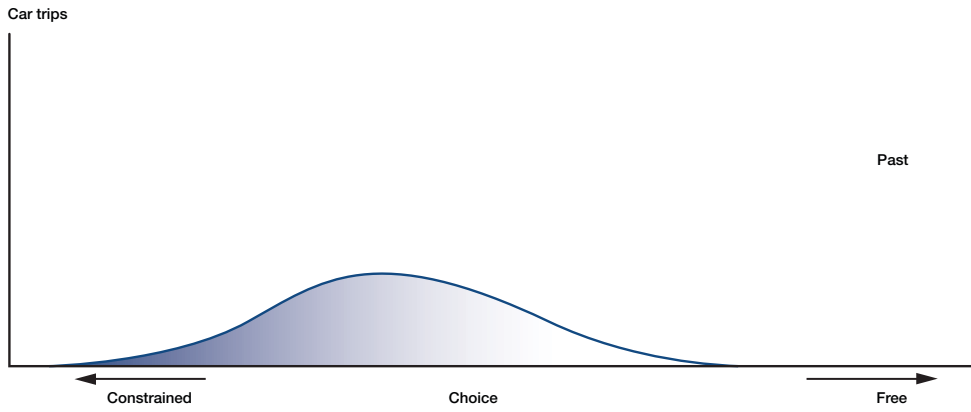
The RAC Foundation ‘Car Dependence’ report (Goodwin, 1995) conceptualised car journeys as a series of curves, as shown in Figures 5.1 to 5.3.

In this model, there is always likely to be a ‘hard core’ of journeys that are best made by car, but the proportion of journeys in this group will vary, depending on factors ranging from land-use decisions to subjective choices. These graphs were created as potential images of the past, present and future, but can arguably be also used to also consider the situation of different groups.

For example, non-car-owners may be in a situation similar to graph A – with a small proportion of car-dependent journeys, presumably made by a combination of rental, lifts or taxis. The existence of these options may move them towards graph B, though the extent of the movement is likely to depend on the cost and hassle factors involved. Evidence from car clubs suggests that the movement is likely to be relatively small.

Conversely, ‘average’ car owners arguably have a travel pattern that corresponds to graph B – here, there are two potential options. The first is that, where alternative car options used as an emergency back-up, there may be no movement. The second is that the existence of such options may move them towards graph A.

Figure 5.1: Graph A – low level of car dependence



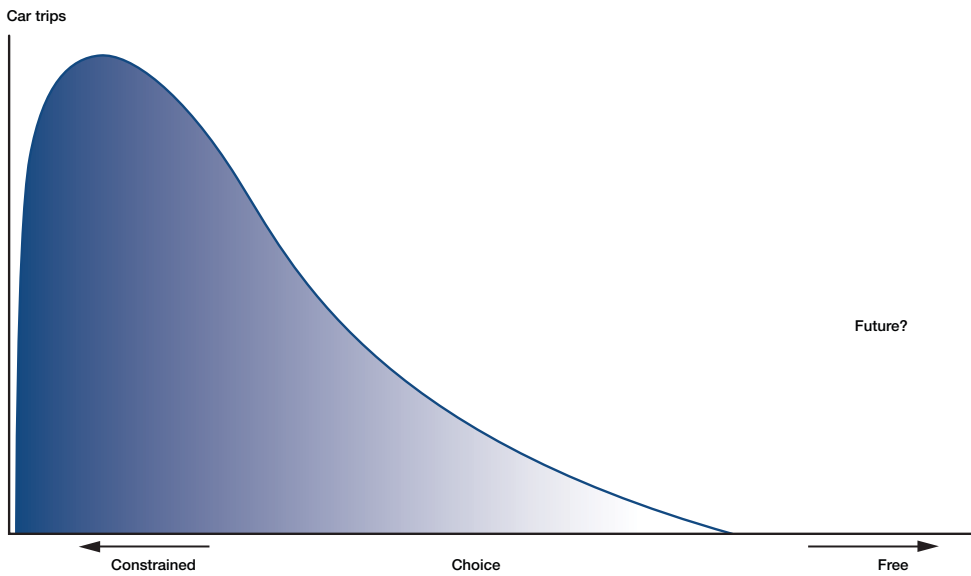
Source: Goodwin (1995)

Figure 5.2: Graph B – intermediate level of car dependence



Source: Goodwin (1995)

Figure 5.3: Graph C – high level of car dependence



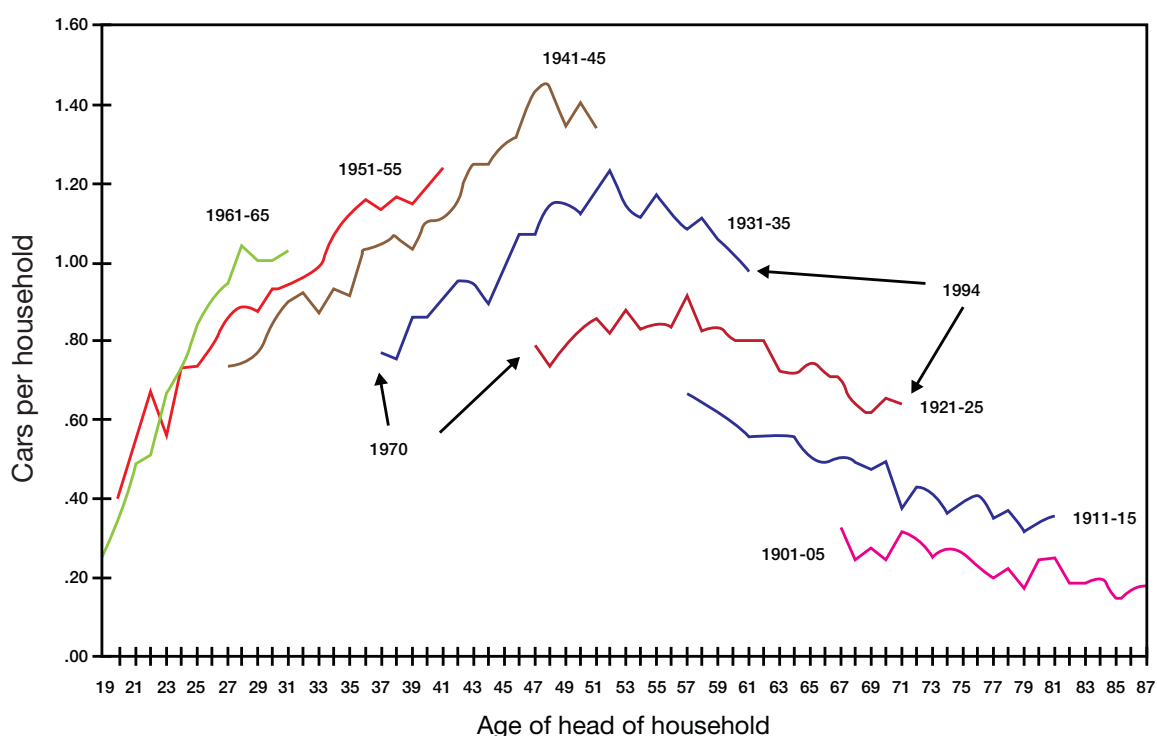
Source: Goodwin (1995)

In thinking through these issues, there are several further dimensions of relevance.

First, people at different stages of life may be at different levels of dependence – for example, as shown in Figure 5.4, levels of car ownership change with age, and over time – today’s 50-year-olds are probably closer to graph C than those born twenty years ago, as are all 50-year-olds compared with the average 20-year-old. Hence, alternative car options might play a particular role at particular life stages. For example, they could be of more relevance to 20- to 30-year-olds, and help to ‘lengthen’ their relatively sustainable habits.

Meanwhile, it is interesting that Bonsall et al. (2002) suggest that initiatives such as car clubs and car sharing may offer particular advantages to the elderly, but they may be far less likely to take them up – even though levels of taxi use and informal sharing are relatively high amongst these groups.

Figure 5.4: Data from the family expenditure survey about changes in car ownership for particular age groups, for different birth cohorts



Source: Dargay & Vythoulkas (1998: 5)

Note: every second cohort shown with year of birth bands for head of household; observation period 1970–1994.

Second, there seems to be some evidence that vicious and virtuous circles come into play. In relation to the Sustainable Travel Demonstration Towns work,

Brog (2010) reported on research involving a hierarchical model of people's decision-making for particular journeys. This showed that, over the Sustainable Travel Demonstration Towns period, both objective and perceived constraints reduced – i.e. as people became more used to travelling by alternative modes, they were more likely to perceive them to be realistic options. In other words, if alternative car options are effective at starting to move people from graph C to B or B to A, the implication is that a 'virtuous circle' effect could then help that movement further. If this is true, this means that the potential for changing travel habits through the promotion of such options could be substantial.

Third, there is a general literature indicating that people are particularly open to adopting new travel habits at times of change in their lives – for example, when they move house or move job, or when their car breaks down or comes round for the annual renewal of tax or MOT. It would be interesting to know how far people look at alternative car options at these points in their lives, and how far these occasions could be used to promote such options.

Fourth, if alternative car options are of particular interest to people for whom owning a car is a relatively marginal decision, it would be useful to understand more about who these people are and/or when these decisions arise, and the nature of the churn underlying the average figures – for example, a 1% change in national car ownership is likely to reflect a much higher proportion of people both increasing and reducing their car ownership. Headicar (2010) postulates that needing a car for the journey to work may be a particularly important factor determining car ownership, implying that 'freeing' people from this constraint (for example, through workplace travel plans that provide more sustainable options) may generate the potential for much more substantial changes in travel habits. One of the other seminar participants suggested synergies between alternative car options and internet shopping services for groceries.

Fifth, at the seminar it was noted that there may be substantial changes in the future context for alternative car options. For example, electric vehicles may come with substantially different pricing structures (either higher 'pay-upfront' capital costs, or battery leasing schemes, which make rental a more commonplace part of car ownership, and may lead to new financial and insurance models). Wider take-up of electric vehicles may also encourage a national shift towards road pricing, in order to compensate for lost tax revenue. Clearly, the nature of the context in which options are promoted will inevitably affect uptake. From a different perspective, Stokes (2010) reports on the observable increase in car ownership in South Yorkshire following the discontinuation of the low fares policy – again highlighting the relationship between car ownership and the nature of other transport options.

5.2 Research themes

In relation to alternative car options, there are a number of common themes that emerge, as described below.

Effects of car ownership on travel habits

An underlying theme of this paper is that ‘pay as you go’ car use is likely to be more ‘rational’ than habituated, pay-upfront car use, and that levels of household car ownership shape how people choose to travel, over and above other determinants of their travel choices.

This is perhaps substantiated by reports that ‘in studies of travel behaviour, it [personal car ownership] has been found (unsurprisingly) to be the most important single factor influencing a person’s level of car use (i.e. beyond age, gender, income, home location etc)’, Headicar (2008). Equally, based on focus group work, Lucas and Psaila (2009) reported that ‘there was the general sentiment across all the groups that once you have a car, you tend to use it, even when it’s not necessary’.

The implication is that, *if* alternative car options reduce car ownership levels, or help to prolong non-car-ownership, the environmental impacts are likely to be positive.

However, one research priority could be to look into this issue further. For example, this might include an exploration of the literature on road pricing; a consideration of data from the NTS showing how levels of household car ownership affect travel choices when controlling for other factors; or an examination of data available from the recent Sustainable Travel Demonstration Towns project, to explore whether car ownership levels had a specific effect on people’s propensity to change how they travelled.

Non-car-owners and/or users of alternative car options

There is a group of people who do not own cars, and who rely on some or all of these alternative car options (i.e. rentals, lifts and/or taxis). What is unclear is the scale and nature of this group. As described by Lucas and Psaila (2009), non-car-ownership is often viewed negatively, with many of those who do not have cars wishing to do so. However, the reduction in the number of younger people obtaining a full driving licence (according to DfT (2008), the proportion of those aged 21–29 with a full car driving licence fell from 75% in 1998/2000, to 66% in 2007), the membership of initiatives such as car clubs by relatively wealthy professionals, and the wider development of ‘urban lifestyles’ all indicate that at least some non-car-owners are such by choice. It is also clear that many of the more innovative initiatives here – such as car clubs, formal car-share matching schemes and HOV lanes – are often reporting substantial growth over time.

Hence, it would be interesting to understand how either non-car-owners, or how users of these new options, perceive their 'alternative car options' package and whether access to a car in these alternative ways has had an effect on their own decisions about personal ownership (for example, has it delayed or obviated a need to buy their own vehicle, or more household vehicles, either because of providing a viable mode for key journeys, or providing a link to public transport?). Where alternative car options are being used as a substitute for personal ownership, or second car ownership, it would then be interesting to explore whether there are ways in which an 'alternative car options' package could be successfully marketed to more people and/or could encourage people who adopt it for a certain period of their lives to continue with it for a longer period. There are several potential routes into identifying these people – such as looking for members of car clubs or those from the NTS who report on regular taxi/minicab use. It is likely that examining these issues might usefully link into other work on market segmentation of different types of transport users. It would also be useful to understand how current use of particular options affects the transport choices that people make in the future.

Notably, some of the alternative car options are undoubtedly providing important social inclusion benefits – for example, for elderly or disabled people who are unable to drive themselves, and who do not have access to public transport. (In connection with this point, Lovejoy and Handy (2008) report on a series of focus groups with Mexican immigrants, which indicates how those without their own car develop complex strategies to access cars, including extensive sharing of cars, borrowing of cars, and getting rides.)



Synergy between alternative car options

It is clear that the different alternative car options are potentially synergistic in terms of offering an alternative to mainstream car use. For example, car club vehicles are typically not used for the journey to work, with at least one operator arguing¹² that people need to be making their commute by another means in order for car club membership to make financial sense. Meanwhile, formal car-sharing matching schemes seem to be most successful at encouraging sharing for the journey to work. One car club member has also commented¹³ that taxis make particular sense for short journeys, when intending to stay at the destination for a long period (say, the whole day), since otherwise hiring the car club vehicle starts to seem expensive. However, it is unclear whether those operating the schemes think in those terms – it seems more likely that those running taxi companies, car clubs, vehicle rental or car-sharing schemes see themselves as being in competition. *liftshare* have called for a town or city-wide car-sharing trial. It might be more interesting to conduct a trial of all of the alternative car options, including developing collaborative relationships between the providers and a public transport operator, and perhaps offering a range of joint services. For example, at the seminar, it was highlighted that the Swiss *mobility* car club has direct links with other forms of transport. Seminar participants also highlighted the potential benefits of intra-industry collaboration – for example, car clubs offering reciprocal membership for members; and the potential for greater standardisation and interoperability of booking and billing systems, to make things easier for customers.

Relationship with other transport options

Alternative car options are potential competitors to public transport, walking and cycling. Supporting options which appear to lock people into car use (in whatever form) may appear relatively unsustainable. However, it is unclear whether this argument can be justified in practice.

It seems likely that alternative car options:

- may be the only realistic travel choice in some circumstances;
- may be cheaper and more environmentally beneficial for the public sector than trying to provide buses in circumstances where ridership would be relatively low;
- will be used relatively rationally by people given the ‘pay as you go’ element;
- may sometimes provide the key access/egress link to public transport;
- may encourage or sustain the adoption of travel patterns that rely on a range of modes, particularly where they impact personal car ownership.

However, it is equally the case that:

¹² RAC Foundation expert seminar.

¹³ RAC Foundation expert seminar.

- price will be a key determinant and (artificially) cheap alternative car options may undermine public transport;
- fully loaded cars will still be less environmentally beneficial than walking, cycling or travelling on a fully loaded bus or train (in terms of emissions per passenger mile);
- the existence of alternative car options may reduce the incentive for people to try other means of travelling.

One possible route into an analysis of these arguments is to address the questions ‘what would people do otherwise?’ and ‘what did people do before these options existed?’.

There is some positive evidence from: the car clubs literature, which points to a synergistic relationship with other modes; some of the shared taxi schemes which have been specifically set up in conjunction with the public transport offering; and the data relating to the effects of car sharing in situations where there is no public transport available. There are also some indications, though no firm evidence, from both HOV lanes and the Milton Keynes shared parking scheme that bus use may have increased in parallel with their success.

However, the work by ITP (2004a and 2004b) on workplace car-sharing schemes, and the *liftshare* evidence both indicate that – for particular types of schemes in particular circumstances – there is likely to be a balance between participation by those who were previously single occupancy drivers and those who previously travelling by other means.

The implication is that it is difficult to generalise – and important to understand the nature of the balance, and how far it is affected by context, the details of the scheme and associated policy measures.

Potential for policy discussion and support

The relative lack of public support – or even discussion – about the promotion or implementation of alternative car options – is striking when compared with many other areas of transport policy. It is unclear how far this relates to a lack of belief that they represent a viable alternative to mainstream car use, and how far it is because of concerns about their sustainability credentials.

This issue received particular attention during the seminar – with participants noting that the attraction of ‘alternative car options’ is that they potentially ‘go with the grain’ (offering a behavioural shift which is relatively compatible with wider social trends), and fit relatively well with the ‘big society’ concept, in that they often involve locally delivered solutions. It was also noted that although many of the options discussed are delivered by private companies and lead to individual benefits, it is not necessarily the case that the market will deliver or that people will automatically change their behaviour. For example, Parker

(2010) noted that the number of members of formal car-share schemes is much higher in Devon than in Yorkshire, despite a number of similarities between the areas, which will partly be due to the higher level of advertising and marketing about car sharing in the former.

Although funding would clearly be one policy means to encourage alternative car options (particularly 'kick-start' funding for new initiatives), it was noted that there were a number of other ways in which policy could encourage, or discourage, alternative car options

For example, various instances were given where current policy is hostile to the wider adoption of alternative car options. In particular, the following were noted.

- The Dutch move to a national system of taxi licensing made it possible for shared taxi services to be provided to a number of provinces and cities by 'Connexxion', an operator with national reach and significant economies of scale. In contrast, any operator wishing to provide a similar shared taxi service in England would have to secure a licence from every district or unitary authority in which they wished to operate, often with different rules and restrictions.
- The police are the designated enforcing authority for HOV lanes, but often do not have the resources to do so, meaning that the integrity and success of such lanes is only maintained by ongoing funding for enforcement costs from local authorities. The situation could be eased if mechanisms were in place to offset these local authority costs against penalty ticket revenues.
- The exclusion of travel from the Carbon Reduction Commitment¹⁴, and, separately, the relatively limited mention of travel in the Defra guidance to organisations on greenhouse gas reporting (such that only emissions from travel in vehicles *owned* by the organisation are included in scope 1 emissions, and there are no travel inclusions in scope 2 emissions – see <http://snipurl.com/1trxl2> [www_defra_gov_uk]) have both meant that companies have been relatively uninterested in promoting car sharing as an emissions reductions technique.

Various examples were also given where policy had helped or could help to encourage alternative transport options, including:

- changes in competition rules to enable bus operators in Oxford to offer joint tickets;
- legislation in California to change the insurance rules making it easier for individual cars to be used in vehicle-sharing schemes (Assembly Bill 1871);
- work on travel plans, which would potentially reduce the need to own a car to commute.

¹⁴ Any emissions resulting from the use of on-site metered electricity for charging electric vehicles would, however, be included.

Participants noted that it was unclear how, in funding allocations, alternative car options could compete with mainstream car options (for example, the Department for Transport's own very high benefit–cost ratios for car sharing did not seem to have led to more resources being devoted to car sharing); and that greater integration or standardisation of information, or booking or billing systems, could naturally come from government (with links to existing streams of work in this area). In general, it was agreed that more understanding about the current position, and the appropriate role for the public sector, would be beneficial.

5.3 Research possibilities

As already outlined, this paper has been based primarily on an informal assessment of the readily available national literature on this topic. It is clear that more information could be sought in order to flesh out the existing knowledge base. There are a number of different types of research activity that could be undertaken (all of which could potentially inform different aspects of the topic). These include the following.

- Further review of the literature – such as information about how people choose cars (currently receiving increasing attention in relation to electric vehicle market assessments), evidence from road-pricing about the effects on use of changing to ‘pay as you go’ driving, and evidence about demand-responsive transport solutions. A review of the international experience of alternative car options might provide a useful comparison with UK experience.
- Further analysis of existing data sets – for example, the Carplus surveys or the *liftshare* database, or data held by vehicle rental companies or taxi companies.
- Analysis of NTS data, obtaining special tabulations of information about groups of interest – for example, comparing the travel patterns of groups depending on levels of household car ownership, whilst controlling for other variables such as age or household composition; or looking at the impacts on travel habits of the age of first owning a car; or looking at the travel habits of groups of, say, regular taxi/minicab users. It might also be interesting to explore whether the NTS could capture more information about use of alternative car options.
- Further monitoring and evaluation of schemes such as the Milton Keynes parking scheme, some of the HOV lanes, and some of the shared taxi schemes – together with future assessment of WhipCar and Mu, as they become more established. It is notable that new camera technology may provide new opportunities for measuring vehicle occupancies.
- Analysis of the household surveys database created for the Sustainable Travel Demonstration Towns, to assess whether there was any difference in the average behaviour change that occurred, depending on car ownership levels.

- Analysis of the DVLA and VOSA databases about car ownership and typical mileages, to look at issues such as churn in ownership and the effects of age of first purchase of a car on subsequent travel habits.
- Analysis of how fuel consumption per capita changes with geographical area and over time – for example, to assess whether the widespread promotion of car sharing in particular locations is sufficient to lead to a decrease in consumption.
- Interviews and/or focus group work with those who choose to be non-car-owners or those who are using alternative car use options (e.g. users of HOV lanes, car clubs, car-sharing schemes).
- Interviews and/or focus group work with the general public – or particular sectors of the public – looking at the potential public interest in alternative car options. For example, the RAC might be particularly well-placed to provide access to people whose car has recently been written off!
- An assessment of the policy support that would help to mainstream alternative models of car ownership and use in a way which optimised their sustainability credentials.



6 References

- Anable, J. & Schuitema, G. (forthcoming). *Workpackage 1.3.1 Literature Review of Car Purchasing Behaviour*. ETI report.
- Bonsall, P., Jopson, A., Pridmore, A., Ryan, A. & Firmin, P. (2002). *Car Share and Car Clubs: Potential Impacts*. Final report to the DTLR and the Motorists Forum, London.
- Bradshaw, T. (2010). Whipcar uses web to drive innovative rental scheme. *Financial Times* website, 2 May. Retrieved 24 January 2011 from <http://www.ft.com/cms/s/0/39022cfe-5612-11df-b835-00144feab49a.html#axzz1BwgRM9WJ>.
- Brog, W. (2010). *Attitudes, Perceptions and Triggers for Behaviour Change in the Sustainable Travel Towns and Lessons for Future Personal Travel Planning Programmes*. Presentation at the Sustainable Travel Towns expert panel, 16 June, DfT, London.
- Brons, M., Givoni, M. & Rietveld, P. (2009). Access to rail stations and its potential in increasing rail use. *Transportation Research Part A*, 43: 136–149.
- Cairns, S., Newson, C. & Davis, A. (2004a). *Making School Travel Plans Work: Research Report*. Report for the Department for Transport.
- Cairns, S., Newson, C., Davis, A. & Swiderska, C. (2002). *Making Travel Plans Work: Research Report*. DfT, London.
- Cairns, S., Sloman, L., Newson, C., Anable, J., Kirkbride, A. & Goodwin, P. (2004b). *Smarter Choices: Changing the Way We Travel*. DfT, London.
- Carplus (2008). *Monitoring Car Clubs*. First Carplus car club (2007) members survey report. Carplus, Leeds.
- Carroll, S. (2010). *The Smart Move Trial: Description and Initial Results*. Report by Cenex, Centre of excellence for low carbon and fuel cell technologies, Loughborough.
- Chatterjee, K. (2010). Personal correspondence.
- Chesters, G. & Smith, D. (2001). The neglected art of hitch-hiking: risk, trust and sustainability. *Sociological Research Online* 6(3).
- City Car Club (forthcoming). *Deliverable D50: Final results from the Implementation of New Mobility Services for More Efficient Vehicles or Less Car Dependent Lifestyles – City Car Club in Bath*. Output from the Civitas Renaissance project, due February 2012.

Clark, M. (2010). *Camden and Islington Car Club Market Study*. Presentation on report by SDG at annual Carplus conference, London, 11 March.

Commission for Integrated Transport (2008). *A New Approach to Rural Public Transport*. Commission for Integrated Transport, London.

Dargay, J. & Vythoulkas, P. (1998). *Estimation of Dynamic Transport Demand Models Using Pseudo-Panel Data*. 8th World Conference on Transportation Research, Antwerp.

Department for the Environment, Food and Rural Affairs (Defra) (2009). *2009 Guidelines to Defra / DECC's GHG conversion factors for company reporting*. Retrieved 24 January 2011 from <http://www.defra.gov.uk/environment/business/reporting/pdf/091013-guidelines-ghg-conversion-factors-method-paper.pdf>.

Department for Transport (DfT) (2006). *Traffic Advisory Leaflet: High Occupancy Vehicle Lanes*. DfT, London.

DfT (2008). *National Travel Survey: 2007 Interview Data*. DfT, London.

DfT (2009a). *Transport Statistics Bulletin: National Travel Survey 2008*. DfT, London.

DfT (2009b). *Transport Statistics Great Britain, 2009 Edition*. DfT, London.

Devon County Council (2007). *Devon Fare Car – Report of the Rural Bus Challenge Project. Final Report September 2002 to May 2006*. Devon County Council.

Devon County Council (2010). *Carsharedevon.com Attracts New Members*. Press release 16 February .

Enoch, M. (2003). Pooling together: why the vanpool works in the US and the Netherlands. *Traffic Engineering and Control*, January 2003: 12–14.

Enoch, M., Potter, S., Parkhurst, G. & Smith, M. (2006). *Why Do Demand Responsive Transport Systems Fail?* Paper for the 85th Annual Meeting of the TRB 2006, based on work from the Intermode study.

Enoch, M. & Taylor, J. (2006). A worldwide review of support mechanisms for car clubs. *Transport Policy*, 13(5): 434–443.

Europcar Comms (2010). *Stress and the Chassis – The Cost of Dormant Urban Motors to Our Pockets*. News item 28 May. Retrieved 14 June 2010 from <http://news.europcar.co.uk/2010-05-28/stress-and-the-chassis-the-cost-of-dormant-urban-motors-to-our-pockets/>.

Fellows N. T. & Pitfield D. E. (2000). An economic and operational evaluation of urban car-sharing. *Transportation Research Part D*, 5: 1–10.

Goodwin, P. (ed) (1995). *Car Dependence. A Report for the RAC Foundation for Motoring and the Environment*. London: RAC Foundation for Motoring and the Environment.

Greater London Authority (2010). *Clearing the Air: The Mayor's Draft Air Quality Strategy for Public Consultation*. GLA, London.

Halsted, L. (2010). *Electric Car Clubs in Camden*. Presentation at annual Carplus conference, London, 11 March.

Harmer, C. & Cairns, S. (2010). *Carplus Annual Survey of Car Clubs 2009/10*. TRL PPR 476, Crowthorne.

Headicar, P. (2008). *Trends in Car Ownership, Use and Dependence: Their Implications for a Sustainable Transport Agenda*. Presentation at the 2008 National Transport Conference, London.

Headicar, P. (2010). Personal correspondence.

Highways Agency (2009). *Explanatory Memorandum to the M62 and M606 Motorways (Chain Bar Roundabout) (Car Share Lane) Regulations 2009 no. 2247*. Report to Parliament.

Howard, B. (2008). Insurer stops 'pay as you drive'. *BBC News*, 14 June.

Institute of Transport Management (2007). *Accusations About Emissions of London Black Cabs Completely Unfounded, Say Manufacturers LTI*. Press release, 13 August.

ITP (2010). *Regional Rural Car Share Feasibility Study: Final Report*. Report to the Yorkshire and Humber Rural Access to Opportunities Programme, produced by ITP, Birmingham.

ITP with Richard Armitage Transport Consultancy, Cleary Hughes Associates & Austin, J. (2004a). *Making Car Sharing and Car Clubs Work: Case Study Summaries*. DfT, London.

ITP with Richard Armitage Transport Consultancy, Cleary Hughes Associates & Austin, J. (2004b). *Making Car Sharing and Car Clubs Work: Final Report*. DfT, London.

Kwon, J. & Varaiya, P. (2008). Effectiveness of California's high occupancy vehicle (HOV) system. *Transportation Research Part C*, 16: 98–115

Latham, S., Boulter, P., McCrae, I. & Turpin, K. (2008). A best practice guide for reducing emissions from taxis in London. PPR349, TRL, Crowthorne.

LeaseEurope (2007). *Vehicle leasing and rental companies' contribution towards emission reductions*. Retrieved 14 June 2010 from www.leaseurope.org/uploads/documents/positions/pp070924.pdf.

Le Vine, S., Lee-Gosselin, M. & Polak, J. (2009). *An Analysis of Car Club Participation and its Environmental Effects*. Paper to the 2009 Universities Transport Studies Group Annual Conference, London.

Local Transport Today (2006). News: HOV lane link with workplace travel plans, Highways Agency suggests. *LTT*, Issue 437, 23 February.

Local Transport Today (2007). News: Kent scraps new road HOV lane plans. *LTT*, Issue 464, 15 March.

Local Transport Today (2007). News: Growing doubts about whether M1 HOV lane trial will get off ground. *LTT*, Issue 478, 27 September.

Local Transport Today (2008). News: M1 HOV lane plans ditched amid safety concerns. *LTT*, Issue 489, 6 March.

Local Transport Today (2008). News: First motorway HOV lane. *LTT*, Issue 491, 3 April.

Local Transport Today (2009). News: Newham considers converting bus lanes into high occupancy vehicle lanes. *LTT*, Issue 530, 9 October.

Lovejoy, K. & Handy, S. (2008). A case for measuring individuals' access to private-vehicle travel as a matter of degrees: lessons from focus groups with Mexican immigrants in California. *Transportation*, 35: 601–612

Lucas, K. & Jones, P. (2009). *The Car in British Society*. RAC Foundation, London.

Lucas, K. & Psaila, A. (2009). *The Car in British Society – Working Paper 6 – Focus Group Exercises*. RAC Foundation, London.

McDonald, M., Crockett, J. & Beecroft, M. (2003). *The Role of Rail in Integrated Transport*. Leeds ITS for Rail Research UK, RRUUK/C3/1.

Mott MacDonald (2008). *The Role of Taxis in Rural Public Transport: Final Report*. Commission for Integrated Transport, London.

MVA Consultancy (2010). *Smarter Travel Richmond upon Thames: First Annual Report*. Report for Transport for London, London.

Myers, D. & Cairns, S. (2009). *Carplus Annual Survey of Car Clubs 2008/9*. TRL published project report PPR399.

Newson, C. (2002). *Making Travel Plans Work: Lessons for Good Practice*. DfT, London.

Newson, C., Cairns, S. & Davis, A. (2010). *Making School Travel Plans Work*. Good practice guide produced by the Department for Transport. Transport for Quality of Life.

Parker, J. (2010). Personal correspondence.

Parker, J., Bradley, J., van de Graaff, E. & Johnson, R. (2010). *Key Findings, Conclusions and Recommendations from the Yorkshire and Humber Regional Rural Car Share Feasibility Study*. Presentation 19 May 2010, Leeds.

Parking Review (2009). News: Aberdeen to trial HOV and lorry lane. *Parking Review*, Issue 214, 22 December.

Press Association (2008). Norwich Union drops pay-as-you-drive. www.thisismoney.co.uk

Rendall, J. (2010). Peugeot's cut-price car rental. *Autocar*, 4 February. Retrieved 9 June 2010 from www.autocar.co.uk/News/NewsArticle/AllCars/247334/.

Richards, A., Beecroft, M., Waterson, B. & McDonald, M. (2008). *The Role of Lift Sharing in Future Mobility*. Universities Transport Studies Group conference. Southampton.

RSSB (2010). *Topic Note on Integrated Transport T824*, RSSB Research Programme, London.

Russon, C. (2010). Mu points Peugeot in new direction. *RoadRecord*, 21 May. Retrieved 9 June 2010 from www.roadrecord.co.uk/news/article/mu-points-peugeot-in-new-direction.

Scott, M. (2008). *The Long Term Sustainability of Liftsharing and its Effect on Other Transport Modes*. Aston University MSc project.

Smith, I. & Emmerson, P. (2009). *Travel Plans – The Potential is Realised*. Evidence from the Highways Agency's ITB Programme. Powerpoint presentation to TRICS.

SMMT (2009). *Tenth Annual Sustainability Report: 1999–2008*. Society of Motor Manufacturers and Traders, London.

- South Gloucestershire Council (2003). *Park & Share at Aspects Leisure, Longwell Green, Planning Application*. Local Transport Plan multi-modal interchange strategy.
- South Gloucestershire Council (2004). *Local Transport Plan Annual Progress Report 2004*. South Gloucestershire Council, Thornbury.
- Stirling Maynard Transportation (2000). *Central Milton Keynes Car Share Feasibility Study*. Report to CMK Transport Group.
- Stokes, G. (2010). Personal correspondence.
- Synovate (2006) *Attitudes Towards Car Clubs*. Research for Transport for London.
- Vacher, L. & Hiptmair, E. (2006) *Demonstrating the Value of Rental*. ORC International presentation.
- Williams, D. (2010). New car-share scheme puts you at the wheel of your neighbour's car. *Telegraph*, 21 April. Retrieved 24 January 2011 from <http://www.telegraph.co.uk/motoring/news/7611549/New-car-share-scheme-puts-you-at-the-wheel-of-your-neighbours-car.html>.
- Whatcar? (2010). *Peugeot Launches Mu 'Mobility Scheme'*. News item 4 February. Retrieved 9 June 2010 from www.whatcar.com/car-news/peugeot-launches-mu-mobility-scheme-/247340.

The Royal Automobile Club Foundation for Motoring Limited is a charity which explores the economic, mobility, safety and environmental issues relating to roads and responsible road users. Independent and authoritative research, carried out for the public benefit, is central to the Foundation's activities.

RAC Foundation
89-91 Pall Mall
London
SW1Y 5HS

Tel no: 020 7747 3445
www.racfoundation.org

Registered Charity No. 1002705

February 2011 © Copyright Royal Automobile Club Foundation for Motoring Limited

Designed and printed by
The Javelin Partnership Ltd
Tel: 01189 303 123

Produced on paper from a managed sustainable source, using pulp that is ECF, also FSC certified as containing 50% recycled waste. Printed using vegetable soya based inks.