DIFFICULTIES IN OBTAINING COMPREHENSIVE DATA FOR EVALUATION OF SUSTAINABLE TRANSPORT INITIATIVES

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1. BACKGROUND

The paper originates from work for Derek Halden Consultancy on evaluation and monitoring of Smarter Choices, Smarter Places programme between January and December 2012. The Transport Scotland' programme, designed to increase active travel and public transport use and tackle transport emissions involved seven local authorities: Barrhead, Dumfries, Dundee, Glasgow East End, Kirkintilloch/Lenzie, Kirkwall and Larbert/Stenhousemuir. Between 2008 and 2012 nearly 10 million have been invested across the towns on provision of the infrastructure, with further 5 million spent on promotion and organisation.

Firstly, the main difficulties in obtaining reliable data from local authorities on pedestrian and cyclists' activities are briefly identified. Then two unique dataset are introduced: the lift sharing data and the MOT data. The data analyses are presented along with the limitations of its interpretation and the difficulties in drawing conclusions from their results. Finally, reflections and recommendations for obtaining more comprehensive datasets are discussed.

In the paper, the local authorities that provided the data of limited use are purposely not named. The term 'lift sharing' is used for the name of activity where two or more persons, from whom one owns the car, voluntary meet in order to share the car journey.

2. DATA ON PEDESTRIAN AND CYCLE ACTIVITY

Several indicators and sources of data have been used to estimate travel behaviour change that resulted from initiatives within the Smarter Choices Smarter Places Programme. While obtaining the data from private sector entities presented no greater difficulty, on few instances retrieving the data from local authorities that were responsible for the programme delivery proved to be challenging.

In order to establish travel behaviour change in the towns, numbers of pedestrians and cyclists were required. Having that in mind, in the early stages of the programme, counters were installed across all towns to capture movements of pedestrians and cyclists. The data were to be collected a few times a year between 2008 and 2012 in order to observe emerging trends in usage of new facilities.

Reliable and consistent data were provided for two out of seven local authorities the data were collected from. Among the reasons given to justify the missing data were:

- Software issues, the lack of counters' maintenance and calibration,
- Cameras not fit-for-purpose – in one town it was found that previously installed cameras aimed the traffic offence surveillance and were not able to count pedestrians,

- Inability to extract the data by the officer,
- Vandalizing of the counters.

The supplied data from those authorities lacked consistency, both in terms of time and locations. Additionally, due to lack of calibration and maintenance of the counters, reliability of their outputs was doubtful. In result, in four towns extra pedestrian counts needed to be commissioned, and in two of them they also included counting of the cyclists.

It may be said that it should have been unproblematic to gather and collate the data from pedestrian and cycle counts - it involved natural numbers and no data processing was needed. Yet, it proved to be difficult for majority of authorities to complete the task. The longitudinal character of the project' monitoring shall not justify the lack of fulfilment.

3. LIFT SHARING DATA

3.1. Background

One of the new innovative datasets used when working on evaluation of the programme was the lift sharing data. They were obtained from company Liftshare (liftshare.com) which manages data for all of the Regional Transport Partnerships covering the Smarter Choices, Smarter Places areas. Founded in 1997, their website allows members of the public to seek and offer car spaces. Via its search engine, users are able to specify such parameters as departure and destination points, travelling times and gender. In March 2013 there were 553,698 members who registered to Liftshare, with 1199 car-share schemes run by it (Liftshare 2013). In recent years Liftshare became the most important lift sharing website in the UK and is the biggest national datasource on lift sharing in Scotland.

Benefits of lift sharing include reduced travel costs, opportunities to meet new people and reduction of congestion and pollution (Bannister 2005). It is therefore understandable that all authorities involved in Smarter Choices Smarter Places programme declared willingness to promote the lift sharing among their initiatives, either as a separate initiative or as a part of their wider travel planning campaigns. After programme gained momentum it was expected that the number of shared lifts was 'low but growing', but it was unknown how successful the Smarter Choices, Smarter Places' initiatives were due to the difficulties in sourcing data on lift sharing from scheme managers (Scottish Government 2012).

It is known that the number of people involved in lift sharing tends to be difficult to estimate due to its often informal character and irregularity. Little is known on the national levels of lift sharing, but there were attempts that aimed to establish it. The study of Robinson, Humphrey and Budd (2007) based on NatCen Omnibus random probability survey of 1530 adults aged 16 or more found that 61% of respondents shared lift with someone who lived outside their household in the month prior to interview. Furthermore, 28% of them declared that lift took place on regular basis, more than once a week. At the same time, only 1% of respondents admitted

membership of a car sharing scheme. Furthermore, from National Travel Survey is known that single occupancy cars form 85% of commuting and business trips in the UK (DfT 2010).

3.2. Results

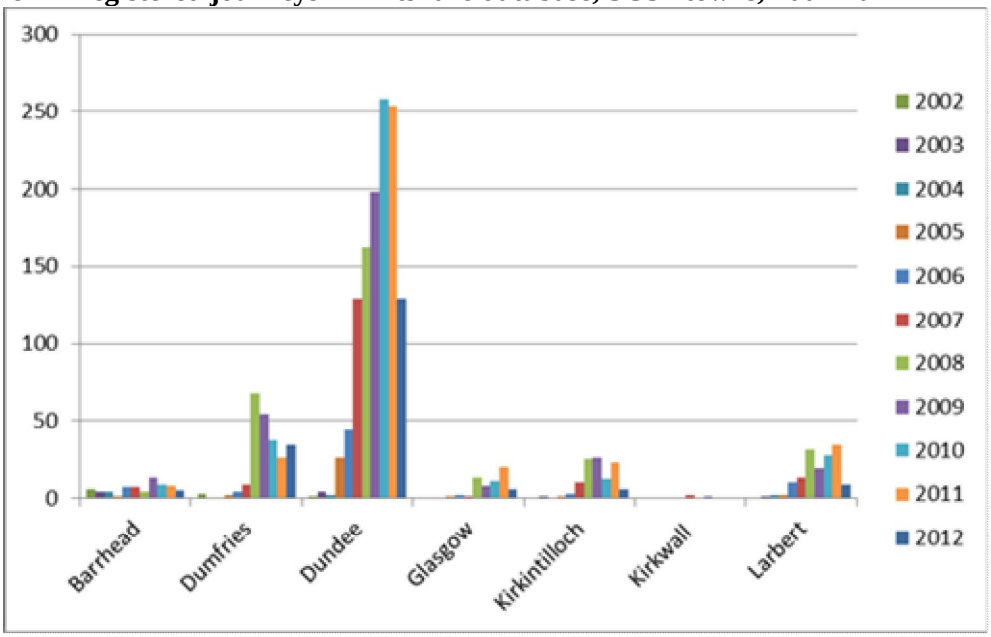
The data in Table 1 presents number of Liftshare registered and contacted subscribers. Across seven Smarter Choices, Smarter Places towns there are 1583 people registered to the programme. The majority of them were from Dundee, where 1028 people subscribed into it. 42.4 % of registered users made at least one lift sharing contact, and the match rate varied from 48.2% in Dundee to 20.3% in Barrhead. Only two people registered in Kirkwall.

Table 1 - Registered and contacted subscribers to Liftshare, 2002-2012

Town	Registered subscribers	Registered subscribers as percentage of area population	Subscribers that made contact via TripShare	Percentage of subscribers that made contact
Dundee	1028	3.32%	495	48.2%
Labert & Stenhousemuir	132	0.68%	60	45.5%
Dumfries & Galloway	212	0.57%	45	21.2%
Barrhead	64	0.38%	13	20.3%
Kirkintilloch	89	0.27%	31	34.8%
Glasgow	56	0.20%	27	48.2%
Kirkwall	2	0.03%	0	0.0%
All SCSP towns	*1583*	*0.91%*	*671*	*42.4%*

Subscribers registered mainly as seeking (85.5%) or offering (12%) the car share journey. Other available options like walking, cycling or taking taxi together were less popular (2.5%). Figure 1 shows the number of registered journeys per year for each town of the Smarter Choices Smarter Places programme.

Figure 1 - Registered journeys in Liftshare database, SCSP towns, 2002-2012



From 2008, noticeable increases in registered journeys are evident for Dumfries, Larbert and Kirkintilloch, although the numbers in those towns generally remain low. In Dundee, the programme gained momentum in 2007.

3.3. Problems with interpretation of the results

The results obtained from such analysis need to be treated with caution. Firstly, number of Liftshare registered subscribers does not fully represent people involved in lift sharing, even if only these businesses where Liftshare was actively promoted are taken into account. Some informal lift sharers have never registered, and it may be expected that some registered subscribers have found matches among non-registered users by word of mouth or other channels. The level of informal lift sharing is difficult to be established and varies significantly between communities (Cairns et al. 2004).

The number of registered journeys is also not fully informative. According to the website, percentage of journeys registered resulting in a match being contacted is 37%. (Liftshare 2013). But the mere fact of registering journey does not imply that one is in need of that journey and is ready to perform it. It may be anticipated that some users registered journeys to test the website' possibilities or check various 'if' scenarios.

From Smarter Choices, Smarter Places towns 11.4% of subscribers registered more than one journey in the database, and 2.7% registered more than 3 journeys. Therefore, it may be expected that number of people that did not register requirement for the second journey when their journey origin or destination has alternated, is much higher. There are several possible reasons for not registering further journeys, they include:

- there was no contact for the first registered journey,
- the first established contact has not been successful and not resulted in lift sharing,
- the first lift sharing experience was disappointing,
- the lift sharing took place and all parts of new connection together changed their journey needs,
- the loss of interest and no incentive for further use of the website.
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Once registered subscriber found the person with similar journey need, he/she was to create connection in the database by registering interest in lift sharing. The website was promoted within businesses where people might have known each other by name and could contact personally without using the website. In addition to it, it is not so uncommon for lift sharing to encourage for more than two people (ibid. 2004). Hence, actual numbers of lift sharing connections could be higher.

Registering connection merely means that people have common interests in sharing the trip and may not reflect actual lift sharing taking place. For instance, in study of Cairns et al. (2004) the ratio of registered sharers to active sharers ranged from 11:1 to 48:31. More importantly, from the data that are available it is not possible to establish how lasting these connections were. Unknown are also people's experiences of the scheme and their level of satisfaction.

Little is also known about those who voluntary dropped the scheme. It is characteristic for most website-based solutions that require registration, that its members, once registered very rarely unregister, unless they are forced to do so. The number of registered members to liftshare.com may therefore remain high, despite the loss of interest of part of its users. Meanwhile, it is in company's interest to report high numbers of its subscribers in order to attract new members and future partners.

While it is difficult to analyse the lift sharing data, it is even more problematic to see their relation to sustainable travel behaviour. It is unknown how lift sharing interacts with other modes of commuting, and there are arguments that it either undercuts or supports them (Cairns et al. 2004). For instance, a formal car sharing scheme may lead to development of 'good' travel habits and resignation of car ownership, but it may also discourage bus use.

On the other hand, lift sharing data obtained from Liftshare provide the number of other variables that could be valuable source for analysis. Such information like subscriber profile (sex and year of birth), origin and destination coordinates, journey type ('seeking'/'offering'), previous mode of transport, or how subscribers heard about the programme, are available, but given the fact that real levels of lift sharing activity cannot be derived from the dataset, they have to be treated with caution.

Additionally, relatively low numbers of lift sharing journeys may make detailed analysis problematic. While it is difficult to analyse the Liftshare data collectively as they represent different locations with variety of uses, frequencies and modes of transport (e.g. 'cycling together' was expected by 1.2% of users), the disaggregation of data is at cost of their informational value. Below (Table 2) is the example of data on commuting, which was declared as journey purpose by 79.9%.

Table 2 – Average anticipated commuting distance from each town, SCSP 2002-2012

Origin	Number of commuting journeys	Average journey distance in km
Barrhead	9	140.3
Dumfries	32	41.9
Dundee	397	78
Glasgow	20	34.3
Kirkintilloch	30	78.2
Larbert	60	42
All towns	548	94.3

The avearge distance for Barrhead is affected by one commuting journey between Barrhead and Southampton, classified as happening 'daily/weekly'. Similarly, due to low numbers of shared journeys little can be said about commuting patterns for almost all towns.

Table 3 informs about the source of information about Liftshare programme. Such data may be used to evaluate and compare the effectiveness of various marketing channels.

In addition to the data that were subject of analysis, web traffic data like number of visits or unique visitors to the site can be also easily collated from liftshare.com. Such datasets, based on web analytics tools, are not yet commonly used in transport

planning, but could open new areas for analysis and application. Given the ubiquity of web-based applications with travel behaviour change in their core, it may be expected that they will become more widespread tools for evaluation and research within the discipline. Among the possible uses they may inform about:

- Raising interest in brands and web-based applications (e.g. number of unique visitors)
- Effectiveness of different marketing channels (referrals)
- Strength of interest in campaigns and persistence in participation (page views, bounce rate, time on site)
- Shifts of interests of the public (keyword analysis)

Table 3 - The source of information on Liftshare programme, SCSP towns, 2002-2012

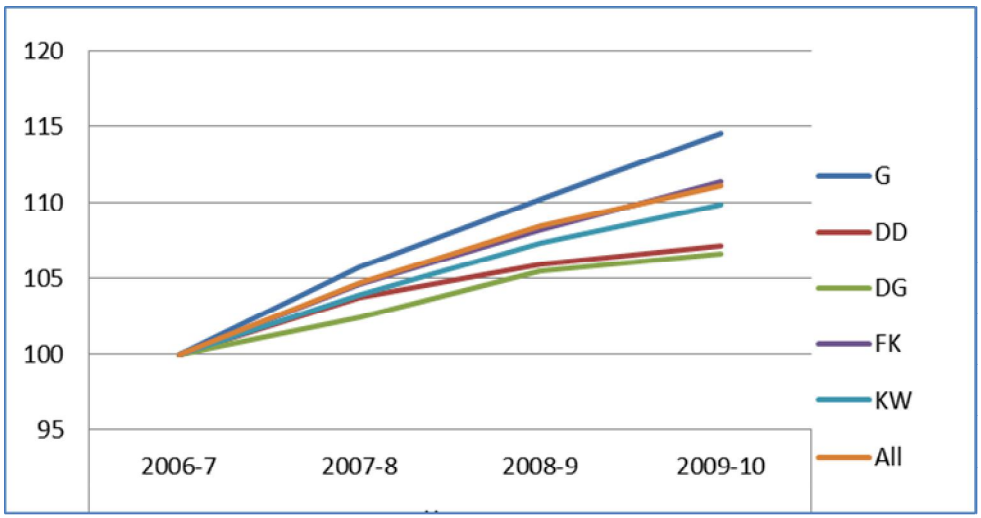
Source of information	Number of subscribers attracted via source	Percentage of the total number of subscribers	Source of information	Number of subscribers attracted via source	Percentage of the total
Website / website link	387	19.5%	Television	19	1.0%
Friend/family/colleague	275	13.9%	Facebook	11	0.6%
Intranet	270	13.6%	Back of bus	10	0.5%
Search engine	210	10.6%	Magazine/newsletter	8	0.4%
Email	191	9.6%	Road sign	8	0.4%
Radio	75	3.8%	Car park ad	3	0.2%
Poster	33	1.7%	Car sticker	2	0.1%
Newspaper	24	1.2%	You Tube video	2	0.1%
Flyer	23	1.2%	Car park ticket advert	1	0.1%
Promotional event	23	1.2%	Not specified	410	20.7%

4. MOT DATA

The other untypical dataset that was used for analysis were data on MOT-tested vehicles. The numbers of cars and their mileages are obtainable for each postcode area.

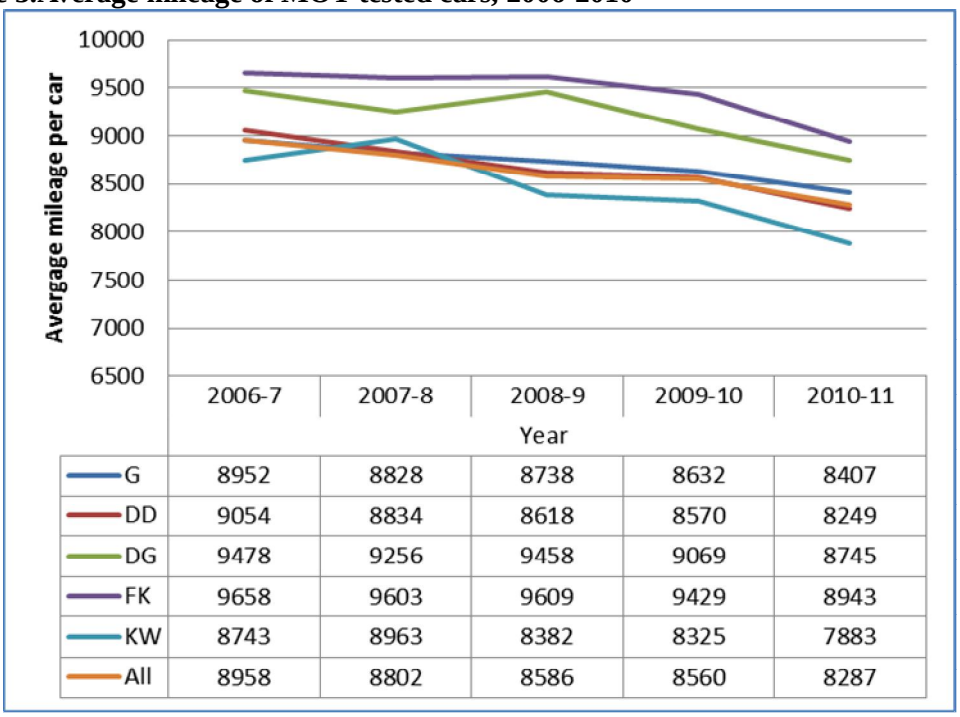
Figure 2 shows an index of MOT-tested cars in postcodes areas for the years 2006-2010 relative to the level from 2006. Increases are evident for all postcodes which could mean that the vehicle fleet is ageing with people keeping their cars longer and/or that there are more cars on the road. While the level of increase for FK and KW is very similar to the national average, number of cars in the G postcode area increased by 14.5%. Numbers of cars for postcodes DG and DD increased less considerably, by 6.6% and 7.2%, respectively.

Figure 2.Number of all MOT-tested cars in relation to the level from 2006-07 (when number of cars in 2006-07=100)



The average vehicle mileage decreased from 8958km in 2006 to 8287km in 2010 (Figure 3). Postcodes DD and G roughly followed national averages, falling steadily over the years, while there were some fluctuations for postcodes DG and KW. In recent years, the FK postcode area has had the highest average mileage from all postcodes.

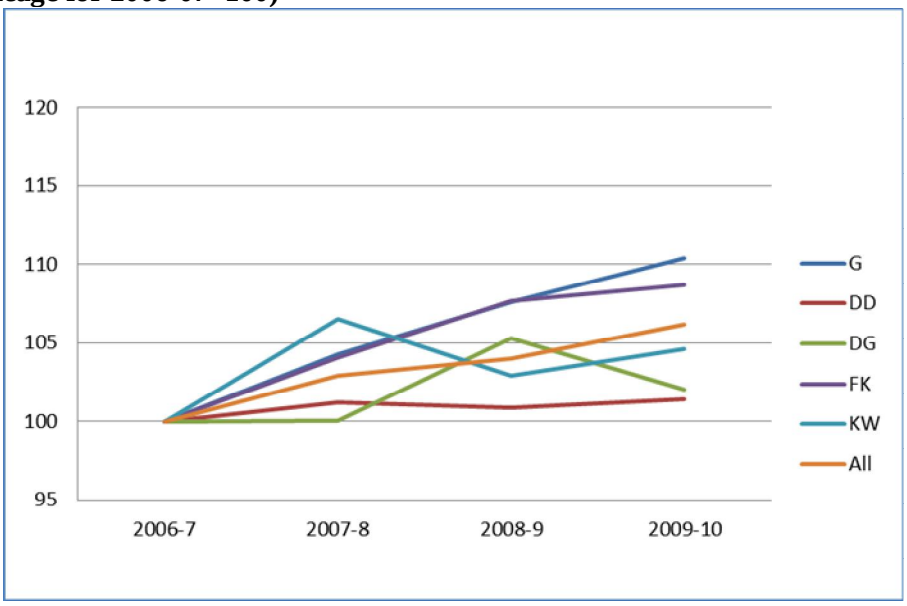
Figure 3.Average mileage of MOT-tested cars, 2006-2010



	2006-7	2007-8	2008-9	2009-10	2010-11
G	8952	8828	8738	8632	8407
DD	9054	8834	8618	8570	8249
DG	9478	9256	9458	9069	8745
FK	9658	9603	9609	9429	8943
KW	8743	8963	8382	8325	7883
All	8958	8802	8586	8560	8287

There is an increase in total mileage of cars for the whole country, and it varies throughout the postcodes (Figure 4). G and FK recorded growths much higher than the national average. Total mileages decreased in the KW area in 2008-09 and in the DG area in 2009-10, in both cases coinciding with fall in average mileages.

Figure 4.Total mileage of MOT-tested cars in relation to the level from 2006-07 (when total mileage for 2006-07=100)



Caution need to be taken when analysing the data. Main reservations include:

- The postcode areas may cover large population. For instance, G postcode that covers Glasgow and many surrounding areas represents both Barrhead and Kirkintilloch,
- The postcode areas are not homogeneous and the characteristics of the areas within which the Smarter Choices, Smarter Places pilot areas are located may be very different from the postcode area as a whole,
- Vehicles that take the MOT do not represent actual car ownership within each postcode since new cars of less than three years in age do not need MOT certificates. What follows, any analysis on newly emerging trends is impossible,
- The postcodes represent the top-level postal area of the VTS (vehicle test station) and not the places of living of car owners.

The usefulness of MOT data for monitoring effectiveness of travel behaviour change initiatives has already been noticed. It is a basis of the Engineering and Physical Sciences Research Council project called 'Using MOT test data to analyse travel behaviour change'. This three year project, in which involved are Transport Research Laboratory (TRL) and Department for Energy and Climate Change (DPCC), due to be finished in 2015 aims to:

- 'Develop software tools for MOT data analysis,
- Work with the DfT and VOSA on maximizing the use that can be made of the MOT data set whilst respecting issues such as data protection;
- Scope the application of MOT odometer readings and the possibilities for triangulating with other data sets (such as vehicle emissions, new vehicle registrations and Census data),
- Develop one (or two) small-scale demonstrations illustrating potential applications of our approach' (Cairns et al. 2011, p.1)

Therefore, it may be expected that use of MOT data in the few years' time will become more widespread among the transport professionals.

5. CONCLUSIONS

The data should be gathered with its possible use in mind. The Liftshare dataset may be a valuable set for analysis, but it lacks solid foundations that could help to establish lift sharing activity. As it is understood than once the database has been set up any changes may be expensive or even unachievable, more co-operation could take place between the IT and transport professionals on early stages of database creation. Assessments of possible uses of future dataset could be made.

Once the database is established, certain level of pro-activity could contribute positively toward the usefulness of the data. For instance, the need of keeping the system up-to-date could be stressed when promoting the system, and incentives (e.g. vouchers) could be offered for updating lift sharing activity. Those who have never registered their informal connections could be prompted to join the database. It is also particularly important from travel behaviour change perspective. Attracting critical mass of users is crucial to success of any lift sharing scheme as it is significantly increases probability to make a match (Cairns et al 2004).

Additionally, the existing dataset could be supplemented with the data on permanence of lift sharing matches that could be gathered by surveys and/or reminders distributed by internal e-mails. It could be supported by some feedback from customers, either in quantitative (ratings) or qualitative form. The future development of liftshare.com and its move towards mobile applications may help to achieve more detailed information on activity of its subscribers.

The MOT data may provide general insight into car ownership in the given postcode area, but limitations of their use should be borne in mind. The usefulness of the MOT dataset within the transport planning discipline is still to be established.

It is somehow understood that Liftshare may not be able to provide comprehensive data as it is a start-up commercial entity, and the use for evaluation of lift sharing programmes could have not been anticipated in the time of establishing its database. It is not the case with pedestrian and cyclists counts organized by local authorities, when the counters were purposively installed with data collection in mind.

Data obtained incorrectly have limited or no value. The process of installing cycle counters and collecting the data cannot be done half-hearted, as the result is the same as not taking any action at all.

In Scotland the culture of gathering data by local authorities for monitoring and evaluation of sustainable transport solutions is yet to be developed.

Bibliography:

Bannister A. (2005) “Britain’s Traffic Problems and Car-Sharing”, **Contemporary Review**, 29(5), p.29-33

Cairns S., Sloman L., Newson C., Anable J., Kirkbride R. and Goodwin, P. (2004) *Smarter Choices – Changing the Way We Travel. Final Report.* Department for Transport, London

Cairns S., Wilson R.E., Chatterton T., Anable J., Notley S., McLeod F., (2011) "Using MOT Data to Analyse Travel Behaviour Change:part 1 – scoping study" TRL. Abstract available from http://ukerc.rl.ac.uk/cgi-bin/ercri5.pl?GChoose=gpersum&GrantPerson=5652&GRN=EP/J004758/1%20&QString=SearchTerm=Cairns (last accessed 13 March 2013)

Department for Transport (2011) *National Travel Survey, 2010*. NTS0906 – Car occupancy by trip purpose: Great Britain

Liftshare (2013) Liftshare.com/business Live Stats http://www.liftshare.com/business/livestats.asp (last accesses 13 March 2013)

Robinson C., Humphrey A., Budd T. (2007) "Public experiences of car sharing". http://www.liftshare.com/business/pdfs/dft%20public%20experiences%20of%20car%20sharing.pdf (accessed 12 March 2013)

Scottish Government (2012) "Monitoring and Evaluation of the Smarter Choices, Smarter Places Programme. Going Smarter? Interim Progress, Process and Impact Review September 2012"