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# **TOWARDS SUSTAINABLE TRANSPORT**

**A comparison of demographic and behavioural characteristics  
of Finnish and international car sharing users**

Master's Thesis  
in International Business

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# 1 INTRODUCTION

## 1.1 Climate change - A major threat to humanity

Strong evidence suggests that the climate is changing and that these changes are largely caused by human activities (Stern 2006, 1). Detailed observations of gathered and analysed by many different research groups along a long period of years show that the our planet's average temperature is increasing fast from pre-industrial ages, with the most remarkable change happening during the past three decades. A consensus exists among researchers that human activity is causing global warming. (National Research Council 2010, 3; Stern 2006, 1.)

Climate change is a global problem and GHGs have the same impact on the climate wherever they are emitted. Effective action calls for international collaboration, as every region will be affected. Effects will however differ vastly around the globe, but sadly the poorest countries will feel some of the biggest impacts. (Stern 2006, 2.) The warming in the last decades can be mostly attributed to human activities releasing carbon dioxide (CO<sub>2</sub>) and other heat-trapping greenhouse gases (GHGs) in to the atmosphere (National Research Council 2010, 3).

In Figure 1 the various sources of global greenhouse gas (GHG) emissions are divided into various sectors. Primary energy production accounts for the biggest share of emissions with combined global GHG emissions of 35 percent in 2010. This amount is mostly generated from consuming fossil fuels as sources of energy production. Global industry produces 18 % of global GHG emissions. Other major sectors committing to global GHG's include the building and the agricultural sector as well as land use changes. The major source of agricultural GHGs comes from soils and livestock, whereas deforestation is the primary source of net GHG emission growth from land use changes. (Stern 2006, 1; UNEP 2012, 11.) The transport sector, which is at the centre of this thesis, produced 13% of global GHG emissions in 2010. In some reports it is estimated that transport is responsible for even a quarter of global energy-related carbon dioxide (CO<sub>2</sub>) emissions (UNEP 2011, 382). In 2000 it was the fastest growing source of GHG emissions along with electricity (Stern 2006, 1). The next chapter is going to focus more on the transport sector and more specifically on sustainable transport.

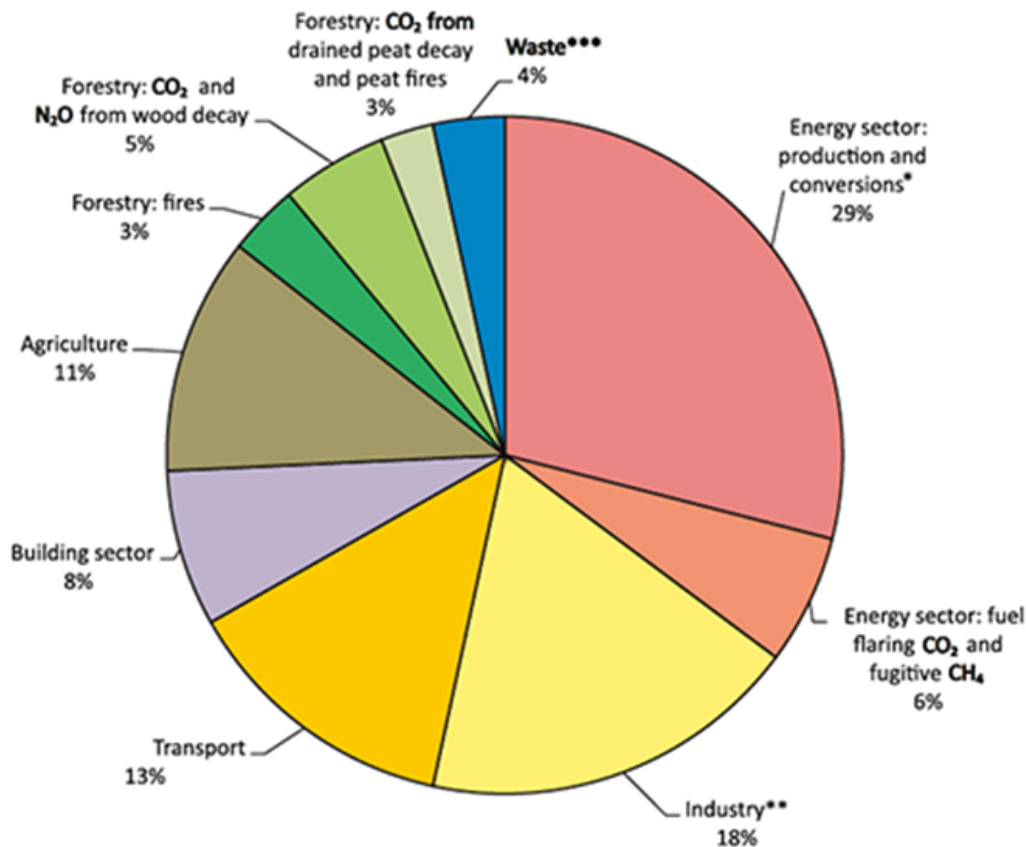


Figure 1 Shares of sources of global greenhouse gas emissions in 2010 by main sector (UNEP 2012, 11)<sup>1</sup>

Human activity has the potential to push components of the Earth system past critical states, resulting in qualitatively different modes of operation. These so called “tipping-points” could lead to large-scale impacts on human and ecological systems. The deforestation of the Amazon rainforests or the decay of the Greenland ice-sheet are examples of possible “tipping points”. These “tipping points” follow the popular idea that, at a particular moment in time, a small change can have large, long-term consequences for a system. (Lenton et al. 2008, 1786.) Ecosystems themselves are subject to local climatic conditions, causing several climate ecosystem feedbacks that might amplify or dampen regional and global climate change. Large amounts of carbon are stored in living vegetation and soil organic matter, and liberation of this carbon into the atmosphere as CO<sub>2</sub> or methane would have a serious impact on global climate. (Heimann and Reichstein 2008, 289.)

Recent scientific studies published by the International Panel of Climate Change (IPCC) estimate that the average temperature of our planet could rise by two degrees by the year 2050 and by four degrees by the year 2100, if substantial actions to mitigate

<sup>1</sup> JRC/PBL (2012) EDGAR version 4.2 FT2010. Available at: <http://edgar.jrc.ec.europa.eu/index.php>

climate change development are not taken swiftly. (Collins et al. 2013, 1031; Cubasch et al. 2013, 121; World Bank 2012, xiii.) A rise in average global temperature weakens natural diversity as it alters the living conditions of living organisms, causing extinction especially among such species unable to cope with drastic changes in living conditions. (Tommila et al. 2013, 12.) At the end of the century some vegetation and organism zones may move several hundreds of kilometres towards the poles because of climate change (Gonzalez et al. 2010, 764).

Global temperature increase also affects the ecosystems of the seas, as seawater acidification occurs when the seas bind additional CO<sub>2</sub>. Acidification harms coral reefs, which are homes to large populations of sea life. (Tommila et al. 2013, 12-13.) A regional extinction of entire coral reef ecosystems, profoundly affects dependent species and the people who rely on them for food, income, tourism, and shoreline protection (World Bank 2012, xv). Global warming will also contribute to a rise in sea level, which directly threatens ecosystems and societies important to human beings. Melting glaciers raise the sea level, resulting in a significantly higher sea level (World Bank 2012, 8). By the end of the century the sea level is projected to rise even by one metre. An elevated water level causes sea floods in low coastal areas and could render the living conditions of hundreds of millions of people inhabitable. The World Bank estimates that a 1-metre rise in sea level will cause yearly losses of 13,5 billion dollars until the year 2080, which mainly originate from damages to tourism and agriculture activities. (World Bank 2012, 34.)

As mentioned, the rise in temperature is divided unequally in different areas of the globe. Earth's northern areas are expected to be the most affected by the temperature change and the temperature rise of the cool months outweighs that of the warm months. (Tommila et al. 2013, 10.) A highly negative result of the temperature rise is that in 2100 even 44% of global agricultural land is expected to suffer from draught and even half of the Earth's population lives in water scarce nations (Gerten et al. 2011, 896). In Europe the average temperature is expected to rise more than the global average. The change in temperature compared with the current levels is significant especially in the summer months, as hot heat waves become more and more frequent by the passing of the century (Tommila et al. 2013, 13). For instance Russia suffered an extreme heat wave in 2010, which had very significant adverse consequences. As a consequence 55,000 people died, annual crop failure was at about 25 per cent, forest fires burned more than 1 million hectares, and estimated economic losses were about US\$ 15 billion. (World Bank 2012, xiv.)

Sudden rain induced floods will become more common in every part of Europe, even though total rainfall will grow only slightly in North of the Alps. (Tommila et al. 2013, 14.) Major floods interfere with food production, contributing to the induction of nutritional deficits and the increased incidence of epidemic diseases. The effects of climate

change on agricultural production may cause under-nutrition and malnutrition in many regions. (World Bank 2012, xvii.) Southern Europe will suffer from draught and from severe water shortage from time to time, which is worsened by salinization of inland water sources (Alcamo et al. 2007, 543).

Taking strong action to mitigate climate change within the next 15 years is crucial as a delay in mitigation efforts largely hampers ability to keep temperature rise below a critical threshold of 2 degrees relative to pre-industrial levels (IPCC 2014, 13). Taking on the challenge of strong, righteous and sustainable growth requires largely increasing investments and shifting resource use in various areas. As there is no simple reform formula or agenda, which works for all countries, each country should deal with development and climate challenges in diverging ways. These ways should be based on differing levels of economic, human and institutional development, social and political structures, history, geography and natural capability. (Commission on the Economy and Climate 2014, 2-3.) A thing that should encourage such progress and development is the fact that no nation is immune to the impacts of climate change (World Bank 2012, xiii). A huge amount of research exists on the causes and consequences of global warming along with a growing knowledge about technologies and policies helpful in mitigating the magnitude of future climate change. (National Research Council 2010, 1.)

In the following chapter this thesis will concentrate on one of the presented sectors – transport and on specific actions helpful in rendering the sector more sustainable.

## **1.2 Sustainable transport**

The transportation sector, which relies heavily on fossil fuel burning and primarily oil, is one of the big contributors to air pollution problems at local, regional and global levels. It is the fastest growing source of greenhouse gas emissions in developing countries (Gan 2003, 537) and is estimated to be responsible for nearly a quarter of global energy-related carbon dioxide (CO<sub>2</sub>) (UNEP 2011, 382)

Even though growing consensus among world's leaders exist on the need for more sustainable patterns of transport activity, investment patterns still favour supporting the “motorisation” model of development. The economic recession in 2008 led to diverse stimulus packages focusing on preserving current industries and forms of transport such as car manufacturing and road building. (UNEP 2011, 382.) Travel is becoming more popular in practically all regions of the world, usually at or faster than the rate of economic growth, and generally faster in the long run than the rate of reduction of energy and pollution intensity. (Goldman and Gorham 2006, 261.) Additional challenges include the potential doubling of transport activity by 2050 (IEA 2009, 46). Simultaneously the global vehicle fleet, comprising of all possible motorized transport modes, is

on a path to multiply three or fourfold in the upcoming few decades, with most of the growth expected to occur in developing countries. Moreover technological improvements such as fuel-efficient vehicles and alternative power sources have not been quick enough in offsetting the impacts of this growth. (UNEP 2011, 383.)

In Europe, where compact urban centres lie, growing suburbs and regional economic integration increase the same growth of intercity goods movement and passenger transport noticed elsewhere. In the megacities of East Asia, rising income levels of the middle class are channelled into automobiles. (Goldman and Gorham 2006, 261.) However as the current situation is unsustainable, the transport sector is forced to contribute fully to achieving carbon reduction targets drafted by national and international institutions (Banister 2011, 1538). As urban living is at the centre of most activity, as currently over 50% of the world's population live in cities, the most important decisions in regards to sustainability in the transport sector are made in cities of both developed and developing countries. The level of urbanization is expected to increase to 70% by 2050. (Banister 2011, 1540.)

Sustainable development was defined by World Commission of Environment and Development (WCED) (1987) as the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Sustainable transport initiatives are based on the definition of sustainable development. Many cities globally are striving to devise sustainable transport strategies with potentially positive effects from a sustainability standpoint. As in sustainable development on a general level, strategies in sustainable transport alike should be devised based on the characteristics of each transport system for instance on country level may differ. (Goldman and Gorham 2006, 266.) On a general level the realization of a more sustainable transport future requires a paradigm shift in future development of the transport sector in upcoming decades. All countries will have to participate, but developing nations have the best chance of making use of this opportunity as in these countries transport can be moulded by investment and planning decisions made today. Leapfrogging towards a sustainable path will require green transport investments, instead of mimicking the mistakes of industrialized countries. (Asian Development Bank 2009, 1.)

A positive factor in the stride towards sustainability is that the transport sector has significant potential for cutting emissions, estimated at 1.7-2.5 gigatonnes of CO<sub>2</sub> in 2020, including aviation and marine sources<sup>2</sup>. Even though the latest development in the transport sector towards sustainability seems dim, many good implementable solutions

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<sup>2</sup> ICCT (in press) Global Transportation Energy and Climate Roadmap. Washington DC, USA: International Council on Clean Transportation.

exist aiding the reduction of energy use in the urban transport sector (Banister 2011, 1538). According to UNEP (2011, 387) making a shift towards green transport requires a holistic strategy combining elements seen in Figure 2<sup>3,4</sup>:

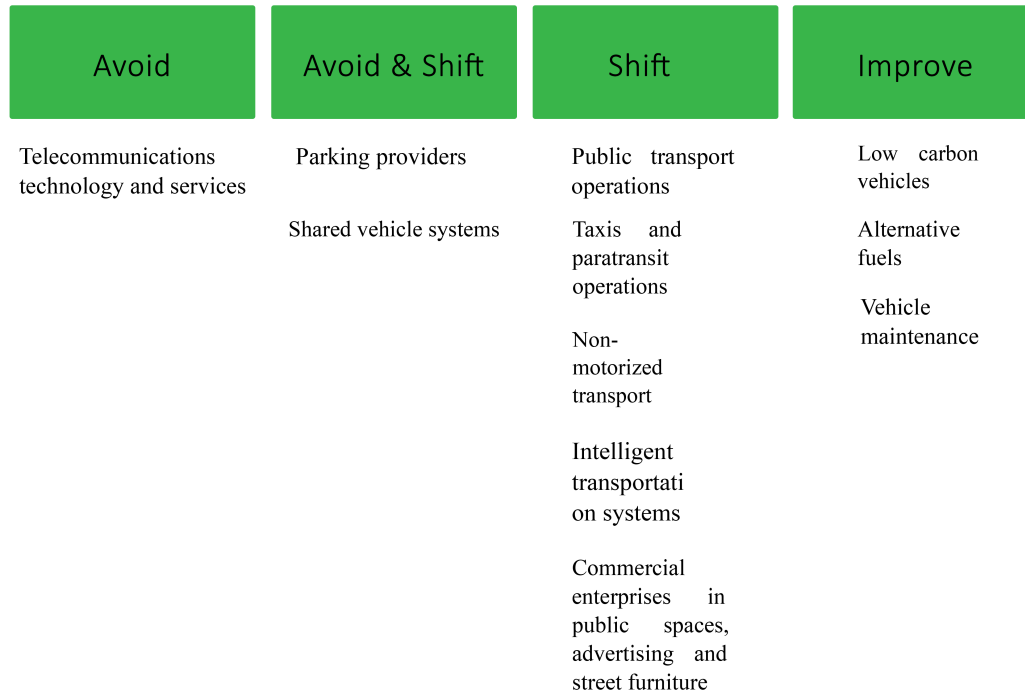


Figure 2 Strategies for sustainable transport: Avoid, Avoid & Shift, Shift, Improve (Adapted from Asian Development Bank 2009, 3; UNEP 2011, 382, 387, 391)

In Figure 2 the strategies to reduce CO<sub>2</sub> emissions of the transport sector can be seen. The strategies consist of the four following strategies: avoiding, avoiding and shifting, shifting and improving. Some of the strategies and means have a better ability to affect CO<sub>2</sub> emissions than others (UNEP 2011, 391). Thus, the more the strategies and means in Figure 2 are combined, the bigger the reduction effect on CO<sub>2</sub> emissions. As already mentioned, the applicability of the described means highly depends on the geographical transport system as they differ widely between different areas. It is im-

<sup>3</sup> Dalkmann, H. and Brannigan, C. in GTZ (2007). Transport and Climate Change. Module 5e: Sustainable Transport: A Sourcebook for Policy-makers in Developing Cities.

<sup>4</sup> The Common Policy Framework on Transport and Climate Change, Available at: <http://www.sutp.org/slocat/bellagio-process/common-policy-framework-cpf-on-transportand-climate-change-in-developing-countries/>

portant that the strategies are applied in such a way that fully considers the context and main problems in each region. (UNEP 2011, 388.)

Reducing or avoiding the number of journeys taken reduces CO<sub>2</sub> emissions. This can be achieved by integrating land use and transport planning. Using this approach would require the design of denser and more compact settlements, harnessing telecommunication technologies, such as teleconferencing to reduce need for work-related travel and localizing production and consumption, for instance through 3D-printing. However such technologies may not be sufficient in reducing the demand for travelling and may need decreasing incentives to travel by private modes. Such means entail for instance road user charging, parking charges, vehicle and fuel tax. Freight transport may be reduced by localizing production and consumption and through the optimization of logistics, leading to the reduction of empty runs and making certain maximum capacity in freight is utilized. (UNEP 2011, 387.)

Environmentally efficient forms of transport are at the centre of the shifting approach. Promoting the use of public transport, walking and cycling should be encouraged, which often requires considerable investment in infrastructure. In order to give public transport a chance to compete with private car ownership, public transport need to be frequent, trustworthy, inexpensive and convenient. Rail and water transport is normally a more sustainable way of transporting freight and decreases pressure on roads. (UNEP 2011, 387-388.)

The third solution is improving vehicle and fuel technology, leading to the reduction of negative environmental effects like pollution and resource depletion. Further improving the fuel economy of conventional engines, lowering the weight of vehicles and creating alternatives such as electric and hybrid vehicles, biofuels, and hydrogen fuel technologies are ways of improving the sustainability of existing solutions. However the production of electricity, hydrogen or biofuels should be conducted in a sustainable way. Additional gains in efficiency are achievable by improving the occupancy rate of vehicles, or through more economical driving. (UNEP 2011, 388.)

Between the three main strategies there are also hybrid strategies, which combine the main strategies: avoiding, shifting and improving. Parking providers and shared vehicle systems are examples of such strategies. Providing formal parking and replacing informal parking space is a means to reduce CO<sub>2</sub> emissions and it has a high emissions reduction potential. Shared vehicle systems, which is the main theme of this thesis, is also an example of such a hybrid strategy. The main aim of shared-vehicle systems is to encourage less private car usage by providing flexible sharing systems for various transport vehicles, for example car sharing for cars and bike sharing for bicycles. (UNEP 2011, 391.)

Strategies and means may also be combined, potentially leading to a greater effect in mitigating transport related CO<sub>2</sub> emissions. A good example of such a combination

could be a car sharing system that uses electric vehicles. As sustainable transport in general is a huge topic, the researcher is compelled to narrow down the topic. Thus this thesis will concentrate on one the sustainable transport strategies, namely the avoiding and shifting strategies and further concentrate on car sharing as an example of sustainable transport.

### 1.3 Research problem

International research shows the many clear benefits car sharing can have in promoting sustainable transport practices. Furthermore good understanding about car sharing users demographics, behaviouristic patterns exist internationally (See eg. Katzev 2003; Meijkamp 1998; Schaefers 2013; Shaheen 1999.) The motivation of this thesis is that only one study on Finnish car sharing has been done on demographic and behavioural characteristics of Finnish car sharing users (Voltti 2010). Thus this research seeks to complement the understanding of Finnish car sharing users and their usage through better categorization. Through better categorization and segmentation of Finnish car sharing users the thesis seeks to provide information for improved marketing insight.

This thesis aims to compare the demographics and behavioural characteristics of the Finnish car sharing users with international car sharing users. Thus the main research question is *Are Finnish car sharing users similar to international ones?*

The main research question divides into three sub-questions:

- What are the demographic characteristics of Finnish car sharing users?
- What are the demographic characteristics of Finnish car sharing users?
- Are the demographic and behaviouristic characteristics of Finnish and International car sharing users similar?

A theoretical framework is drafted based on international research into demographic and behaviouristic characteristics of car sharing users, based on which an empirical survey is done. The third sub-question is answered by taking the collected empirical data on Finnish car sharing users and comparing results with international literature about demographic and behaviouristic characteristics of International car sharing users.

### 1.4 Structure of thesis

The structure of the thesis is the following. In the introductory chapter one anthropogenic climate change is introduced along with sustainable transport. Sustainable transport strategies to mitigate climate change are also introduced in this chapter. In addition to this chapter one reveals the research problem along with the structure of the thesis.



Chapter two introduces car sharing in a thorough way. The market development of car sharing is analysed from the global and Finnish perspective, advantages and barriers presented based on which a theoretical framework for is formulated. In chapter three the research methodology is presented, consisting of research design and methods, research conduction, measure definition, data analysis and evaluation of the quality of the study. Chapter four represents the research findings and is the chapter where the data analysis is done. The chapter is divided to two chapters both independently analysing the three sub questions of the research. The conclusions of research results and a discussion on theoretical, institutional and managerial implications are represented in chapter five. Next the thesis will concentrate more thoroughly on explaining car sharing, which is used as an example of sustainable transport.

## 2 CAR SHARING

### 2.1 Defining car sharing

Car sharing appears in many forms throughout the globe and the term encompasses shared vehicle programs of open-access, intended for casual trips where a car is required. (Millard-Ball et al. 2005, 2-1). Car sharing is a mobility solution encouraging its users to decrease private car usage in favour of communal transit and environmental goals. The idea of car sharing originates from the aspiration to decrease personal car ownership and to reduce vehicle distance travelled, leading to the improvement of urban land use and development. Car sharing organizations (CSOs) aim to provide inexpensive access to vehicles owned by the CSO for all its members, as well as encouraging members to walk, cycle, use public transport. Additionally it aims to reduce the reliance on fossil fuels and expects to reduce the transport carbon footprint of users. (Carsharing Association 2014.) Car sharing can play an important role in promoting the use of sustainable transport modes (Loose, Mohr, and Nobis 2007, 365).

Car sharing differs from ridesharing or carpooling. Car sharing means using vehicles owned by a separate organization and shared between a number of different users, who may use them at different times, whereas ridesharing or carpooling means sharing privately owned vehicles for a particular trip. (Millard-Ball et al. 2005, 2-1.) Car sharing is a membership-based service usable by all persons with a driver's licence. When accessing the CSO's vehicles, no additional agreement is required from the member each time a car is reserved and used. CSOs serve its members with a scattered network of shared vehicles at unattended self-service locations, which are available to members whenever they desire. (Carsharing Association 2014.) Members reserve vehicles online or by phone, walk to the nearest car location, open the car doors with an electronic membership card, and drive away. Members are billed each month depending on the usage time, mileage or both. (Millard-Ball et al. 2005, ES-1.) CSOs differ, but on a generally they share the following characteristics:

- They are used organized group of participants
- The organization shares one or more vehicles
- CSOs operate a decentralized network of parking locations stationed close to homes, workplaces and/or transit stations
- A vehicle is booked prior to use
- Vehicles are rented for short time periods (increments of one hour or less)
- Self-accessing vehicles (Millard-Ball et al. 2005, 2-1.)

Car sharing has a chance to substitute private vehicle ownership within households, while at the workplace it can act as an optional vehicle for business use and personal

errands during the workday, decreasing the need of employees to drive to work. Car sharing has been referred to as a “missing link” in the options of alternatives to private vehicle use. (Millard-Ball et al. 2005, ES-1.) This reference means that transit, taxis, cycling and walking often meet most mobility needs, but other trips may require a private car (Millard-Ball et al. 2005, 2-15). Members of CSOs can use various options to private car use such as public transport, cycling and walking for most of the daily trips, but have the choice of using a car when required through car sharing. Car sharing also complements taxis, which suit better for one-way trips and offer an alternative for people unable to drive. (Millard-Ball et al. 2005, ES-1,2.) However nowadays one-way trips are becoming an option within a growing number of CSOs (Shaheen and Cohen 2014, 3). Rental cars are generally cheaper when considering longer journeys. Car sharing is said to be the most cost-effective for intermediate length trips (Millard-Ball et al. 2005, ES-2, 2-15.).

Thus, on a general basis car sharing is first and foremost planned for trips that are shorter in time and distance and functions as an extension of a mobility mix. It is designed to patch the shortcomings of public transport. The versatility and attractiveness of car sharing may be further improved by offering longer trips to further discourage car ownership (Carsharing Association 2014). Figure 3 shows how car sharing positions itself when it is compared on the axis of “distance to travel” and “flexibility needed” to other possible modes of transport.

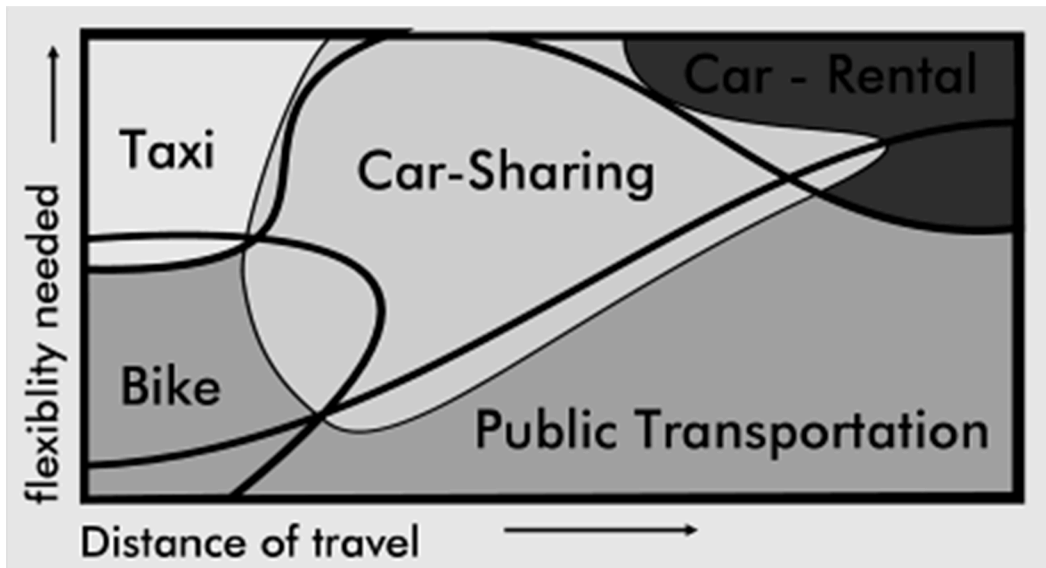


Figure 3 Car sharing relationship to other modes of transport (Millard-Ball et al. 2005, 2-15)<sup>5</sup>

According to Figure 3 car sharing positions itself in terms of travel flexibility in the crossroads of taking a taxi or the bicycle on shorter distances, but becomes less valid as a source of transport than a rental car or public transport as the distance travelled increases. The majority of privately owned automobiles are used for less than one hour per day and usually carry only one person (Shaheen, Sperling, and Wagner 1998, 35). CSOs can assist members in saving money through various ways. Money can be saved through not owning a private car, through encouraging members to drive less often, by planning more the trips they make, by using other transportation modes and by sharing fuel-efficient cars, when one is needed. (Carsharing Association 2014.) The break-even point of cost of car sharing and private car ownership is estimated to be at around 10 000 km per year or at a car use frequency of 3 times a week (Goedkoop et al. 1999, 75)<sup>6</sup>.

## 2.2 Evolution of car sharing

Early on in the car sharing sector citizens were crucial as promoters of car sharing, shaping view on the technology at the beginning. Consumers flattened the development

<sup>5</sup> Schwartz, Joachim (1999) Presentation at Car-Free Cities Working Group Seminar

<sup>6</sup> Stichting voor Gedeeld Autogebruik (1997) Deelauto biedt nieuwe kansen: De 1000 dagen route (Federation of carsharing and autodate, Autodate offers new changes, the route of 1000 days, in Dutch)

cycle through their ability to decrease producer cost and by shaping the image and quality characteristics of car sharing. As the car sharing industry has matured and as established professionals have assumed the promotional role, the role of users as promoters of car sharing has diminished. (Truffer 2003, 151.)

The birth of car sharing can be traced back to Zurich in Switzerland, where one of the earliest pilots of car sharing took place. It was known as “Sefage” and it began in the city back in 1948. This experiment was motivated by economic rationality, as members of “Sefage” could not afford a car as individuals, and ended up sharing one. Similar primitive attempts of car sharing, called “public cars” were attempted elsewhere, for instance in France, but failed to become successful. (Harms and Truffer 1998, 40.)

The recent, more successful, practices of car sharing begun in the middle of the 1980’s in Europe (Shaheen, Sperling, and Wagner 1998, 38)<sup>7</sup>. In the past, basically all CSO ventures were supported by public funds, with the minority receiving their support through corporate subsidies. (Shaheen, Sperling, and Wagner 1998, 38.) In recent years the car sharing industry has experienced the entry of carmakers and car rental agencies to the car sharing market. Two CSOs represented by well established automakers, BMW and Daimler-Benz, represented 22,4% and 21,6 % of carsharing memberships and deployed fleets in January 2014. Worldwide there are five rental car companies who provide car-sharing services. (Shaheen and Cohen 2014, 3.)

Innovation within the car sharing service has also taken place during recent times as in August 2014 the two automaker-CSOs, DriveNow and Car2Go had operations in 11 American markets, which also offered one-way trips, in addition to classic (only round-trips and short-term vehicle access) car sharing modes, which allows car sharing users to start using the car at one point and leaving it at another location, making it a similar service as a taxi ride. Additionally the Bolloré Group is set to launch an electric vehicle one-way car sharing service called BlueIndy in Indianapolis in late 2014. (Shaheen and Cohen 2014, 3.)

Recent years have shown a wave of consolidation within the industry. The most recent acquisitions within the industry were the acquisition of IGO CarSharing by Enterprise Holding in May 2013 and Zipcar by the Avis Budget Group in January 2013. The acquisitions can be categorized as acquisitions in the earlier mentioned classic car sharing market. Such consolidation began in the early 2000s when Flexcar acquired Car-

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<sup>7</sup> Glotz-Richter, M (1997) Stadtauto Car-sharing / Citycarclub – A Practical Step Towards an Inter-modal and Sustainable Urban Transport, Transport Research Institute, Napier University

sharing Portland in 2001 and when Zipcar and Flexcar merged in 2007. (Shaheen and Cohen 2013, 1.)

The diffusion of car sharing is widely based on improved technology in the reservation and usage phase. Car sharing Portland developed an automated reservation system, which functioned with the phone. Early on an Internet reservation system was not perceived as necessary nor were mobile phone based systems that were far away from being ubiquitous. At the early stage of car sharing reservation and usage was maintained mostly through manual systems. (Shaheen, Cohen, and Chung 2009, 40.) Currently most CSOs use automated systems to cope with reservations and usage. To drive a car sharing car a member simply phones the automated reservation system or books a car online through applications available at multiple devices. (Katzev 2003, 65-86). The car is brought to use via a smart card or with the mobile phone (Voltti 2010, 8).

## **2.3 Market development of the car sharing**

### ***2.3.1 Global market development of car sharing***

There has been significant growth occurring between 2006 and 2012 in both in vehicle and member numbers. In October 2012 CSOs could be found operating in 27 countries, on five continents and with an estimated amount of 1 788 000 members, who were sharing more than 43 550 vehicles. The growth of global CSO membership numbers and vehicle fleets between 2006 and 2012 can be seen in Figure 4 and Figure 5. (Shaheen and Cohen 2012, 1.)

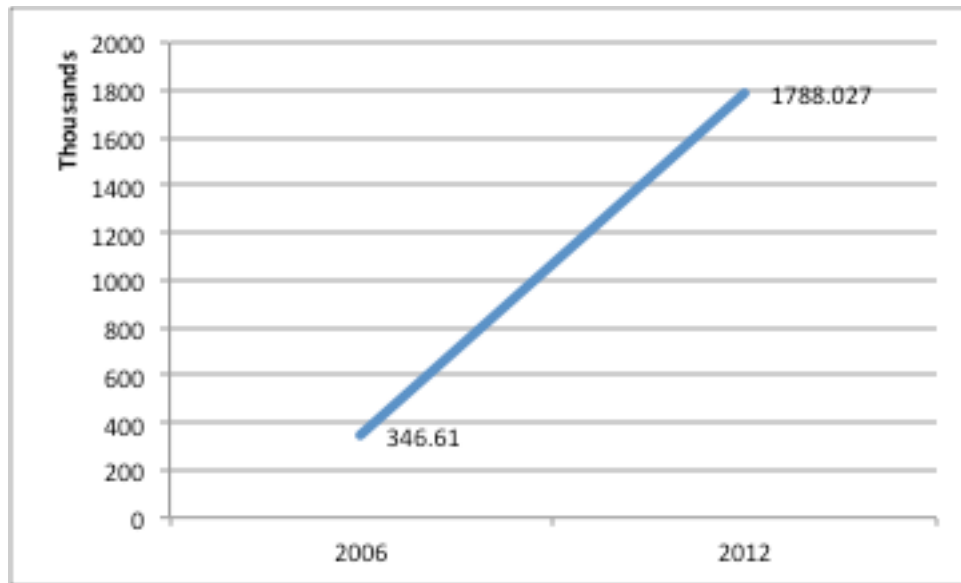


Figure 4 Worldwide Car Sharing Members 2006 & 2012 (Shaheen and Cohen 2012, 2).

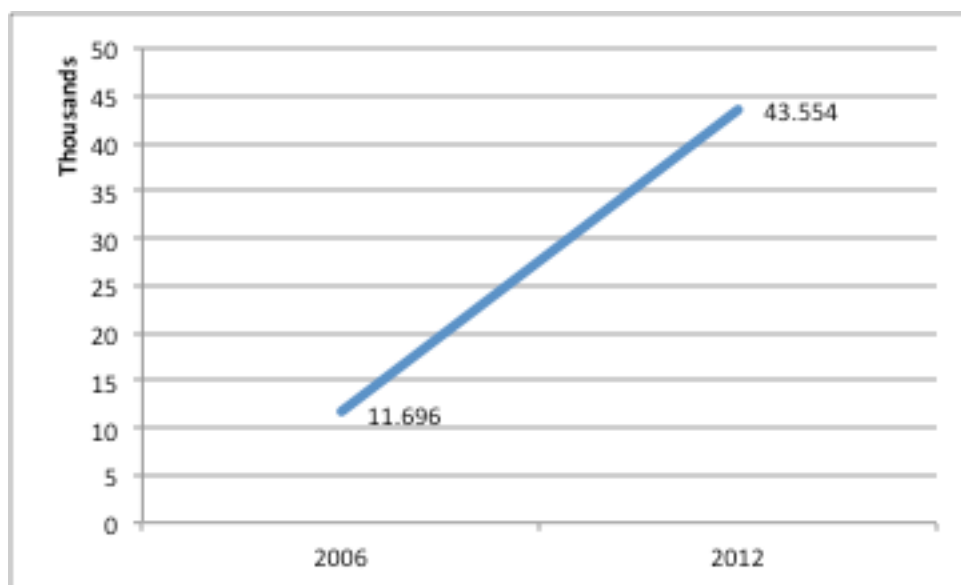


Figure 5 Worldwide Car Sharing Vehicles 2006 & 2012 (Shaheen and Cohen 2012, 2).

Figure 4 shows that during 2006 and 2012 the amount of car sharing members grew by more than 500 percent. The global amount of CSO membership grew from 346 610 persons to 1 788 027 during the mentioned period. Simultaneously Figure 5 shows the massive growth rate of vehicle fleets during the same period, which was closer to 400 % between 2006 and 2012. The size of global CSO fleet grew from 11 696 vehicles to 43 554 vehicles by the end of 2012.

Figure 6 illustrates the division of regional car sharing markets in 2006 and 2012.

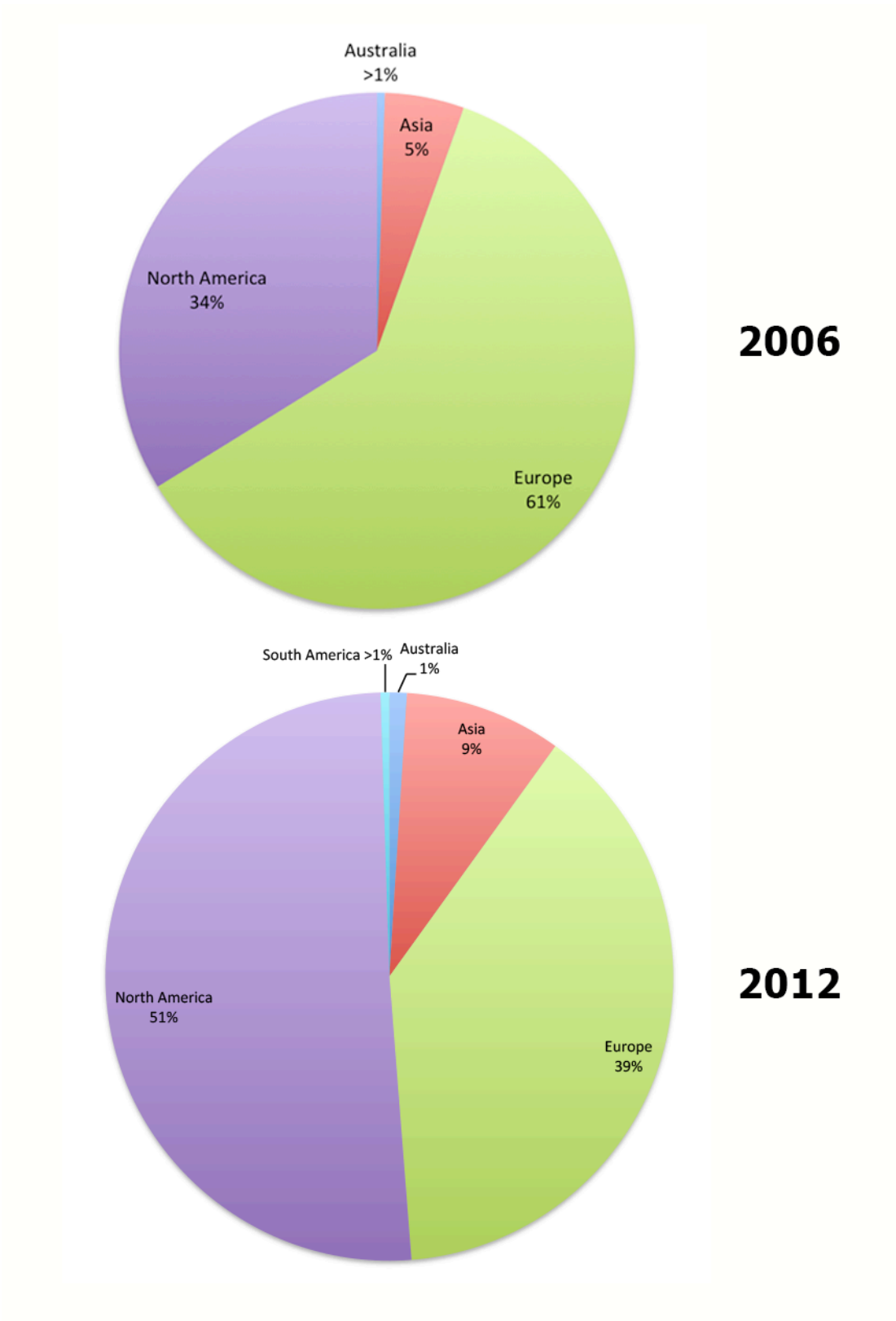


Figure 6      Percent of Worldwide Membership by Area in 2006 & 2012 (Adapted from Shaheen and Cohen 2012, 2).



As shown in Figure 6 North America remains the largest car sharing market in the world measured through CSO membership, with 50,8 % worldwide members and with 36 % of deployed CSO fleets. The same numbers within Europe are 38,7 % of worldwide CSO members and 47 % of worldwide CSO fleets deployed. (Shaheen and Cohen 2012, 1.) These numbers are shown in Figure 6.

### ***2.3.2 Market development of car sharing in Finland***

Car sharing is said to have begun in Finland in the capital area in 2001 when City Car Club begun its operations. In 2010 the company had approximately 3000 customers and the growth rate of new customers was 20 %. In addition to City Car Club a few other CSOs were functioning in Finland, which could not be completely categorized as CSOs. (Voltti 2010, 8-9.)

The current user base of CSO's is still in Finland quite small, which is why the potential of car sharing in Finland is hard to determine based on current growth. In Europe however recent years have shown huge growth in car sharing users, even 100 % growth a year. No country has however shown the slowing of growth, which would help in determine the maximum of potential users. (Voltti 2010, 22.) Based on a research there are 73 000 potential car sharing users in the capitol area, 9 000 in Turku and 10 000 in Tampere. The numbers support the data of "Kulkuri" -research, in which the potential of individual users was estimated to be similar. (Voltti 2010, 28.)

The customer development of City Car Club in Finland can be seen in Figure 7. Between 1999 and 2003 the user base grew from 0 to 800 users. (Loose, Mohr, and Nobis 2007, 373.)

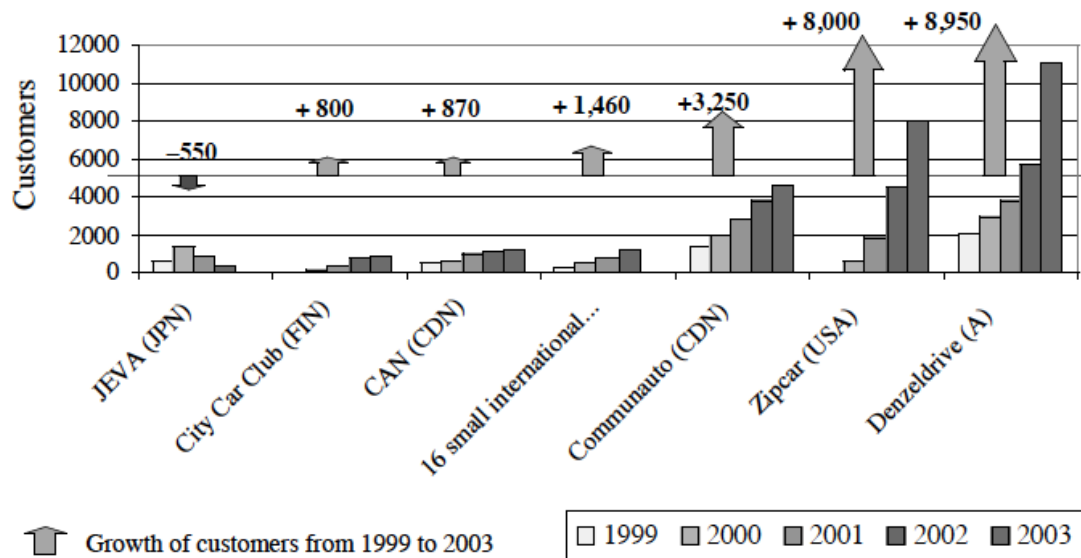


Figure 7 Customer development of selected international car-sharing organizations, 1999–2003 (Loose, Mohr, and Nobis 2007, 373)

Figure 7 shows that during the same period major growth has also been occurring in other markets where car sharing is available. In most regions the growth of customers exceeded the growth in Finland between 1999 and 2003.

## 2.4 Advantages and barriers of car sharing

Various benefits of car sharing exist. Some of them are more speculative, while others are backed by solid data (Millard-Ball et al. 2005, ES-4). The benefits can be seen in Figure 8.



Meijkamp 1998, 241). Moreover a group of member reported that by becoming car sharers, they were able to sell owned private automobiles or could avoid purchasing one (Katzev 2003, 67). Meijkamp (1998, 241) studied CSOs in the Netherlands and concluded that on average CSO members drove 33 percent less per year after becoming members of a CSO. Another unpublished report showed 7 percent annual growth of train rideship, bicycle use growth of 5 percent and bus use growth of 18 percent among new CSO members. Decline in vehicle ownership is also a common statistic widely observed effects of CSO users in Europe. (Katzev 2003, 76-77.)<sup>8</sup> However contesting data has been introduced in studies done to members of Car sharing Portland. The study concluded that members did not drive any less after joining the organization than prior to becoming members. (Katzev 2003, 79.)

Car sharing cars are used very intensively, meaning they have to be replaced more frequently. This leads to environmental benefits as always the newest, most economical and environmentally friendly vehicles are used as car sharing vehicles. (Meijkamp 1998, 242.) Car sharing is also based on the notion that relatively high fixed costs of owning a private vehicle, such as insurance, taxes and service costs, are mostly ignored when making a car purchase decision. Rather such individual tend to focus on variable costs associated with each car trip, which leads to more travel by car. A result is more car travel that would probably not occur if such individuals would need to pay for each trip. In this way, as individuals become more conscious of the variable costs of each trip, car sharing is predicted to decrease the overall level of travel by car. As members are also required to reserve a vehicle beforehand and to a certain degree plan their travel route, it would probably result in less sporadic trips than with a privately owned car. (Katzev 2003, 69.) The most speculative benefits of car sharing include less congestion, better urban design, more compact development along with less energy or resources used for vehicle manufacturing (Millard-Ball et al. 2005, ES-4).

However many barriers inhibit a wider adaptation of car sharing (Katzev 2003, 83). A major concern for people considering car sharing is the availability of vehicles. Such individuals may presume that the demand for the car sharing vehicles in the fleet is not evenly distributed throughout the day and that a car shortage may occur during the weekends, when demand for cars increases. (Katzev 2003, 72.)

The barrier of wider car sharing adaptation is reflected through the following six negatives spoken out by Bernard<sup>9</sup> (Katzev 2003, 83):

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<sup>8</sup> Lightfoot, G. (1997). Pay as you drive carsharing: Final report. Unpublished report.

<sup>9</sup> Bernard, M. (1998). San Francisco Bay Area Station Car Demonstration: Evaluation report. Unpublished report, National Station Car Association, Bay Area Rapid Transit District (BART), Oakland, CA.

1. The user is forced to plan trips beforehand, which leads to loss of spontaneity.
2. The user is forced to remember to take time in making a reservation.
3. The car-sharing car is likely to be parked further from the user's dwelling than his or her car would be.
4. Car sharing cars need to be leaved clean after each use, even though the user would be in a hurry.
5. Users are forced to deal with each trip with some sort of paperwork, personal identification numbers, lockboxes or other ways when acquiring a key for the car-sharing car.
6. The user is on a time limit and is penalized for a delay in the return of the vehicle, which is another loss of spontaneity. (Katzev 2003, 83.)

However Sperling and Shaheen (1999, 2) state that car sharing can be best seen as a facilitator of intermodal travel and as a precursor of a new mode filling the gap between transit and private cars (Sperling and Shaheen 1999, 2). They add that perhaps taking a longer perspective could be in place, when visioning the ability of CSOs in prototyping an entirely new business activity, called mobility service companies (Sperling and Shaheen 1999, 19).

However here also lies a major barrier for car sharing adaptation, if it is aimed at reducing car ownership, which is usually its primary purpose (Millard-Ball et al. 2005, 2-16). As car sharing is a complement to the mobility mix, it is making it highly affected by the availability of other mobility modes (Millard-Ball et al. 2005, ES-8). Additionally change in mobility behaviour requires a lot of time and momentum. Thus informational marketing campaigns on the relatively unknown car sharing service need to be presented when life changes occur. (Huyer 2004, 86.)

Millard-Ball et al. (2005, 3-20) also studied the barriers of car sharing usage by researching the least attractive features of car sharing. These responses can be seen in Figure 9.

<b>Feature</b>	<b>% Citing This Feature*</b>	<b>% Citing As Least Attractive Feature</b>
Hourly costs are too high	33.9%	20.2%
Mileage costs are too high	26.2%	10.6%
Hard to extend the rental time	24.1%	7.7%
Have to reserve a vehicle too far in advance	22.1%	7.1%
Hard to get vehicles at the times I need them	21.3%	8.8%
Distance/effort to get to the vehicle	19.6%	7.1%
Hard to get a vehicle when I need it	17.2%	5.5%
Vehicles not available close to me	15.9%	6.1%
Vehicles not always clean	13.3%	3.2%
Membership costs are too high	9.3%	3.0%
Billing procedures	7.0%	2.3%
Vehicles are in inconvenient / unsafe locations	5.8%	1.2%
Vehicles not always in good working order	5.5%	1.2%
Vehicles not attractive or not the right size	4.7%	1.4%
Hard to get information or reservations	3.4%	0.7%
Other	16.7%	13.8%

\* Multiple responses permitted; therefore, percentages add up to more than 100%.

Figure 9 Least Attractive Features of Car-Sharing (Millard-Ball et al. 2005, 3-20)

Figure 9 lists behavioural and quantitative barriers of car-sharing usage. The behavioural findings partly support the list of Bernard, listing factors that affect the flexibility of car usage. “Hard to extend the rental time”, “Have to reserve a vehicle too far in advance”, “Hard to get vehicles at the times I need them”, “Distance/effort to get to the vehicle”, “Hard to get a vehicle when I need it”, “Vehicles not available close to me” and “Vehicles are in inconvenient/unsafe locations” are flexible use related factors that support the claims of Bernard’s list. Many of the factors stated in Figure 9 mostly reflect barriers, which in the case of these users are not convenient because of monetary issues or comparison to other transport means.

Another important issue in the discussion of barriers of adaptation is the issue when people are most likely to join a CSO. According to Brook (2004, 6) very few people trade in their vehicle for car sharing, when first hearing about it. Most cases show that individuals tend to continue familiar transportation models, whether this would constitute the use their personal car, public transportation, walk or use a bike. A change in transport patterns among consumers tends to happen when an event in their life provokes them to think of alternatives. Such a triggers may be a job change, marital status

or relocating to another apartment. For car owners such an event may be considerable and surprising repair costs of their car or a major accident. (Brook 2004, 6.) In the next chapter an analysis on the demographic and behavioural characteristics of car sharing users is conducted.

## **2.5 Analysis of the car sharing market**

According to Millard-Ball (2005, 3-1) car sharing a niche service. This perception is based on the fact that in December 2004 car sharing attracted only 0.02% of the entire US population, 0.03% of US licensed drivers, and the same proportion of urban residents. In countries where car sharing has been established for a long time, such as Switzerland, car-sharing membership still accounts for less than 1% of the population and 1.4% of driver's license holders. In Germany at the end of 2001 just 0.12% of licensed drivers were car sharers<sup>10</sup>.

However car-sharing is said to have potential to serve a growing and significant group of population in the United States and elsewhere among targeted demographic groups and in particular geographical areas. Such potential may be reached by better understanding such market niches, where analysis shows car sharing is a viable option.

Through market segmentation distinct groups of customers that share similar characteristics can be identified. The groups are likely to show identical purchasing behaviour. Common demographic, spatial, behavioural and attitudinal characteristics patterns may be exposed through market segmentation among car sharing users. This data may be used to show the users or group of users who are most likely to use car-sharing services. (Millard-Ball et al. 2005, 3-2.)

A thorough study of the demographic, behavioural and geographic factors may enable further increasing the popularity car sharing among potential users (Millard-Ball et al. 2005, 1-264). The research on demographic and behavioural factors is further represented.

### **2.5.1 Demographics of car sharing users**

Research on the demographic characteristics has been conducted in various geographical areas and on various occasions. Research in the area has been conducted by Mil-

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<sup>10</sup> Schwieger, Bodo (2004). International Developments towards Improved Car-Sharing Services. Oxford: Writersworld.

lard-Ball et al. (2005) in North America, by Katzev (2003) and Shaheen (1999) in the United States and by Voltti (2010) in Finland among others. Research on demographic factors of car sharing users has also been widely studied in Europe.

According to Millard-Ball et al. (2005) factors such as age, income, education and auto ownership could have significant effect on the market segments, who are responsive to car sharing. Other often measured demographic factors in studies include use are gender, household size, community size, marital status, employment status, occupation (Millard-Ball et al. 2005; Shaheen 1999).

Age and lifestyle affect mobility patterns. Individuals travel more at different stages in life. It also has an effect on the travel mode. (Shaheen 1999, 162.) In Millard-Ball et al. (2005) the mean age of respondents was 37,7 years, the median age being 35 years. In his study the lowest age reported was 20 and the highest 75. More than 2/3 of respondents (39%) were in the age group 35-44 years. (Millard-Ball et al. 2005, 3-5.) In Katzev's study (2003) respondents ranged from 22 to 75 years and the mean age was 37,24 years. Voltti (2010) concluded the majority of car sharing users are between 30-40 years old.

A higher level of income is said to induce more travel<sup>11</sup>. The incomes of 50 percent of the respondents had annual household incomes of 60 000 \$ or more. 13 percent declared annual incomes of 30 000 \$ or less and 18 percent earned 100 000 \$ or more a year. When comparing income in Canada and the United States, Millard-Ball et al. concluded that people in the United States were earning more on average. (Millard-Ball et al. 2005, 3-5.) In Shaheen's (1999, 159) study the household yearly income of close to 73 percent exceeded 50 000 \$ and approximately 16 percent of yearly household incomes had incomes above 110 000 \$. The median yearly income of individuals in Katzev's (2003, 71) study was between 36 000 \$ and 48 000 \$ a year. Voltti's (2010) study did not report the yearly incomes of individuals or households.

Education is said to have strong effect on an individuals mobility patterns<sup>12</sup>. More than a third (35 %) of respondents held a Bachelor's degree and almost half informed to have an advanced degree or having done some post-graduate work. Two percent of respondents had less than some college education. (Millard-Ball et al. 2005, 3-5.) Shaheen's (1999, 164) study concluded that over 58 percent had a Bachelor's degree or higher, with 19 percent having a Master's degree or a Ph. D. Voltti's (2010, 25) study did not report researched information on education, but informed that many studies have

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<sup>11</sup> United States Department of Transportation (1995) 1190 NPTS Databook. New-York, NY, McGraw-Hill, Inc.

<sup>12</sup> United States Department of Transportation (1995) 1190 NPTS Databook. New-York, NY, McGraw-Hill, Inc.



concluded that 70-85 percent of car sharing users hold a high level of education. From the represented data it can be devised that higher level of education in this case is equivalent to the results found in Millard-Ball et al. and Shaheen's studies.

Car-ownership has direct effect on the mode choice and travel. Carless individuals are more likely to choose other travel means compared with car-owners (Shaheen 1999, 161). In Millard-Ball et al. (2005, 3-6) study 72 percent of respondents represented carless households. 87 percent of the Canadian respondents lived in carless households, while the same number in the United States was 66,8 percent (Millard-Ball et al. 2005, 3-5.) In Voltti's (2010, 13) study 81 percent of household's were carless, 16 percent owned one car and three percent owned more than one car. Katzev (2003, 71) took another approach to studying vehicle ownership. In his study the majority of car sharing users did not own a car when they joined the CSO, whereas 41 percent owned a car.

Shaheen (1999, 163) concluded that women make fewer trips than men and emphasized studying the correlation of this factor with travel mode choices. Millard-Ball et al. (2005, 3-6) study was responded by fewer men (45 %) than women (55 %). In their study 52 percent of Canadian respondents were male and 43 percent of US respondents were men. They pointed out that women were more likely to be involved in post-graduate work in their sample. (Millard-Ball et al. 2005, 3-5.) Neither one of the genders were dominant in Katzev's.(2003, 72) study. In Voltti's (2010, 11) research the males represented 57 percent of users, while 43 percent were female. His study measured also the gender division of users in Great Britain, Belgium and Frankfurt. In Great Britain 69 percent of users were men, while 31 percent were females. In Belgium 58 percent were male and 42 percent female and in Frankfurt 63 percent of users were men and 37 percent were women. His research however reports contradicting reports to Millard-Ball et al. (2005) indicating that only in the United States and Canada female user's represented the majority of users. (Voltti 2010, 11.)

Household size is said to be a crucial indicator of travel demand. Bigger households travel more and it may also have an effect on travel mode choice. (Shaheen 1999, 158.) Millard-Ball et al.'s (2005, 3-6) research indicated that 64 percent of car sharing households lived with at least one other person. 24,4 percent of households had children. (Millard-Ball et al. 2005, 3-6.) According to Voltti (2010, 12) the division of the household size of CSO users in Finland's capitol area is the following. A quarter (25 %) live alone, a third (33 %) are adult couples and even half (50%) of the users are families with children. Voltti (2010, 12) points out that this differs from users in i.e. in Frankfurt. In Frankfurt 78 percent of users are household of 1-2 persons, whereas this number in the capitol area of Finland is 58 percent. In Belgium the amount of single households using car sharing is 1,5 times bigger than in Finland's capitol area. (Voltti 2010, 12.)

Community size affects travel patterns, as people who live in rural areas are more dependent on cars than individuals who live in cities where better travel infrastructure

and services exist. In Shaheen's (1999, 157) dissertation 81,6 percent of households lived in small to large cities and 16 percent lived in suburbs. Less than five percent lived in rural areas. (Shaheen 1999, 157.) Almost 90 percent of car sharing users were white or Caucasian in Millard-Ball's (2005, 3-6) research.

Figure 10 represents a summary of the most common demographic characteristics of car sharing users in scientific research (Millard-Ball et al. 2005, 3-9).

<b>Characteristics</b>	<b>Typical Car-Sharing Member</b>
Age	Mid 30s to mid 40s
Income	Upper middle class (but real variations here)
Education	Upper levels (college degree(s))
Household size	Smaller than average (1 – 2 persons)
Auto ownership	Half own one vehicle
Gender	Slightly more attractive to males

Figure 10 Literature's General Concensus Regarding Typical Characteristics of Car-Sharing Members (Millard-Ball et al. 2005, 3-9).

According to Figure 10 car sharing members are usually in their mid 30's and 40's and are highly educated. They are part of the upper middle class based on annual or monthly income and they are households of 1-2 persons. Half of car sharing users own one vehicle and males are the slightly dominant gender among users. (Katzev 2003, 71-72; Millard-Ball et al. 2005, 3-9) Moreover the car sharing users mostly live in cities or dense urban areas (Millard-Ball et al. 2005, 3-25). These findings are widely confirmed in both in North America and Europe (Katzev 2003, 72).

### **2.5.2 Behavioural characteristics of car sharing users**

Several studies have collected data on the behavioural characteristics of car sharing users in various countries. Such studies are for instance Costain et al. (2012), Katzev (2003), Millard-Ball et al. (2005), Schaefers (2013) and Shaheen (1999). Schaefers (2013) collected data on usage-motives of car sharing and grouped his behavioural findings on car sharing users to four basic usage-motive patterns. These were the value, convenience, lifestyle and environmental seeking users. According to Millard-Ball et al. (2005, 3-16) members of CSOs have powerful perceptions about a range of social and environmental concerns. The usage motives found by Schaefers (2013) will be central factors of study in this thesis. Millard-Ball et al. (2005) collected data on metrics such

as trip purpose, auto ownership, trip frequency, expenses, miles driven and alternatives to car sharing. Costain et al. (2012, 425) collected data on car sharing trip behaviour. These behavioural characteristics will be partly researched in this thesis. The chapter of behavioural characteristics of car sharing users is mostly based on the extensive book of Millard-Ball et al. (2005) about car sharing.

In Schaefer's (2013) study the *value-seeking usage motives* stem from the following perceived attributes of car sharing. The ability to save money and use it for other sources of consumption was a central argument in favour of car sharing. Attributes such as reasonable prices of car sharing, free parking could be tied to the value-seeking usage motive, along with functional consequences such as the easily calculated costs of car sharing and the ability to enjoy less expenditure by avoiding car ownership. Additionally "the ability to go carless" was also an important factor in this study, which could be linked to the value-seeking user. (Schaefer 2013, 73.) The findings of Millard-Ball et al. (2005, 3-17) support this finding as their study concluded that CSO members were cost sensitive, as 82,3 % of car sharing respondents concluded that "saving money" was important or very important to them. This group labelled as Economizers are by majority non-auto owners and are very aware of the costs of automotive travel compared to car owners. (Millard-Ball et al. 2005, 3-17.)

*Convenience* was the second usage-motive pattern in Schaefer's (2013, 73-74) study and can be linked with the desire of saving time. The ability to easily find parking spots, flexible use of the car, reduced responsibility and simple pricing models are all attributes that potentially help in saving time of the car sharing user. Convenience inducing factors included also a dense network of car sharing vehicles, availability of vehicles when needed and the reliability of the car sharing cars.

The third usage motive grouping discovered in Schaefer's (2013, 74-75) study was the *lifestyle consumption* pattern. As opposed to the prior two usage motives, this usage motive can be regarded as an affective motive rather than a utilitarian one. Factors such as the labelling of car sharing vehicles, vehicle design, and the small size of vehicles are symbolically relevant in a social context. Schaefer (2013) concludes that the common denominator of such characteristics is the value of belonging, manifested by a sense of community among car sharing users based on the ability to recognize other users and be recognized by others. Furthermore Schaefer (2013) emphasizes that the visible usage of car sharing fulfils motives along with the ability to talk about car sharing among peers is a status motive. The lifestyle motive can be interpreted to be a communal motive and can be seen among a small fraction of car sharing users. Car sharing provides these users the ability to interact with likeminded users and to make a statement about their lifestyle. (Schaefer 2013, 74-75.) Another study concluded that very few CSO members associate car ownership with status motives. Only 17 % agreed or strongly agreed that the car the drive "is and important reflection of their personality". People for whom

this attribute was important had the tendency of owning a vehicle. (Millard-Ball et al. 2005, 3-17.)

The *environmental motive* of car sharing users gives them indirect benefits and can be considered partly as an altruistic motive. Environmental awareness seems to be a major psychosocial consequence for car sharing users. This can be interpreted from desired vehicle characteristics such as size and fuel efficiency and from the sought after ability of going carless. Environmental awareness is mostly linked with the value of sustainability, but is additionally often considered as an important factor of improving quality of life. (Schaefers 2013, 75.) Most research considers car sharing as a source of sustainable transport (Shaheen 1999) and this research result is in line with the majority of car sharing research. (See eg. Katzev 2003; Millard-Ball et al. 2005; Schaefers 2013; Shaheen 1999). Environmentally aware car sharing users may even be prepared to pay a premium on environmental-friendly alternatives (Costain, Ardron, and Habib 2012, 421). Car sharing members generally have strong concerns about environmental issues. In Millard-Ball et al. (2005, 3-16) 87,7 % were concerned or very concerned about environmental issues. According to Schaefers (2013, 75) research environmental motives were not the dominant driver of car sharing usage, but more of a positive side effect. According to him value-seeking and convenience motives proved to be the determining motives of car sharing users. (Schaefers 2013, 75.)

In addition to research on usage motives of car sharing of international car sharing users, scholars have also researched factors such as trip frequency or trip length distribution. Figure 11 presents trip frequency and trip length distribution of car sharing users in Toronto, Canada.

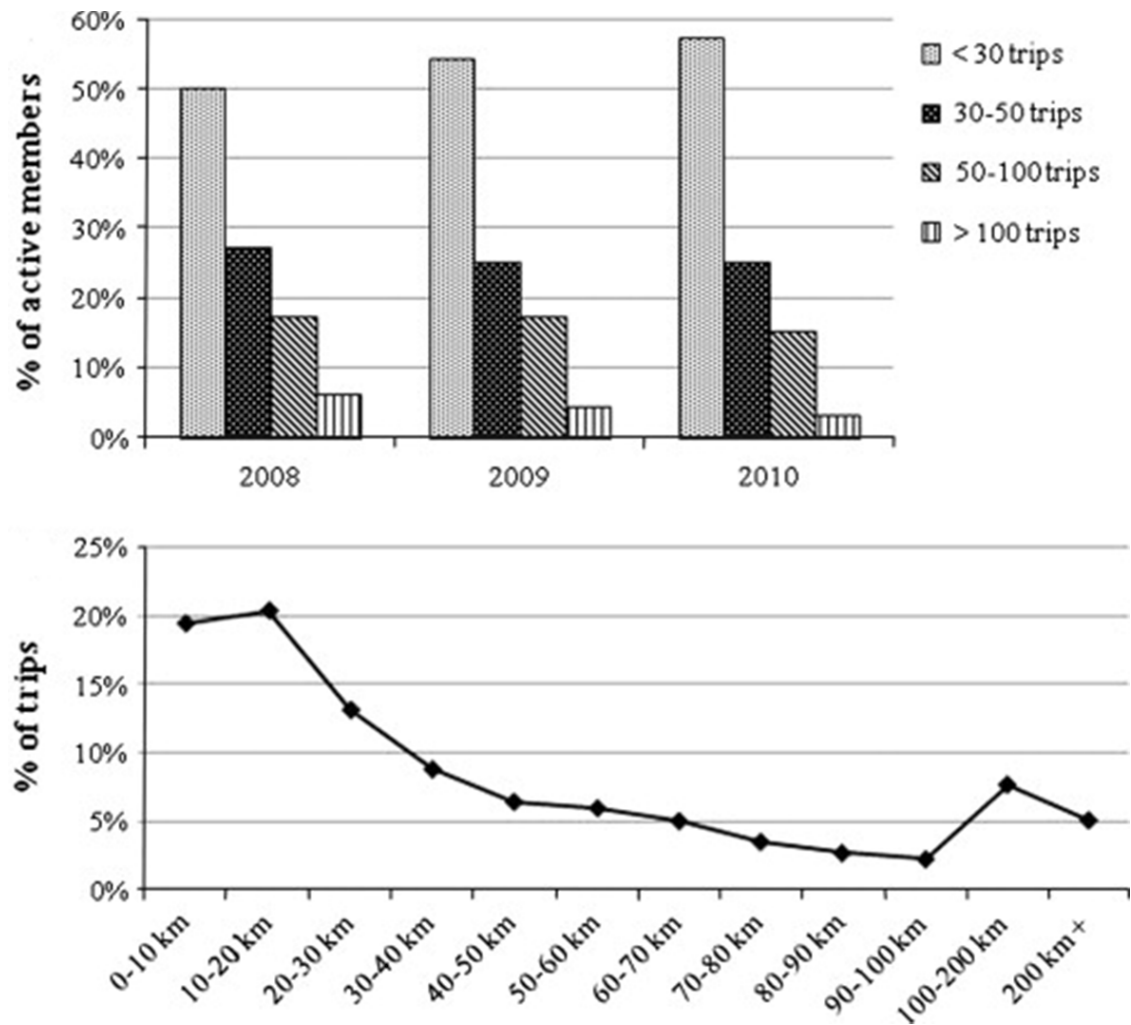


Figure 11 Trip frequency and trip length distribution (Costain, Ardron, and Habib 2012, 424)

As it can be seen in Figure 11 50 percent or more car sharing users drove less than 30 trips with a car during the year in Canada through 2008 to 2010. In 2008 50 percent of car sharing users drove between 30 to more than 100 trips with car sharing cars during the year. By 2010 the proportion of car sharing users driving less than 30 trips a year had reached almost 60 percent of all car-sharing users. Car sharing users in Canada also drove mostly short trips as nearly 60 percent of car sharing car trips were beneath 40 km in distance. (Costain, Ardron, and Habib 2012, 424.)

Figure 12 shows the monthly frequency of usage, trip start time and day of the week distribution. More than 60 percent of users use car-sharing cars less than twice a month. The use time during the day is quite evenly distributed between various time points of the day. (Costain, Ardron, and Habib 2012, 425.)

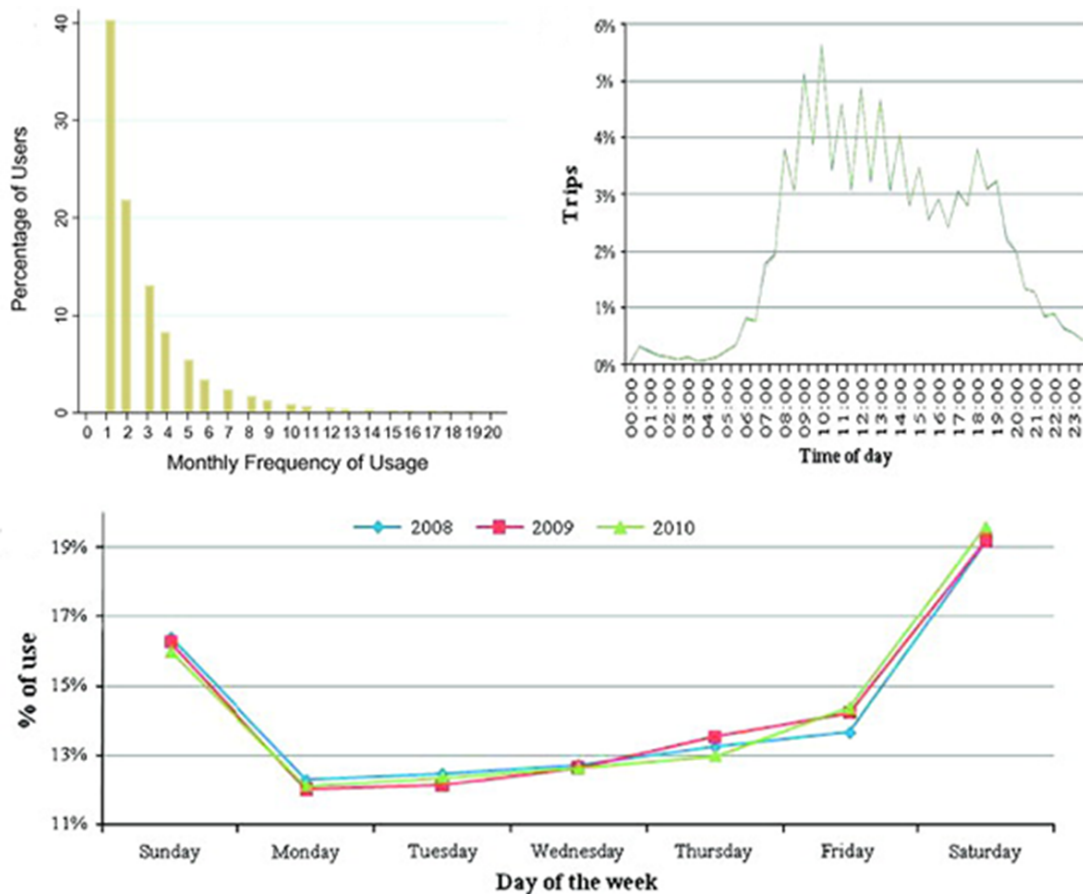


Figure 12 Monthly frequency of usage, trip start time and day of the week distribution (Costain, Ardron, and Habib 2012, 425)

As it can be seen in Figure 12, nearly 100 percent use car sharing cars between 8-19 and the percentage of usage is approximately between 3-5 percent during each hour. Car sharing car usage is quite evenly distributed during the weekdays (12-14%), even though some intensification of car sharing usage occurs during weekends (16-19%). (Costain, Ardron, and Habib 2012, 425.)

Respondents who participated in Millard-Ball et al.'s (2005, 3-15) study did drive on average on 3850 miles/year. This number includes both households with shared cars and households that owned a vehicle. The amount is about 63 percent of the mileage these households previously holds and would deem a big reduction in personal vehicle use.

Trip purpose of car sharing has also been studied and based on the research various purposes for taking a trip with a car-sharing car exists. The various purposes are portrayed in Figure 13.

Purpose	% Using Car-Sharing for This Purpose		Trip Frequency (Trips per Month)**
	On Any Trip*	On Last Trip	
Recreation / social	55.4%	16.0%	1.7
Other shopping	50.9%	16.8%	1.3
Grocery shopping	49.4%	16.2%	1.7
Personal business	44.5%	24.7%	1.6
Work-related	21.2%	12.2%	2.2
Unspecified / other***	9.5%	11.9%	2.2
To and from work	5.5%	2.1%	3.1

\* Multiple responses permitted; therefore, percentages add up to more than 100%.

\*\*Frequencies only apply when trips were actually made for that purpose (i.e., zero values are not included). This is particularly important related to trips to and from work, since only 5.5% of respondents made trips in this category.

\*\*\*Other trips included transporting family and friends (2.5%), moving furniture or hauling large loads (1.7%), medical appointments (1.1%), and visiting relatives (1.0%).

Figure 13 Car sharing trip purpose (Millard-Ball et al. 2005, 3-12)

Answers range from recreational uses, to various shopping purposes, to personal business and work-related travel, along with uncategorized purposes for the trip. According to Figure 13 when every car-sharing trip is measured recreational or social trips (55,4 %) are the biggest reason for using a car-sharing vehicle. Other shopping (50,9 %) and grocery shopping (49,4 %) are close to follow, along with personal business trips (44,5 %). Work-related trips (21,2 %) spurs for substantially less car-sharing usage than the four firstly mentioned purposes for a car-sharing trip. Figure 13 also shows that the trip-frequency for any purpose ranges approximately between 1-3 trips per month without regard to trip purpose. From this data is can be devised that the trip purpose of the majority of people using car sharing use it for once in a while for recreational purposes or for shopping related travel.(Millard-Ball et al. 2005, 3-12.)

Millard-Ball et al. (2005, 3-12) researched trip purpose more thoroughly and also measured reasons for making the car sharing trips. According to his research 47,8 percent stated that they had things to carry. 37,8 percent said they needed a car to get to their destination and 25,8 percent had multiple stops to make. 24 percent refer to a well-priced service, stating that the cost of the car-sharing car for the trip was acceptable. 17,9 percent stated that the destination was too far to walk and concluded that car sharing was in the setting the most comfortable option to travel to the destination. 16,0 percent stated that the cost of car sharing for the trip was far better than other travel options and 14,0 percent praised the ease-off drop-off with car sharing, as it required no parking

hassles or costs. 13,2 percent did not want to use public transport. Other lesser reasons covered a wide range of reasons for making the trip with a car-sharing car.

Millard-Ball et al. (2005, 3-13) study concluded that minor differences existed between genders that responded to trip purpose related questions. For males cost and not wanting to use other modes as motivator for using car sharing for trips, whereas females stated more often that they needed to make multiple stops and that they needed a car for a specific destination. The youngest of car sharing users (24 and under) responded that an acceptable cost for the trip, greater comfort compared to other means and the need to carry were reasons for using car sharing, whereas they stated less the reason of having multiple stops to take. The older users (45-54 years) most frequent reasons for car sharing trip purpose needing to make multiple stops and bringing multiple passengers with them. (Millard-Ball et al. 2005, 3-13.)

According to Millard-Ball et al. (2005, 3-13) study respondents experienced that car sharing partially replaced other transport modes. If there car-sharing would not have been available almost 30 percent of respondents had not taken the trip. 20 percent would have turned to public transportation, a bit more than ten percent would have rented a rental car and 10 % would have taken a taxi to reach the destination, while a bit less than ten percent would have borrowed a friend's car. Households with car would have used the car they owned or would have shared the ride with another person.

In Millard-Ball et al. (2005, 3-14) study more than a quarter of respondents live in households with a car. In more than 80 percent of the households, which owned a car, the car sharer had the chance or was using the household car. The most important factor for owning the car was the full flexibility of vehicle use (76,4 %). Other lesser reasons was the affordability of making longer trips with the car as well as the ability to modify the vehicle, i.e. with a child seat when needed. The most disliked features of car ownership are listed in Figure 14. (Millard-Ball et al. 2005, 3-14.)

<b>Feature</b>	<b>Percent Respondents</b>
Cost of insurance and upkeep	38.3%
Hassle of owning a car	28.8%
High purchase costs of cars	15.9%
Parking hassles and costs	9.2%
Other factors*	5.2%

\* Negative environmental consequences and social costs were a large portion of these other factors.

Figure 14 Most disliked features of car ownership (Millard-Ball et al. 2005, 3-15)



Figure 14 shows that the majority of disliked car ownership features are cost related. Almost 40 percent state that “Cost of insurance and upkeep” is a major burden of car ownership. Other such cost related factors include “High purchase cost of cars” and partly “Parking hassles and costs”. “Negative environmental consequences and social costs” were a large part of “Other factors” and seem to be of less interest to car owners (5,2%).

According to Millard-Ball et al. (2005, 3-19) saving in costs is the single most tempting trait of car sharing, which can be seen in Figure 15. Environmental and ease-of-use properties were among the next most attractive features. The costs of car sharing was also one of least tempting properties in car sharing, which can be explained by reasons of perception. Car sharing can be perceived as a cheap opportunity for individuals that have not owned a car before, but it can be simultaneously appear expensive to those have experience in owning a car.(Millard-Ball et al. 2005, 3-19.)

<b>Feature</b>	<b>% Citing This Feature*</b>	<b>% Citing As Most Attractive Feature</b>
Less costly than owning a car	85.3%	31.9%
The overall philosophy of car-sharing	78.9%	16.4%
Helps the environment	77.0%	10.2%
Less hassle than owning a car	74.9%	16.7%
Can pay for a car only when using a car	74.6%	12.2%
Easy to use	60.3%	1.8%
Easy to make reservations	57.9%	0.5%
Don't have to ask for rides from others	49.5%	5.2%
No parking hassles	41.7%	1.7%
Reliability – cars are there when I need them	35.9%	2.0%
Other	4.3%	1.5%

Figure 15 Most Attractive Features of Car-Sharing (Millard-Ball et al. 2005, 3-19)

A general consensus of the previous studies suggests that primary motivations for joining a car-sharing organization will include the characteristics shown in Figure 16.

<b>Motivations</b>	<b>Relative Importance</b>
Desire to save money	High to very high
Concern about environmental issues	High to very high
Convenience – not dealing with maintenance, etc	High to very high
Changes in one's personal life situation	Moderate to high
Positive attributes of the car-sharing experience	Moderate
Work-related conditions	Moderate to low

Figure 16 General Literature Consensus Regarding Motivations of Typical Car-Sharing Members (Millard-Ball et al. 2005, 3-24).

As earlier mentioned cost related issues, social and environmental issues along with convenience reasons are factors that have a high to very high tendency of being factors driving car-sharing usage. Changes in personal life situation determine moderately to highly car sharing usage, whereas positive attribute of the car-sharing experience have only moderate effect. Work-related conditions have a moderate to low effect motivating car-sharing usage. (Millard-Ball et al. 2005, 3-24.)

In addition to the factors listed in Figure 16 car sharing users tend to be highly concerned about environmental and social issues, not high-mileage drivers, considered to be innovators, thinking of a vehicle based on it's functionality rather than status and have joined a CSO because they needed an additional vehicle once in while. Furthermore cost savings, the ability derive financial savings from avoiding the ownership of a car or the ability to derive cost savings from going carless were factors usually determining car sharers. (Katzev 2003, 71.)

## **2.6 Theoretical framework for determinants of car sharing usage and market analysis**

Based on earlier research this study drafts a theoretical framework for the determinants of car sharing usage and market analysis. This framework is pictured in Figure 17 along with the research focus.

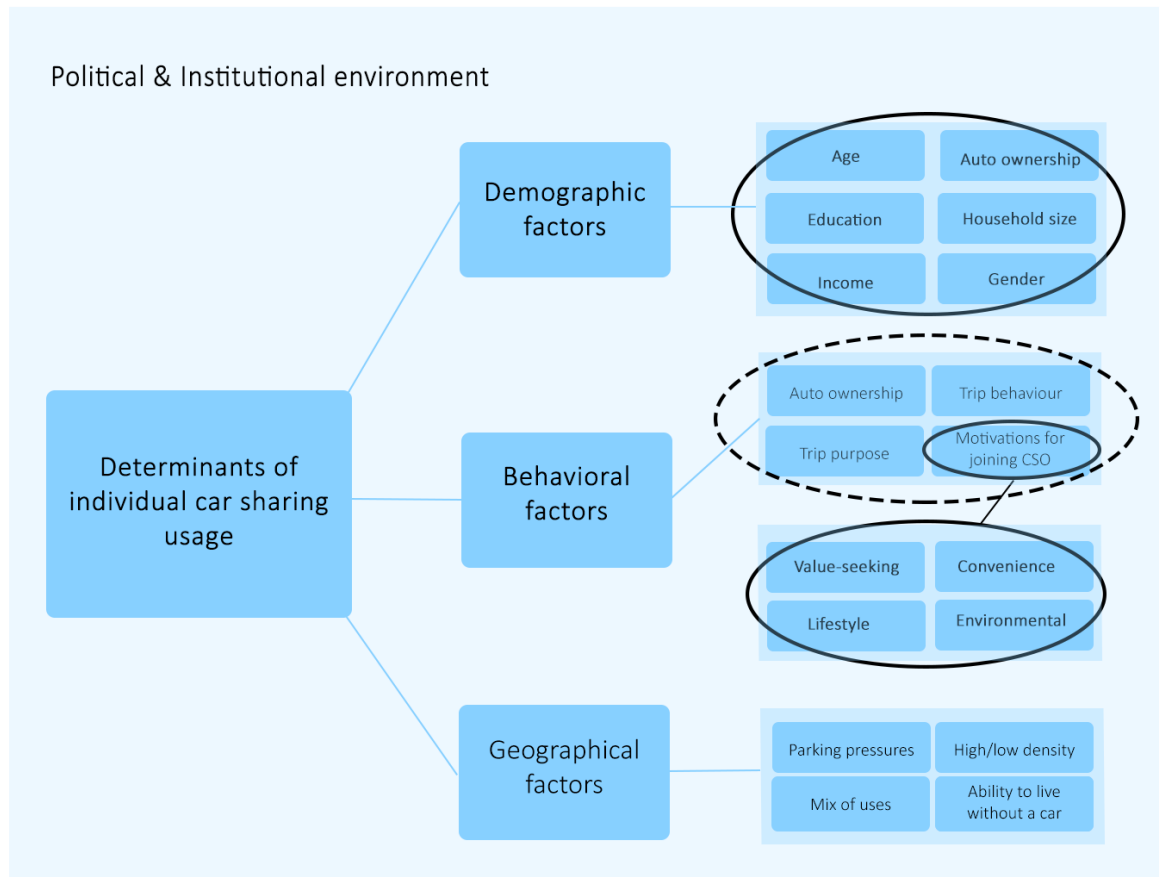


Figure 17 Determinants of individual car sharing usage

Figure 17 divides the determinants of individual car sharing usage to three dimensions. These dimensions are the demographic factors, behavioural factors and geographical factors.

Demographic factors are divided in to factors such as age, auto ownership, education, household size, income and gender. The chosen demographic factors are based on earlier car sharing studies(See eg. Millard-Ball et al. 2005; Katzev 2003; Shaheen 1999) as well as suggested typical demographic parameters to be used in sociological research (KvantiMOTV 2007).

Behavioural factors split in to factors such as auto ownership related behavioural factors, trip behaviour, trip purpose and motivations for joining a CSO. Shaefers (2013) research mostly concentrates on usage-motives of car sharing and is one of the important factors determining individual car sharing usage. Even though other relevant car sharing theory exists, the behavioural factors part of this thesis is mostly based on Schaefers (2013).

Geographical factors include parking pressures, population density in area, ability to live without a car and mix of uses. Institutional and political factors have also an effect

on car sharing availability, individual car sharing usage and provide the larger environment for CSOs and their users (Mont 2004).

The research areas of this thesis are pictured in Figure 17 with elliptical circles. The circles with continuous lines are areas, which are completely included in the research, whereas the dotted line represents factors, which are partly part of the research framework and questions. In the following chapter the research methodology is introduced.

### **3 METHODOLOGY**

#### **3.1 Research design and methods**

Among the possible research methods, survey was chosen as the proper method for collecting data for the thesis research problem. The empirical survey method was chosen to gain enough population data, to be able to generalize the findings in to the larger population. In surveys the verbal behaviour data of respondents is collected via questionnaires or interview techniques and it is an effective for gathering opinions, attitudes and descriptions or even cause-and-effect relationships. In order to answer research problems in the best possible way, proper research methods, which are systematic, focused and orderly collected need to be applied. (Ghauri and Gronhaug 2002, 85, 93.)

Research design greatly influences the quality of empirical research, which is performed to answer research questions. In order to answer research problems in the best possible way, research design needs to use the best-suited research approach, which allows for answering research questions. Research design choice affects plausible research activities for instance the collected data or the means in which data is collected. (Ghauri and Gronhaug 2002, 47.) Thus, research design is a “procedural plan that is adopted by the researcher to answer questions validly, objectively, accurately and economically” (Kumar 2005, 84.).

The survey method of this thesis combines analytical and descriptive characteristics. The method is descriptive as the research the problem is structured and well understood (Ghauri and Gronhaug 2002, 49) internationally. Because of these factors a quantitative empirical research approach was chosen. Simultaneously the thesis is analytical by nature as it aims to identify independent and dependent variables. In this thesis demographic factors are compared with behavioural patterns of car sharing users.

Descriptive surveys aim to identify the population at specific or varying times. Descriptive surveys focus more on a representative sample of the relevant population than on analytical design as it is more concerned with accuracy of the findings and whether they can be generalized. Analytical surveys on the other hand test theory and emphasize identifying independent and/or dependent variables. In both methods the timely review of existing theory literature is of utmost importance. (Ghauri and Gronhaug 2002, 95.)

#### **3.2 Conducting the study**

The survey was conducted to City Car Clubs customers through an email survey. Such a targeted survey was done to specifically reach Finnish car sharing users, to whom car

sharing is already a familiar topic. If the survey had been done to the general public in Finland, many of the car sharing concepts would have needed to be explained and the questionnaire would have needed to be formulated in totally different way. Targeting the survey to Finnish car sharing users provides an accurate and good overview of car sharing usage behaviour in Finland.

To survey was performed by building a structured questionnaire that was targeted to the customer audience of a Finnish CSO, City Car Club. A questionnaire is a list of written questions that is responded by a sample of the population and their answers are recorded for further analysis. In a questionnaire respondents read the questions, interpret what is expected and write down their answers. As in a situation of a survey, no person is available in to answer the questions of respondents, the questionnaire needs to be easily understood. (Kumar 2005, 126.) To achieve good understanding among respondents the questions of the survey were proofread, with the former CEO of City Car Club and colleagues in order make sure that the questions were easy enough to understand and that question were logical to Finnish car sharing users. The wording of the survey was checked by a university researcher and by thesis working colleagues. Special attention was put to survey question wording as if survey questions are worded poorly respondents may be reluctant to answering or may lead to respondents answering questions incorrectly. The first issue known as item non-response may increase data analysis complexity, while the second issue easily leads to response error (Malhotra and Birks 2006, 338.)

The questionnaire was sent out approximately 4000 customers of City Car Club through e-mail. The e-mail database of the City Car Club customers provided a unique opportunity to get responses about the demographic and behavioural characteristics of Finnish car sharing users. The questionnaire was responded by 532 respondents, which deemed an adequate response rate of 13,3 percent. What potentially further elevated the response rate was that the respondents were given a chance to be rewarded by answering the short questionnaire.

The survey in both English and Finnish was created between 07.06.-14.06.2013 with MS Excel, from where the questions were transferred to Webropol Survey software during 13.06.2013.-14.06.2013. As the English survey received only few answers the data analysis was concentrated on the answers received from the Finnish questionnaire. Because of this the thesis refers to only one questionnaire. A link to the questionnaire was added to a monthly newsletter of City Car Club, which was sent out 14.06.2013 and prompted the answering of the questionnaire, as one of the respondents were to be awarded with a prize. The prize was to get a car sharing Lexus at disposal for the duration of a weekend. The electronic questionnaire consisted out of 20 questions, which were all quick to answer. As the researcher acknowledged the fact that shorter questionnaires deem a higher response rate, the questionnaire was quickly answered, with a re-

sponse time less than 10 minutes. The response duration is key in receiving as many responses as possible. It is believed that the shorter the survey is, the bigger the response rate. What is a short or long questionnaire is anyway not specified in current academic writings. A respondent may lose interest of finishing the survey if it is too long. (Ghauri and Gronhaug 2002, 97.)

The questions consisted out of single choice and multiple-choice questions, and in few questions open-ended answer was available. Open-ended answer choices were offered for instance when respondents were asked about their profession, as the list of choices in the question was not exhaustive. An electronic questionnaire was chosen as the method of sending the questionnaire, because it is a fast and cost-efficient way of receiving answers. It also provided the ability to receive a response from everyone of the car sharing users who have provided an email address for City Car Club.

The relevance and purpose of the research was indicated in a short description of the survey. The respondents were told that the responses of the study are used to further improve the offered CSO service. Explaining the relevance and purpose of the research to probable respondents is important in order to receive data of good quality. It is of great importance no matter which data collection method is used, but it is especially important in the case of a questionnaire, as there is no one to answer the questions of respondents as there is in the case of an interview. Furthermore the majority of people who receive the questionnaire never respond to it, which creates a risk of self-selecting bias. Another problem in anonym questionnaires is that spontaneity in answers is mostly not allowed, and respondents may be influenced by answers of other questions or people. (Kumar 2005, 119, 130-131.)

As costs of data collection were of great importance to the researcher collecting data through a questionnaire was elected instead of an interview. Low expenses were important, as the university institution did not provide financial assistance for the completion of the thesis and the compensation from the firm for performing the study was low. Lower expenses and greater anonymity are the advantages of a questionnaire, even though it has quite an extensive list of disadvantages and thus the application is limited. A questionnaire can certainly not be done to illiterate people and possibly not to very young or old people. Young people answering the questionnaire was not a problem in this questionnaire as car sharing users all hold a viable drivers license, that has an age limit of 18 years in Finland.

The survey questions were based on the research questions, which were based on the main research problem. Based on this the questionnaire was in line with the objectives of the thesis. This is important, as a researcher should be aware of the basis of the study and what he aims to achieve (Ghauri and Gronhaug 2002, 96). The questionnaire as a whole is based on current theory and widely cited articles about car sharing. When creating a questionnaire, the type of needed information needs to be specified. The demo-

graphic part of the questionnaire is based on articles or scientific studies (See eg. Katzev 2003; Millard-Ball et al. 2005; Schaefers 2013; Shaheen 1999), as well as a source that lists the relevant or mostly used demographic questions (KvantiMOTV 2007). Socioeconomic and demographic characteristics of the researched population affect largely the data collection method, which is why it is paramount to know as much as possible about characteristics such as level of education, age, structure and socioeconomic status (Kumar 2005, 119). Behaviouristic questions in the study were widely chosen from existing international academic literature on car sharing usage behaviour. The part that was aimed to discover behaviouristic characteristic of car sharing users in Finland and is largely based on the same articles as the demographic part (See eg. Katzev 2003; Millard-Ball et al. 2005; Schaefers 2013; Shaheen 1999). The questionnaire along with survey questions can be seen in the appendices chapter.

All answers to questions were forced and the questionnaire could not be completed without answering all questions. Questionnaire forcing was done to receive fully completed survey answers. Forcing answers may lead respondents without opinions to mark the middle scale option, potentially resulting in the distortion of measures (Malhotra and Birks 2006, 308.) Answers were forced as earlier international car sharing theory clearly defines answers to questions.

### **3.3 Measures**

In the items that studied demographic factors, respondents were given a list of potential answers and in some questions in the case a respondent answered other, he or she was asked to further elaborate on the answer. Questions 15-19 were measured on a 5-step Likert scale. The Likert scale is an extensively deployed rating scale requiring respondents to express a degree of agreement or disagreement with a series of statements about stimulus objects. Normally a Likert scale has five response categories, from “strongly disagree” to “strongly agree”. The Likert scale is suitable for Internet surveys, mail, telephone or personal interviews as it is easily drafted, administered and respondents easily understand the scale. Time is a disadvantage with the Likert scale as properly reading and reflecting each questions takes more time when compared with other scaling choices. The Likert scale employed in questions 15-19 varied from (1) “Not important” to (5) “Very important”. The used surveys can be found in the appendices section. The elaboration of the survey questions can be seen in Table 1. (Malhotra and Birks 2006, 304-305.)



Table 1      Operationalization table of research questions

Main research question	Sub-questions	Survey questions
Are Finnish car sharing users similar to international ones?	What are the demographic characteristics of Finnish car sharing users?	1,2,3,4,5,6,7,8
	What are the behaviouristic characteristics of Finnish car sharing users?	9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19
	Are the demographic and behaviouristic characteristics of Finnish and International car sharing users similar?	All questions

Table 1 shows the clear division of the questionnaire in to three specific parts. The first part of the survey, questions 1-8 consists out of items studying demographic characteristics of respondents, while the second part 9-19 studies behaviouristic characteristics of respondents. The third sub-question uses data collected from the survey to compare Finnish and International car sharing users. As the items measuring demographic and behaviouristic characteristics have been used earlier car sharing and studies researching demographic characteristics of respondents, the researcher concludes that these measures can be considered as valid and reliable.

### 3.4 Data Analysis

After the survey period, the data (N=532) was uploaded first to MS Excel for slight modification of the raw data. After this the formulated data was entered to SPSS to be thoroughly analysed and interpreted. After receiving the answers for the questionnaire question 20 was not elected to use in the data analysis, as it had little relevance in answering the thesis research questions.

As the research is quite unique in the Finnish setting quantitative content analysis an explorative method of research was used for data analysis. Quantitative content analysis is performed through explorative research means and done via descriptive statistics and crosstabs. The statistical significance of variance of the crosstabs was measured via simple Pearson's Chi-square ( $\chi^2$ ) -tests.

Explorative research is often done by the means of descriptive statistics and was a large part of the analysis of the results. All questions in the data analysis part were analysed by descriptive statistics to provide a clear overview of the data collected. Descriptive statistics helps in making large amounts of data understandable and is performed to describe the basic characteristics of the data (Cohen, Welkowitz, and Lea 2011). With the combination of data summaries and simple graphical illustrations, descriptive statistics provides a backbone of every quantitative analysis (Trochim 2006). Descriptive statistics was used throughout the analysis to clearly define important characteristics in the data. Descriptive statistics analysis was conducted with all survey questions.

Crosstabs was another mode of analysis employed and further supports the explorative approach used in this thesis. Crosstabs is a more versatile tool of data analysis as it provides a means of comparing independent and dependant variables among each other. Crosstabs is a good way of comparing factors and relevance with each other, which was an aim of this study. Crosstabs is a basic form of data analysis that is used to determine relations between factors in a data set. Crosstabs are sometimes called contingency tables as they can be used to test hypotheses of variables. (White and Korotayev 2004.) As the nature of the thesis was explorative and descriptive no research hypotheses were formed. The relevance of the relations of behaviouristic and demographic attributes was tested with the help of the chi-square statistic ( $\chi^2$ ). "The chi-square statistic is used to test the statistical significance of the observed association in a cross-tabulation. The test helps in assessing if an organized association exists among to variables. To perform the test expected cell frequencies are calculated with expected row and column totals. The null hypothesis,  $H_0$ , assumes no association between the compared variables. Assumed cell frequencies,  $F_0$ , received in cross-tabulation are used to count the chi-square statistic and the bigger the difference of expected and detected frequencies, the bigger the value of the statistic becomes. The test may also be conducted to determine the goodness-of-fit test to conclude if certain models are in line with the observed data. These tests can be performed through counting the significance of deviations of samples from expected distributions. The test also works also with frequencies. (Malhotra and Birks 2006, 463-465.) As the amount of responses fell below 1000 units,  $\alpha=0,05$  was chosen as the level of significance value in this thesis.

The data was collected and afterwards the data was retrieved from Webropol's online database as a file in Ms Excel format. The data was first edited slightly within Ms Excel and transferred then to IBM SPSS 22.0 software for further statistical analysis. In SPSS 22.0 the data was labelled, coded and some of the original questionnaire groups were re-coded into different variables. During the analysis the results were tested in a way that the reported answers were approvable by statistical analysis parameters.

### 3.5 Evaluation of the quality of the study

As earlier explained the study is done to a unique sample of Finnish car sharing users, which is why the results are not generalizable to the entire populations. However by targeting the study to Finnish car sharing users the results may determine well the behaviour of the population of Finnish car sharing users. Even though the results of the thesis are not generalizable to the entire population, the validity and reliability of the thesis can be reviewed among car sharing users.

The earlier reported response rate of 13,3 percent was satisfactory as no reminder was sent out to respondents. After receiving the responses a comparison to the study population was not available, but prior research conducted by Voltti (2010) to the same car sharing population deemed similar answers. This indicates that the sample population is quite well balanced with the general population of Finnish car sharing users. Usually the response rate rises by sending the respondents a reminder of the questionnaire, when the answering period is over. However in this thesis the primary amount of responses was satisfactory in terms of validity, which is why a reminder was not sent out.

As survey questions were lead from the two research questions, which were chosen based on earlier social as well as international car sharing research; the researcher can determine that the research is valid. Validity is the ability of an instrument to measure what it is designed to measure and three types of validity exist. These are face and content validity, concurrent and predictive validity and construct validity. Face and content validity is based on “a logical link between the questions and the objectives of the study.” When survey questions are observed individually questions of validity arise, as the research objective are simpler to relate to tangible (demographic) questions such as age, gender, income than less intangible questions portraying behaviouristic perspectives. Validity of tangible questions for example determining usage motives of car sharing is more difficult to determine as potentially several questions are needed to determine such factors. (Kumar 2005, 154.) In this thesis the weakness of the validity of behaviouristic questions is mostly related to question forcing and closed answer options. If improved validity would have been pursued in the behaviouristic questions, all questions should not have been forced or many of them should have had the choice of open-ended answers. However as a multitude of prior research was the basis of the research questions the forced approach and closed answers was chosen in the questionnaire.

“Predictive validity is judged by the degree to which an instrument can forecast an outcome. Concurrent validity is judged by how well an instrument compares with a second assessment concurrently done” (Kumar 2005, 155.) When we reflect predictive validity in terms of the employed instruments in the demographic research questions, predictive validity is at a good level. Simple questions regarding demographic ques-

tions, receive predicted answers. When predictive validity is judged in regards to behaviouristic questions predictive validity is harder to determine as behaviouristic perceptions may possibly not be determined by individual question answers. However based on the results that the majority of the results in demographic and behaviouristic are in line with prior research, a good level of predictive and concurrent validity is assumed.

“Construct validity is a more sophisticated technique for establishing the validity of an instrument. It is based upon statistical procedures. It is determined by ascertaining the contribution of each construct to the total variance observed in the phenomenon”. (Kumar 2005, 155.) As the researcher is not able of determining the degree of validity of each instrument, this type of validity is disregarded in the analysis of the validity of the research.

“The concept of reliability in relation to a research instrument means that if a research tool is consistent and stable, and, hence predictable and accurate, it is said to be reliable.” If a researcher receives the same results under similar research conditions a research is said to be reliable. In this research the demographic and behaviouristic results are mostly in line with earlier research, why we can consider the results of the thesis to be reliable and applicable to a population of car sharing users. (Kumar 2005, 156.)

Measuring reliability can be divided into external and internal reliability. “External findings compare findings from two independent processes of data collection with each other as a means of verifying the reliability of a measure” (Kumar 2005, 157). A big part of prior car sharing theory was based on quantitative research methods, while the research method in an important scientific article (Schaefer 2013) in regards to this thesis was done by qualitative means. Furthermore this article was done through several face-to-face interviews, whereas the collected data in this thesis was collected via a closed questionnaire. When external reliability is considered in comparison to Schaefer (2013) article the reliability is not good. However quantitative techniques regarding car-sharing behaviour have been employed in other articles, which again would mean good external reliability of the thesis.

“The idea behind internal consistency is that items measuring the same phenomenon should produce similar results.” (Kumar 2005, 158.) As already earlier mentioned the scientific results this thesis has received in comparison to earlier research, may imply that the internal reliability of the results this thesis received is at a good level.

## 4 CAR SHARING IN FINLAND AND ABROAD

### 4.1 Demographic determinants of Finnish car sharing users

In this chapter this thesis will represent various demographic figures discovered in the study conducted to car sharing users of City Car Club. The studied demographic factors were chosen based on two reasons. The first reason was that the used demographic factors could be found in most academic studies in which demographic background characteristics of respondents are studied or where they are used to segment the respondents into various respondent groups. The second reason is that in the academic papers or studies this thesis bases upon, these demographic factors are often used.

In Figure 18 the gender distribution of study respondents is shown.

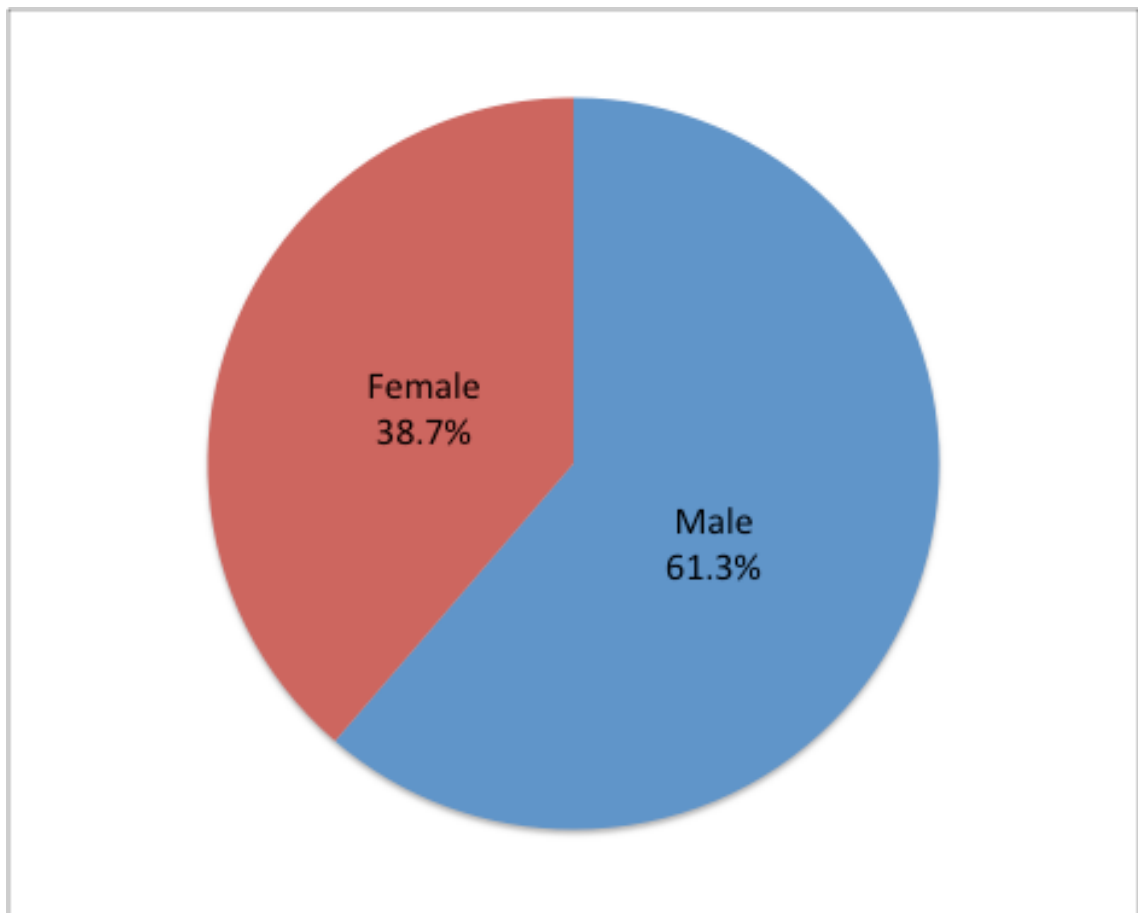


Figure 18 Gender distribution of study respondents

According to Figure 18 38,7 percent of respondents were female, while 61,3 percent were male. This finding partly contradicts previous international findings (See eg.

Katzev 2003; Millard-Ball et al. 2005), although it supports the sole Finnish study (Voltti 2010).

Figure 19 represents the age distribution of the study respondents. The respondents were regrouped into 4 new groups from the former 6 in order to represent a more even distribution of the various ages of Finnish car sharing users. The earlier 18-24 and 25-34 groups were grouped into a single 18-34 group and the groups 55-64 and 65+ were grouped into one group 55+. According to Figure 19 19,4 percent of users were between 18-34 years old, 35 percent of respondents belonged to the age group of 35-44, 29,1 percent were between 45-54 and 16,5 percent were 55 or older.

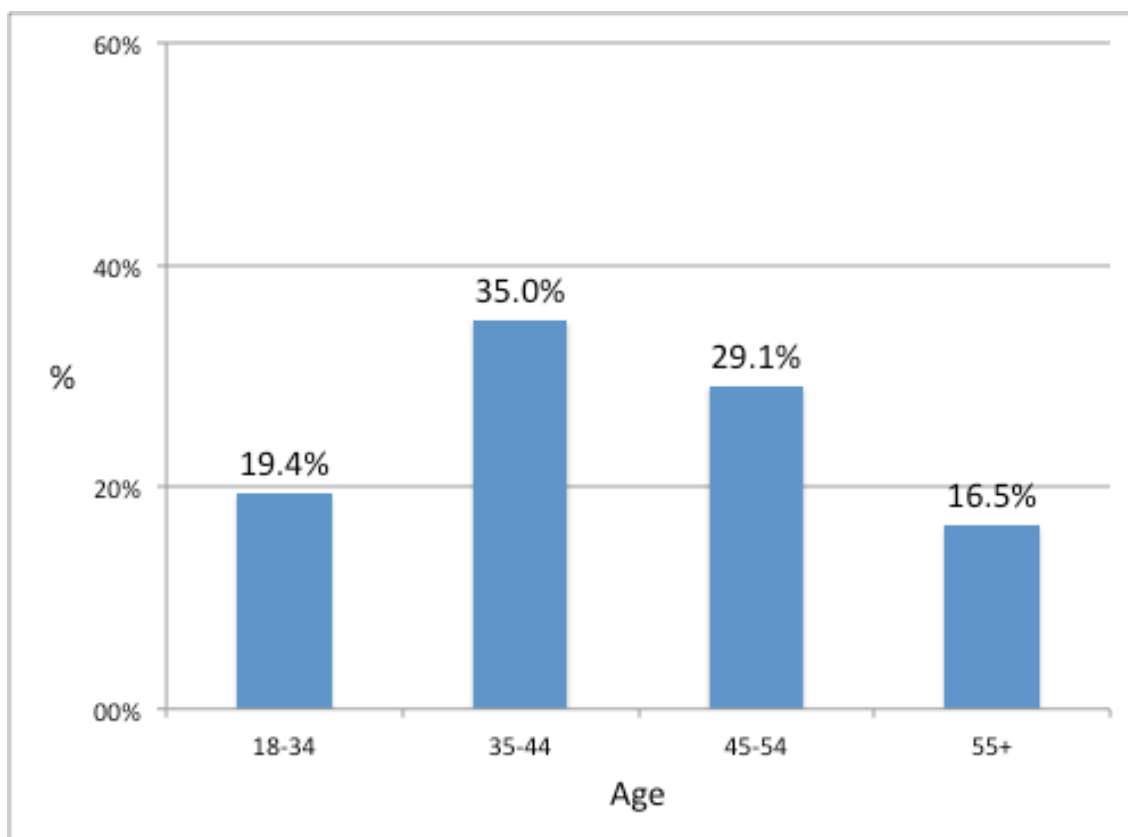


Figure 19 Age distribution of respondents

The median age group of the respondents was 35-44. This result partly supports earlier studies and partly differs from them. Figure 19 partly supports earlier studies as the median age group 35-44 partly belongs in the median age group of earlier studies. (See eg. Millard-Ball et al. 2005.)

Figure 20 represents the income distribution of the study respondents. Earlier international studies have concluded that car-sharing users generally have average or higher than average incomes (Millard-Ball et al. 2005, 3-10). The results of this study support earlier findings, as the median income group in the study was above the average yearly Finnish income, which was approximately 27 200 euros in 2012. The average income of

men were 31 297 euros a year, while the same number for females was 23 304 euros a year in 2012. (Tilastokeskus 2014.)

In order to create a more balanced graph about the respondents' incomes some groups were combined. The original groups 5-7 were combined into one group of people earning more than 70 000 euros a year and earlier response groups "I don't know" and "I don't want to answer" were coded as missing.

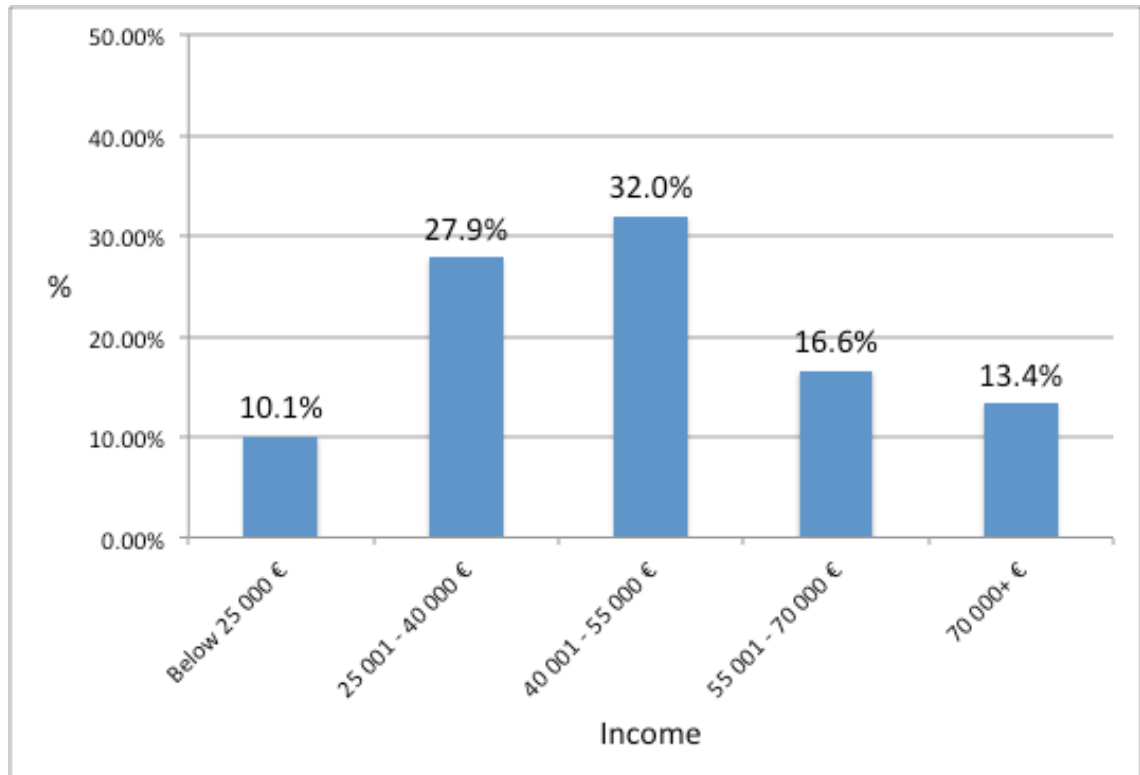


Figure 20 Income distribution of respondents

According to the study only 10,1 percent of Finnish car sharing users had less than the average income earning below 25 000 euros a year, while 27,9 percent belonged to the average yearly earner group of 25 001 – 40 000 euros a year. 32,0 percent belonged to the median group 40 001 - 55 000 euros, which earned more than the average Finn. 16,6 percent earned between 55 000 – 70 000 euros a year, while 13,4 percent earned more than 70 000 euros a year.

Level of education is also a defining factor among car sharing users. Earlier studies have concluded that the majority of users are well educated and the majority hold a bachelor's, master's or above degree from university. In order to represent a more evenly distributed distribution of the responses, original education groups were combined. Original groups 1-5 were combined to form a group labelled "Some Secondary". This group consist out of respondents, who have elementary, vocational, elementary or vocational, high school or professional degrees. The group "Secondary degree" comprises

people with a bachelor's degree from university of a degree from a university of applied sciences. The "Graduate experience" group consists out of people with a master's degree from university or even higher university education or degrees.

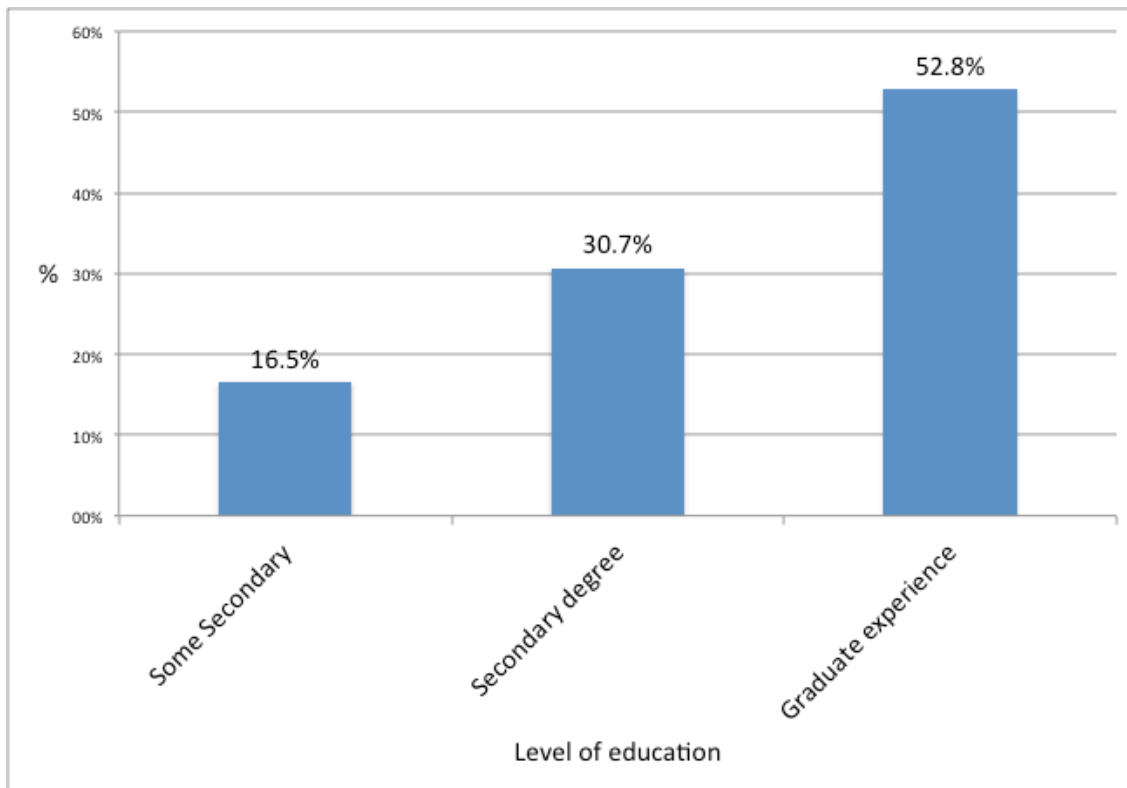


Figure 21 Level of education distribution of respondents

The results seen in Figure 21 support the earlier international findings as the minority of 16,5 percent hold "Some Secondary" education. 30,7 percent has a secondary degree, while more than half (52,8%) hold Graduate experience.

Figure 22 reveals the area of residence of study respondents. Earlier studies have concluded that car sharing is mostly concentrated in metropolitan areas (Millard-Ball et al. 2005, 3-26). As City Car Club only operates in the capitol area of Finland the results of Figure 22 are anticipated. In the original study question the respondents could choose their area of residence from all the cities in the capitol area or state openly their area of residence. As the majority of respondents resided in Helsinki and as the researcher wanted to avoid a hugely skewed diagram other answers except Helsinki were combined to the category "Other". Even though such moderation was performed, Helsinki still represent more than  $\frac{3}{4}$  of all respondents, with 77,3 percent living in Helsinki. 22,7 percent of respondents live in "Other" areas, which includes cities both in the capitol area and outside it.



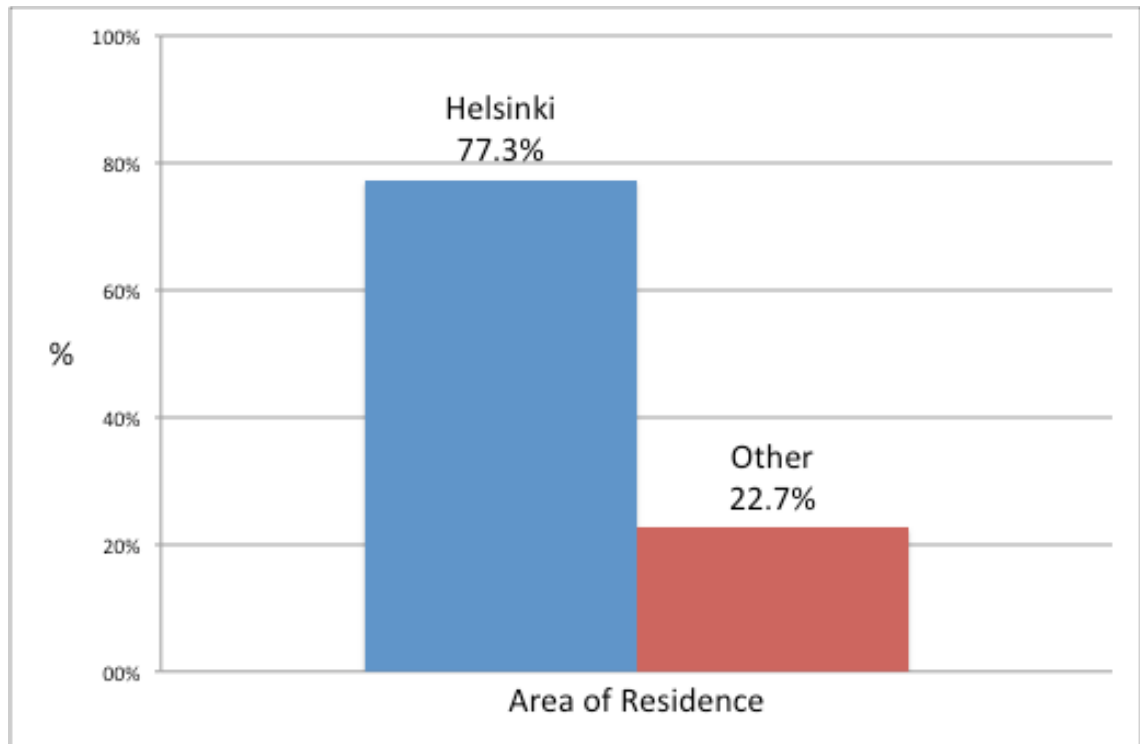


Figure 22 Area of residence of respondents

In Figure 22 the “Other” response mostly consist out of respondents living in Espoo or in Vantaa. This was expected as Espoo and Vantaa are the two most populous cities in the capitol area after Helsinki.

Figure 23 represents the year when respondents of the study became members of a CSO. As there were only few respondents who had joined a car sharing organization before 2000, these respondents were combined to a group labelled “2000 and before” in order to reduce the amount of unnecessary or groups without respondents.

The accession year among respondents seen in Figure 23 is quite evenly distributed, even though 2010 is the median and peak year among respondents, with 17,1 percent of respondents belonging in this group.

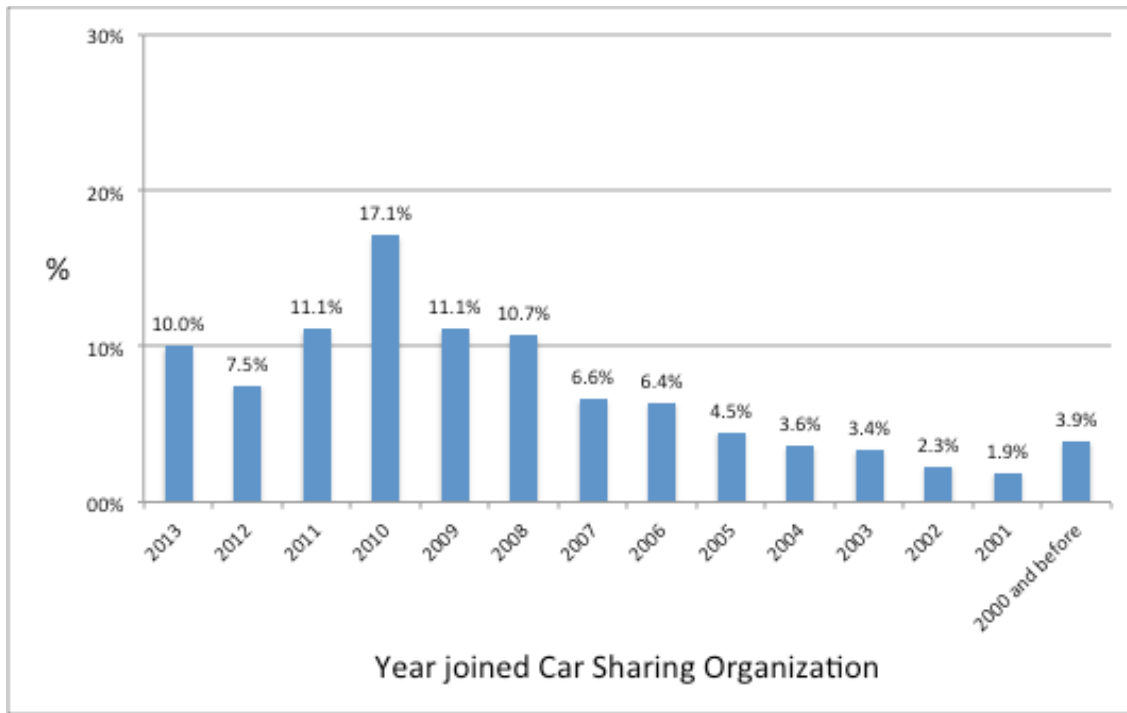


Figure 23 "Year joined Car Sharing Organization" distribution of respondents

The accession year of respondents in Figure 23 is seldom studied, but the lack of responses before 2001 can probably be explained with the fact that the main operator of Finnish car sharing, City Car Club started their operations in Finland in 2001.

## 4.2 Behavioural determinants of Finnish car sharing users

Another large part of the thesis study concentrated on discovering behavioural determinants of Finnish car-sharing users. Figure 24 represents a number of factors determining vehicle attributes earlier asked by Schaefer (2013, 72). These five factors are Visible labelling, distinct design, small size, and gas efficiency of vehicles along with fleet size. The respondents have valued the factors on a five-stage Likert scale from "Not important" to "Very important".

The attributes can be clearly divided to three categories from the perspective of the respondents. Visible labelling or distinct design appears to be mostly of no importance or less important to Finnish car sharing users both receiving over 80 % of the responses in the two earlier mentioned categories.

Small size seems to be more important to Finnish users than visible labelling or distinct vehicle design, but it is not very important as it receives less than ten percent of responses in the "Important" and "Very important" categories. Small size of vehicles is potentially less of importance to car sharing users in Finland as City Car Club cars have

designated parking spots around the city, even though it contains a convenience factor in relation to parking car-sharing cars.

The clearly most important factors to car sharing users are the “Gas efficiency” and the “Fleet size” of car sharing cars. These two answer choices receive nearly 60 percent in the categories “Important” and “Very important” and “Fleet size” nearly 80 percent of answers in the aforementioned categories. Gas efficiency is directly tied to petrol costs of cars, reflecting the importance of value-seeking motives, whereas “Fleet size” is a clear convenience factor. “Fleet size” reflects on the ability of car sharing cars. The bigger the “Fleet size” is, the more secure and convenient the customers feel the service is. A large “Fleet size” of cars heightens the probability of cars being available near users when they need one. Figure 24 further elaborates the importance of vehicle factors.

	Not important	Less important	Not important or important	Important	Very important
Visible labeling	69,7%	12,0%	10,5%	5,3%	2,4%
Distinct design	65,4%	16,0%	13,2%	4,1%	1,3%
Small size	38,2%	19,7%	32,1%	7,3%	2,6%
Gas efficiency	13,5%	7,9%	20,3%	34,0%	24,2%
Fleet size	4,3%	2,6%	13,3%	38,7%	41,0%

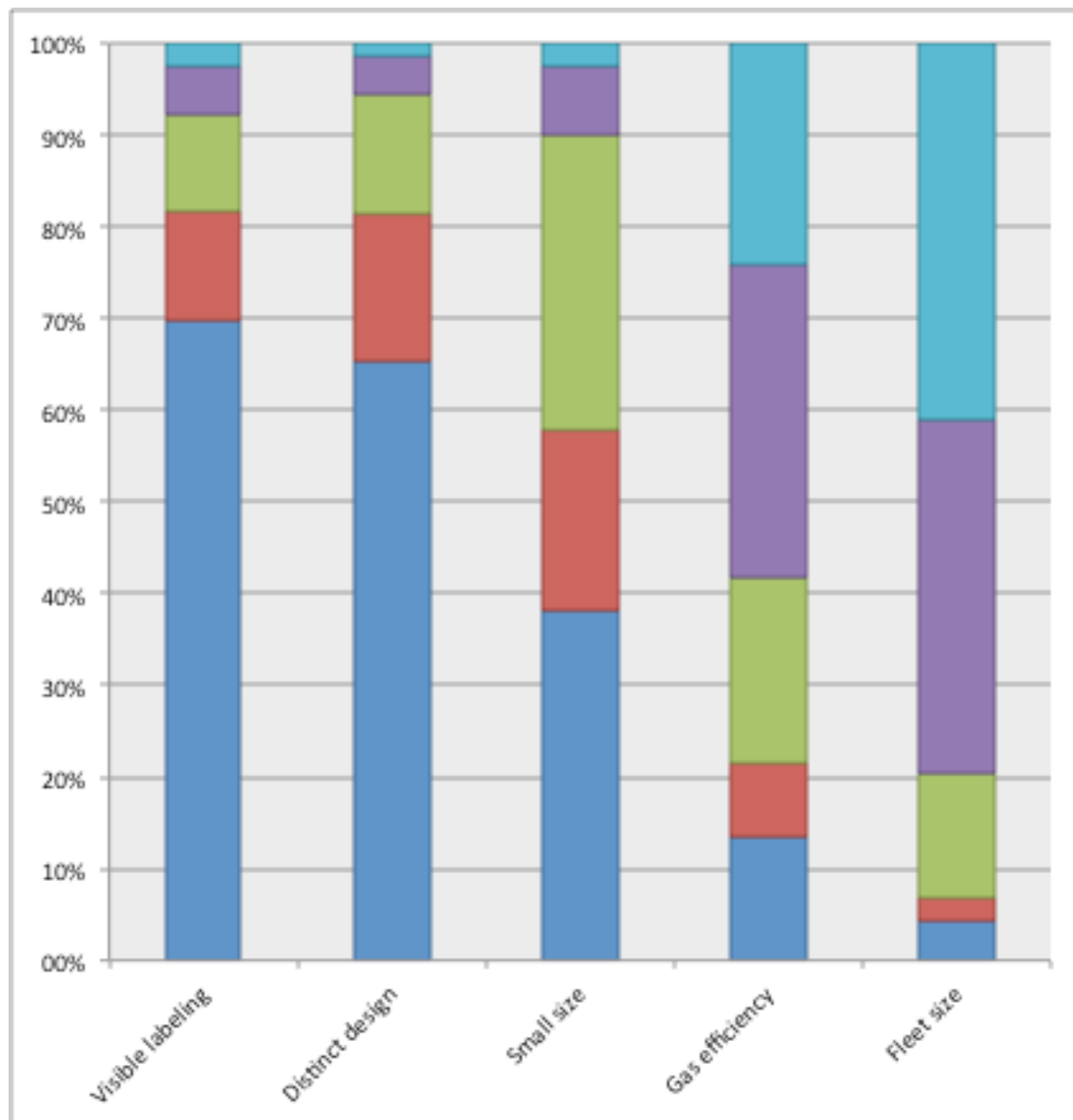


Figure 24 Distribution of importance of vehicle attributes

When you explore the differences of the two genders through crosstabs, statistically significant difference appears among the males and females in “Visible labelling”, “Small size” and “Fuel efficiency” of vehicles. With “Visible labelling” men express more firmly than females that it is of no importance to their car sharing usage, whereas females answer more often than males that “Visible labelling” is “Not important or im-

portant” to them. When the females and males are asked about size, the opinions differ in an even stronger statistically significant manner. 43,6 percent of men perceive that “Small size” is “Not important” whereas only 29,6 percent of women perceive the same. The same percentages within the “Important” and “Very important” bracket vary so that only 6,4 percent of males perceive “Small size” as “Important” or “Very important” and 15,6 percent of females perceive it as “Important” or “Very important”. The most statistically significant difference between the two genders exists when females and males are asked about the importance of “Fuel efficiency” of cars. 70,8 percent of females perceives “Fuel efficiency” “Important” or “Very important”, whereas only 50,3 percent does so. This is reflected also in the “Not important” and “Less important” bracket as 26,5 percent of males perceive “Fuel efficiency” to be “Not important” or “Less important” and only 12,9 percent of females perceive the same.

			What is your gender?		Total
			Male	Female	
Fuel efficiency	Not important	% within What is your gender?	17,5%	7,3%	13,5%
	Less important	% within What is your gender?	9,2%	5,8%	7,9%
	Not important or important	% within What is your gender?	23,0%	16,0%	20,3%
	Important	% within What is your gender?	31,0%	38,8%	34,0%
	Very important	% within What is your gender?	19,3%	32,0%	24,2%

Figure 25 Crosstabs between Gender & Fuel efficiency

From this difference we can interpret that females are both more aware of economical costs than males. Secondly it can be devised that females are potentially also more environmentally aware as they perceive “Fuel efficiency” to be significantly more important than males.

When age of respondents is compared with the various vehicle attributes “Visible labelling” and “Small size” shows significant statistical difference between the various age groups. Out of these two factors only “Small size” is comfortable to be viewed based on Chi-Square test parameters. The results are shown in Figure 26.

			Age				Total
			18-34	35-44	45-54	55+	
Small size	Not important	% within Age	33,0%	41,9%	41,9%	29,5%	38,2%
	Less important	% within Age	32,0%	20,4%	16,1%	10,2%	19,7%
	Not important or important	% within Age	27,2%	31,7%	31,0%	40,9%	32,1%
	Important	% within Age	5,8%	5,4%	9,7%	9,1%	7,3%
	Very important	% within Age	1,9%	,5%	1,3%	10,2%	2,6%

Figure 26 Crosstabs between Age & Small size

When the importance of "Small size" and "Age" is compared, it can be devised that for 55+ old people "Small size" is significantly of greater importance compared to other age groups.

When "Income" is compared with vehicle attributes statistically significant difference exists among "Income" and "Visible labelling" and "Fuel efficiency". Out of these two only "Fuel efficiency" is more thoroughly inspected based on Chi Square test parameters. For people who earn less than 40 000 euros a year "Fuel efficiency" is significantly more important than for people who earn more than 55 000 euros a year. In fact the importance is almost double between these two income groups.

When "Level of education" is compared with vehicle attributes only statistically significant difference exists between "Fleet size" and "Level of education". Statistically significant difference exists between people with "Some secondary" education and with people with "Graduate experience", out of whom 45,1 percent perceive "Fleet size" to be "Very important" whereas the same percentage for "Some secondary" respondents is only 33,7 percent. No statistically significant difference exist between "Area of residence" and "Vehicle attributes".

Figure 27 reveals the importance of various service attributes of car sharing. The questioned service attributes consist out of seven attributes. The attributes are "Reasonable prices", "Everything included in the service", "Pay per use & monthly billing", "Reserve first", "Ad-hoc usage enabled", "Free parking" and "Designated parking". These attributes are ranked from "Not important" to "Very Important" on a five step Likert scale.

The most important attribute obviously seems to be "Reasonable prices" with closer to 95 percent of respondents valuing it "Important" or "Very important". This is probably a very important factor as if car-sharing services were not reasonably priced, customers would probably choose another form of mobility, such as a taxi or purchasing their own vehicle.

The second most important service attribute is “Everything included in service” with almost 80 % valuing the factor “Important” or “Very important”. This is a convenience factor as it would probably frustrate customers if they were billed in a similar way low-cost carriers, where the basic price is rises often by offering a multitude of risk-decreasing services, such as better covering insurance.

“Designated parking”, “Pay per use & monthly billing” and “Reserve first” are the three next most important service attributes. Of these three “Designated parking” can be valued as the most important as in absolute terms about 72 percent of respondents value it as “Important” or “Very important” and more than half of them value it as “Very important” as an attribute. “Designated parking” is a convenience issue as it saves car sharing users time, when looking after a place to park their vehicle. Secondly it is a security issue, as users know instantly that the car is in a valid parking place and thus they do not risk parking fines. “Pay per use & monthly billing” and “Reserve first” are probably convenience factors as they are something users have become used to with City Car Club. Another possible payment choice could be to “Pay per use instantly” in a similar manner as with a taxi. “Reserve first” is the current usage mode of City Car Club cars. It means that users are required to reserve the car first and state the time period they use the car.

Another usage mode that would create flexibility of usage to users could be “Ad-hoc usage enabled”. “Ad-hoc usage enabled” would mean that customers could pick up vehicles without reserving them first, which is a usage mode offered by few CSOs in Europe and in North America. “Ad-hoc usage enabled” is clearly the least important of the service attributes, as it probably is an unfamiliar service attribute to City Car Club users. Secondly if a CSO enables ad-hoc usage, it makes the capacity of cars hard to manage.

“Free parking” is the second least important factor of usage even though “Important” and “Very important” answers amount more than 50 % of all answers. It is probably this important at least because of two reasons. It is a convenience factor as it would add more hassle to the usage of the car sharing cars and because the designated parking slots are already free of charge for car sharing users.

	Not important	Less important	Not important or important	Important	Very important
Reasonable prices	0,4%	1,7%	4,1%	23,5%	70,3%
Everything included in service	1,3%	3,0%	15,4%	32,1%	48,1%
Pay per use & monthly billing	3,6%	4,3%	26,9%	33,5%	31,8%
Reserve first	1,1%	4,5%	30,3%	42,7%	21,4%
Ad-hoc usage enabled	12,6%	22,2%	30,3%	24,1%	10,9%
Free parking	4,9%	12,2%	26,9%	27,1%	28,9%
Designated parking	2,4%	5,6%	19,7%	35,0%	37,2%

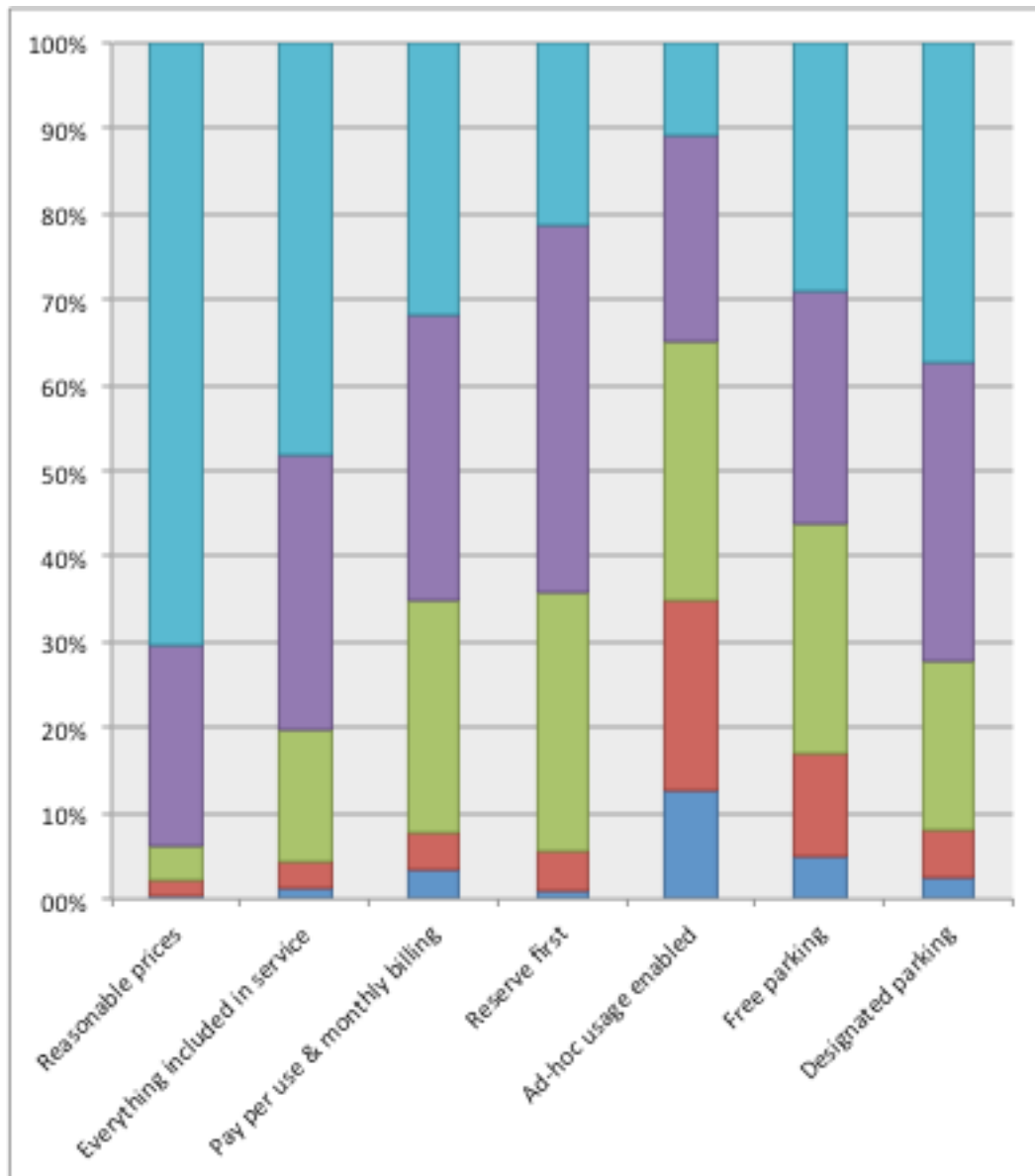


Figure 27 Distribution of the importance of service attributes

Based on crosstabs where “Gender” and car sharing service attributes are compared statistically significant difference exists between “Gender” and “Reasonable price”,



“Everything included in the price” and “Pay per use”. Among these three, only “Everything included in the price” and “Pay per use” fulfil the Chi Square test parameters. Both females and males perceive that “Everything included in the price” is an important attribute in car sharing, females perceive it to be more “Very important” than males. Where 55,8 percent of females perceives “Everything included in the price” is “Very important”, only 43,3 percent of males thinks alike. From this it can be devised, that females appreciate less hassle with car sharing than males. The same is true when “Gender” is compared with “Pay per use”. This factor is also more appreciated or considered more important among females than men.

When “Age” is compared with service attributes of car sharing the sole factor with significant statistical difference is “Ad-hoc usage”. This factor is considered by 26,1 percent of 55+ users “Not important”, which is almost double the percentage compared with other user groups. One response to this may be that elderly people are most accustomed to already existing usage mode of car sharing and do not even consider an alternative to this usage pattern. When “Income” was compared with service attributes through crosstabs none of the factors proved to be statistically significant as Chi Square test parameters ruled out possible groups where statistically significant difference existed.

The sole statistically significant factor, when “Level of education” and service attributes are compared is “Free parking”. 74,4 percent of respondents with “Some secondary” education respond that “Free parking” is either “Important” or “Very important”. The same responses are selected by 56,9 percent of “Secondary degree” respondents and by 49,1 percent of “Graduate experience” respondents. When “Area of residence” was compared with service attributes through crosstabs none of the factors proved to be statistically significant.

Figure 28 describes the importance of functional attributes caused by the use of car sharing. In this question fourteen choices were given and they were “Flexible use”, “Quick and easy transportation”, “Access without ownership”, “Easy to calculate costs”, “Spend less than for own car”, “Replacement for own car”, “Easy identification of vehicles”, “Recognize other drivers”, “Be recognized by others”, “Reduced CO2 emissions”, “Small distance to next vehicle”, “Less walking”, “Availability” and “Reliability”. Respondents were given the choice of ranking the importance of the aforementioned attributes from “Not important” to “Very important” on a five-scale Likert scale.

According to Figure 28 the most important factors for Finnish car sharing users are “Flexible use”, “Access without ownership”, “Spend less than for own car”, “Replacement for own car”, “Availability” and “Reliability”. 75 % out of all respondents rank these factors as “Important” or “Very important”. It can be concluded that the listed factors are all convenience or value-seeking factors. “Flexible use”, “Access without ownership”, “Availability” and “Reliability” are all convenience based usage motives,

even though they contain some amount of valuable properties. “Spend less than for own car” and “Replacement for own car” are clearly economically driven factors. The majority of car sharing users seem to assume that car sharing is a cheaper choice for them than owning a car even though “Easy to calculate costs” is not as important as the prior two.

“Quick and easy transportation”, “Easy to calculate costs”, “Reduced CO2 emissions” and “Small distance to next vehicle” are the next most important factors that are ranked by 52,8 – 72,9 percent to be “Important” or “Very important”. “Easy to calculate costs” is a value-seeking based motive as often car owners are not aware of the cost of for instance driving a mile with their car. With City Car Club a monthly bill is received that shows how the costs of the month are structured. “Quick and easy transportation” reflects the convenience of car sharing even though it may not be as flexible as owning a car, from the usage perspective. “Small distance to next vehicle” is also an important factor as the longer the distance to the next mobility solution is from the car sharing parking slot, the less convenient it becomes as a mobility option. “Reduced CO2 emissions” is the only factor of the potential choices associated with environmental usage values.

“Easy identification of vehicles”, “Recognize other drivers” and “Be recognized by others” are the least important functional attributes according to all respondents. Over 70 percent or more of all respondents rank these factors as “Not important” or “Less important”. Lifestyle or communal usage motives seem to be of less importance to Finnish car sharing users as the ability to identify or be identified by other car sharing users is really not important to them.

	Not important	Less important	Not important or important	Important	Very important
Flexible use	0,6%	1,5%	10,7%	36,7%	50,6%
Quick and easy transportation	1,3%	3,0%	23,3%	41,5%	30,8%
Access without ownership	1,3%	2,1%	7,7%	27,4%	61,5%
Easy to calculate costs	2,6%	8,8%	24,2%	36,1%	28,2%
Spend less than for own car	3,2%	5,1%	16,2%	26,9%	48,7%
Replacement for own car	4,5%	3,9%	13,9%	26,5%	51,1%
Easy identification of vehicles	47,7%	25,2%	17,5%	6,4%	3,2%
Recognize other drivers	71,6%	16,2%	9,4%	1,7%	1,1%
Be recognized by others	71,8%	16,0%	8,6%	2,6%	0,9%
Reduced CO2 emissions	10,9%	11,1%	25,2%	26,5%	26,3%
Small distance to next vehicle	8,8%	8,3%	19,9%	37,6%	25,4%
Less walking	33,3%	20,9%	25,6%	13,3%	7,0%
Availability	0,4%	0,9%	3,8%	32,0%	63,0%
Reliability	0,6%	0,4%	3,9%	24,4%	70,7%

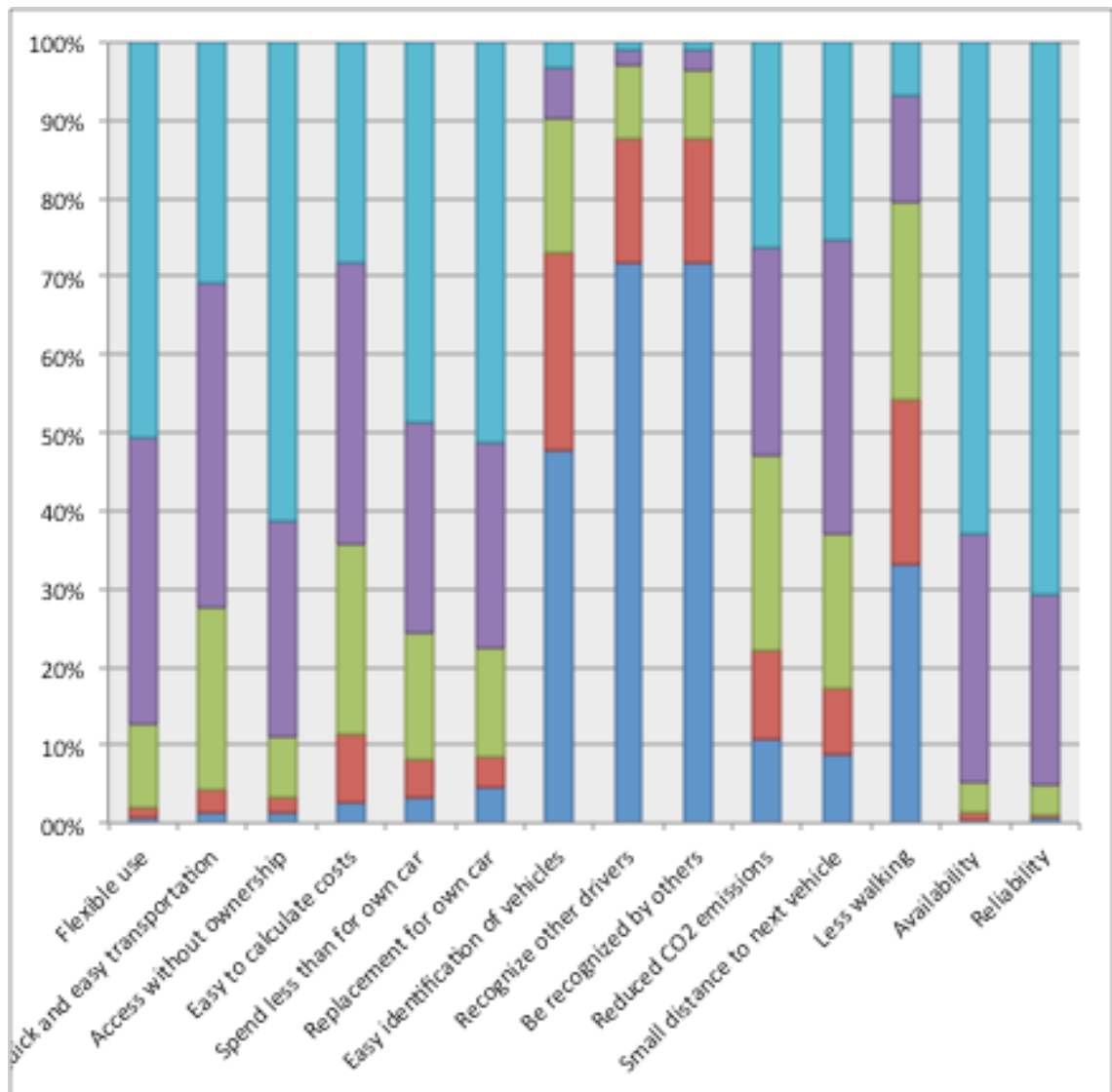


Figure 28 Distribution of importance of functionality attributes

Based on Figure 28 the researcher can assume that convenience- and value-seeking motives are the most important thing driving car sharing use, environmental and convenience factors the second most important factor and lifestyle and communal usage motives the least important of usage motive drivers in Finland.

When “Gender” is compared with functionality attributes of car sharing through crosstabs, statistically significant difference among genders can be found in “Easy to calculate costs”, “Spend less than for own car”, “Replacement for own car”, “Easy identification of vehicles”, “Be recognized by others”, “Reduced CO2 emissions”, “Small distance to next vehicle”, “Less walking” and “Reliability”.

The notion that women are more cost conscious than men is further heightened by the fact that the percentage amount of females who say that “Easy to calculate costs” is “Very important” is almost double the amount of males with 38,8 percent of them responding in the explained manner. Furthermore, 14,8 percent of males say that “Easy to calculate costs” is either “Not important” or “Less important”, while only 6,3 percent of females respond in the similar way. When “Spend less than for own car” is compared between the genders cost awareness of females is further enhanced when compared with males. 85 percent of females respond that “Spend less than for own car” is either “Important” or “Very important”, while 69,9 percent of males do the same. Both genders agree that “Replacement for own car” is a very important factor, although a higher percentage of females think in this manner. 82 percent of females respond that “Replacement for own car” is either “Important” or “Very important”, while 74,9 percent of males respond in such a way. When “Easy identification of vehicles” is scrutinized some difference exists between the two genders. A big proportion of males perceive that “Easy identification of vehicles” is not important, as 78,5 percent of them respond “Not important” or “Less important” to this question, while 64,1 percent of females respond in this manner. Both genders perceive “Be recognized by others” not be of importance as over 80 percent of both genders respond “Not important” or “Less important” to this question, although again males take a stronger stance in this matter, shown as percentage of nearly 90 percent. When males and females are asked about their stance to “Reduced CO2 emissions” a significantly larger proportion of females (66,5 %) perceive it as “Very important” or “Important”, while when compared only 44,2 percent perceive it to be “Important” or “Very important”. “Short distance to next vehicle” is more to females than males, when we compare “Very important” answers among the genders. However when we combine the “Important” and “Very important” brackets, the gender percentages are quite similar. “Less walking” is slightly more appreciated by females than males in the “Very important” bracket, but again when the “Very important” and “Important brackets are combined similar percentages among genders are received. The same is true for “Reliability”.

When “Age” is compared with functional attributes of car sharing statistically significant difference is found between “Easy identification of vehicles” and “Reduced CO2 emissions” and “Age”. “Easy identification of vehicles” is the most important among the oldest age group 55+. In the 55+ age group 17,1 percent of respondents perceive “Easy identification of vehicles” to be “Important” or “Very important”, while in other groups respondents fall below ten percent. Otherwise when you compare the age groups with “Easy identification of vehicles” no big differences exist. Across the board “Reduced CO2 emissions” appear to be important to all respondents despite what age group they belong in. However it is clearly most important to the oldest age group 55+, of whom 70,5 percent perceive “Reduced CO2 emissions” is “Important” or “Very important”. In comparison among 18-34 year old respondents “Reduced CO2 emissions” gather 44,6 percent of “Important” and “Very important” answers, in the 35-44 age group 48,4 percent and in 45-54 age group 53,6 percent.

When yearly income is compared with functional consequences of car sharing, statistically significant differences among users exist only in “Reduced CO2 emissions”. When various income groups are compared with “Reduced CO2 emissions” it can be concluded that “Reduced CO2 emissions” is most important to the respondents of the two lowest income brackets of “Below 25 000 €” and “25 001-40 000 €”. 60,8 percent and 61,0 percent of these respondents express, that “Reduced CO2 emissions” is “Important or “Very important”, whereas only 36,8 percent of respondents in the highest income bracket “70 000+ €” respond in this way. In the “40 001-55 000€” and “55 001-70 000” brackets, approximately 50 percent of respondents conclude that “Reduced CO2 emissions” is either “Important” or “Very important”. When “Education” and functional consequences of car sharing are compared none of the responses show statistically significant difference among respondents or they are rule out due to Chi Square test parameters.

When “Area of residence” and functional consequences of car sharing are compared statistically significant difference exist among respondents in “Quick and easy transportation” and “Spend less than for owning a car”. 74,0 percent of people living in Helsinki say that “Quick and easy transportation” in either “Important or “Very important”, when 66,9 % of people living elsewhere respond in this manner. Otherwise the respondents concur mostly in their opinions. Similarly 77,4 percent of all Helsinki based respondents respond that “Spend less than for owning a car” is “Important” or “Very important”, while simultaneously 69,4 percent living outside Helsinki respond in this way.

Figure 29 represents the importance of miscellaneous consequences caused by the use of car sharing. Other consequences can be split into thirteen various consequences, which are “Fun”, “No worries”, “No responsibility”, “Being able to go careless”, “Not feel stranded”, “Sense of community”, “Something to talk about”, “Save money”,

“Have money for other things”, “Save time”, “Not miss anything”, “Focus on important parts of life” and “Environmental awareness”.

The most important other consequences in Figure 29 receiving 50,9 - 66,4 percent of “Important” to “Very important” responses are “No worries”, “Being able to go care-less”, “Not feel stranded”, “Save money”, “Have money for other things”, “Save time” and “Environmental awareness”. “No worries”, “Being able to go careless”, “Not feel stranded” and “Save time” are convenience factors, which further strengthen a percep-tion that convenience is one of the most important factors driving car sharing usage in relation to other mobility options.

Among these convenience factors the most important is “Being able to go careless” that collects 66,4 percent of all “Important” to “Very important” answers. Thus it ranks better than value-seeking factors such as “Save money” and “Have money for other things”, which also are part of the most important factors bracket. One of the interesting factors regarding this question is that “Environmental awareness” ranks as the second most important factor, collecting 61,3 percent of all “Important” to “Very important” answers. This refers to the fact that environmental factors are one of the important driv-ers of car sharing usage. However what is noteworthy when comparing the important “Other consequence” factors to earlier questions regarding service or vehicle attributes is that on average “Other consequence” don’t seem to be as “Important” or “Very im-portant” as some car sharing vehicle or service attributes.

The second most important factors in Figure 29 are “Not miss anything” and “Focus on important parts of life” receiving 40,4 percent and 45,7 percent of all “Important” to “Very important” responses. These low importance percentages imply that although they rank as the next most important factors in the “Other consequences” bracket, these factors are not that important to car sharing users. Both consequences are factors, which refer to a somewhat utilitarian motives of using car sharing rather than idealistic such as “Environmental awareness”.

	Not important	Less important	Not important or important	Important	Very important
Fun	29,1%	22,6%	31,0%	13,5%	3,8%
No worries	7,3%	9,6%	26,9%	37,6%	18,6%
No responsibility	30,1%	18,0%	28,4%	15,2%	8,3%
Being able to go careless	5,5%	7,1%	21,1%	39,3%	27,1%
Not feel stranded	10,9%	12,2%	25,9%	31,4%	19,5%
Sense of community	57,0%	22,0%	16,4%	3,9%	0,8%
Something to talk about	54,9%	19,9%	19,5%	4,5%	1,1%
Save money	6,0%	8,1%	25,2%	36,1%	24,6%
Have money for other things	7,0%	7,7%	24,8%	33,6%	26,9%
Save time	7,0%	8,8%	28,9%	38,2%	17,1%
Not miss anything	14,3%	9,0%	36,3%	27,1%	13,3%
Focus on important parts of life	14,1%	7,9%	32,3%	30,3%	15,4%
Environmental awareness	9,0%	6,0%	23,7%	31,0%	30,3%

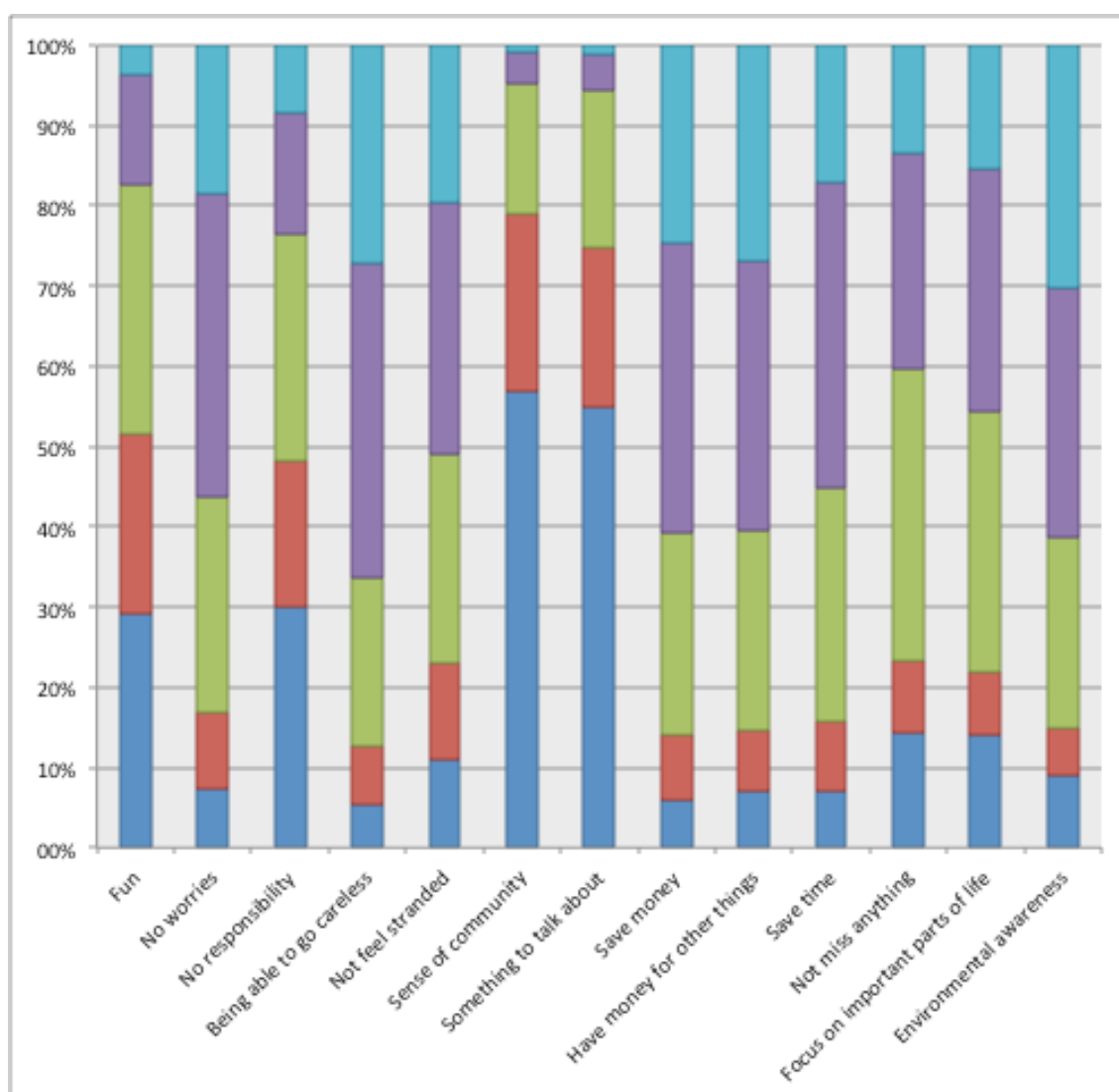


Figure 29 Distribution of importance of other consequences

The least important of the other consequence factors in Figure 29 are “Fun”, “No responsibility”, “Sense of community” and “Something to talk about”. The latter two received almost 80 % of all “Not important” and “Less important” responses, while “Fun” and “No responsibility” received about 50 percent of the “Not important” and “Less important” answers. What can be devised from this is that to community and lifestyle driven usage-motives are the least important to Finns. Having “Fun” as one of the less important can be interpreted as Finns seeing car-sharing usage as a simply utilitarian mode of mobility. “No responsibility” that was intended to relate to being able to go carless may have been interpreted wrongly by the respondents, as “Being able to go carefree” was among the most important “Other consequence” factors.

When “Gender” is compared with other consequence attributes statistically significant differences are found in “Fun”, “No responsibility”, “Something to talk about” and “Environmental awareness”. 22,8 percent of females respond that having “Fun” while using a car sharing vehicle is “Important” or “Very important”, when 13,8 percent of males only do so. However overall having “Fun” while using a car sharing car does not seem to be specially important as interpreted earlier. 30,1 percent of females perceive “No responsibility” to be “Important” or “Very important”, compared with 17,4 percent of males responding in this way. This attribute however appears to be quite indifferent or not important to both gender as other “Not important or important”, “Less important” and “Not important” receive the biggest share of responses among respondents. “Something to talk about” is not of great importance to either of the genders as only a handful of respondents perceive it as “Important” or “Very important”. However a larger proportion of females perceive it as slightly more important than males. “Environmental awareness” however splits the two gender opinions in a more significant way. As earlier mentioned “Environmental awareness” seems to be more important to females and this question receives 73,6 percent “Important” to “Very important” answers from females, while 53,7 percent of males have the same opinion. This further strengthens the perception that females are more environmentally aware or perceive it as more important than males.

When “Age” is compared with other consequence attributes of car sharing statistically significant difference may be observed in “No responsibility”. When the various age groups are compared with “No responsibility” some statistically significant difference among age groups exist in the “Not important” and “Less important brackets”. However when you combine these two brackets for all age groups no special difference among groups exists as all age groups answers in “Not important” and “Less important” amount roughly 50 percent of all answers. When various income groups are compared with other consequences of car sharing usage not statistically significant differences arise or the groups do not pass Chi Square parameters.



When level of education is compared with other consequences of car sharing usage statistically significant differences can be observed in “Fun” and “Being able to go care-less”. When “Fun” is compared with various education groups we can conclude that is indifferent or largely of no importance to all groups despite their level of education, even though the most educated group with “Graduate experience” feels most strongly that is of no importance. When “Being able to go careless” is compared with “Education”, all groups perceive it to be mostly “Important” or “Very important”. All of the groups answer “Important” or “Very important” more than 50 percent to this question. 71,2 percent of the most educated answering in this way, while 62,5 percent of “Secondary degree” and 55,8 percent answer “Important” or “Very important” to this question.

When “Area of residence” is compared with other consequences of car sharing usage “Being able to go careless” and “Something to talk about” are factors where statistically significant difference occurs. “Being able to go careless” seems in general as an important outcome of car sharing over 50 percent of people residing in Helsinki and other locations perceive it as “Important” or “Very important”. However it seems to be more important to people living in Helsinki as 69,6 percent of respondents perceive it as “Important” or “Very important”, while 55,4 percent of people residing elsewhere respond in the same manner. When “Area of residence” is compared with “Something to talk about” it can be concluded that is not an important factor to either of the groups. However over 75 percent of people residing in Helsinki express this, when slightly less, 70,2 percent of people residing elsewhere express such an opinion.

### **4.3 A comparison of the demographic and behavioristic characteristics of Finnish and International car sharing users**

After conducting the study of demographic and behaviouristic characteristics of Finnish users it can be determined that Finnish car-sharing usage behaviour follows largely that of their international counterparts.

In terms of demographics the general notion is that Finnish car sharing users are middle aged young adults (30-40 years), with a high level of education and earn mostly better than the average habitant in Finland. Voltti’s (2010, 11) findings support the age finding and also added that similar results on age the structure of CSO respondents have also been received in other parts in Europe. Moreover he concludes that Finnish car sharing users in terms of gender are similar to European countries. The results of this thesis regarding demographic characteristics are also similar with several academic studies performed in North America, although car sharing appears to be slightly more of interest to females in North America. Many scholars who have studied the North American

car sharing market concur that respondents are generally highly educated individuals, with academic degrees and earn the above average wage. Moreover all related domestic and international studies indicated that CSO members tend to live in cities where a good public transportation network is available. (See eg. Katzev 2003; Millard-Ball et al. 2005; Shaheen 1999). This seems understandable, as this thesis has indicated that car sharing is a complement to an individuals mobility mix.

When behavioural characteristics of Finnish car sharing users are compared with international findings, the findings support international findings on a general level (See eg. Katzev 2003; Millard-Ball et al. 2005; Schaefer 2013; Shaheen 1999). Although this thesis is not directly comparable in terms of answers with all of the mentioned studies, empirical evidence indicates that that convenience, value-seeking and environmental values are factors behind the popularity of car sharing. The most important motivations for Finnish car sharing users in this study were “fleet size”, “gas efficiency”, “reasonable prices”, “everything included in in service”, “pay per use & monthly billing”, “reserve first”, “designated parking”, “flexible use”, “quick and easy transportation”, “access without ownership”, “easy to calculate costs”, “spend less than for own car”, “replacement for own car”, “reduced co2 emissions”, “small distance to next vehicle”, “availability”, “reliability”, “being able to go careless”, “save money”, “have money for other things”, “save time” and “environmental awareness”. Some of the listed motivations can be categorized both convenience and value-seeking motives, although clear motives belonging clearly to one of the two groups can also be found.

The clear convenience factors in the list are “fleet size”, “pay per use & monthly billing”, “reserve first”, “designated parking”, “flexible use”, “quick and easy transportation”, “small distance to next vehicle”, “availability”, “reliability”, “being able to go careless” and “save time”. The importance of fleet size, reliability and availability of car sharing vehicles is important to users as a CSO members expects a vehicle to be available he needs one. Even though in Millard-Ball et al’s (2005, 3-19) study reliability of availability was among the most attractive features of car sharing, it received only a fraction (35,9 %) of all answers compared with this study. This may reflect the fact that in the case of City Car Club this may have been an issue in the past for users. Simultaneously the fact that it is not as of great importance in Millard-Ball et al’s (2005) study may reflect the fact of higher availability than in Finland. Pay per use & monthly billing, reserve first, designated parking, flexible use and small distance to next vehicle reflect more the technical implementations of the car sharing system in Finland. This assumption is further supported by the fact presented by Katzev (2003, 73) that in his study availability of vehicles was of no problem to his respondents.

Pay per use & monthly billing is a common way of billing customers on the service and its high demand importance reflects that users perceive it an easy way of taking care of the occurring costs. Reserve first falls to the same category as a traditional means of

acquiring a car to use as well as designated parking. Designated parking reflects the wish to avoid parking hassles that was one of the most important in Millard-Ball et al.'s (2005, 3-19) study as well, although it again received a fraction (41,7%) of the importance in Finland. Small distance to the next vehicle is an important factor to Finnish car sharing users, but also affects the lucrativeness of usage according to Katzev (2003, 74). His study concluded that the further the car sharing cars the less people use the vehicles, hence the great importance of distance to the next vehicle in Finland as well.

Clear value-seeking motives are "reasonable prices", "access without ownership", "easy to calculate costs", "spend less than for own car", "replacement for own car", "save money", "have money for other things" and "save time". All of the above reflect the cost sensitiveness of Finnish car sharing users also identified by Millard-Ball et al. (2005, 3-17). He generalized car sharers as "Economizers" and found out that saving money was of utmost importance to his car-sharing respondents (82,3 %).

The factors that can be categorized, as environmental attributes are "gas efficiency", "reduced co2 emissions" and "environmental awareness". Gas efficiency is a combination of economic awareness and environmental behaviour as the more gas efficient the car-sharing car is the less it pollutes or consumes petrol. Reduced co2 emissions and environmental awareness were also very important attributes to Finnish car sharing users and reflects the overall concern for environmental issues of users. The importance of environmental issues is supported by Millard-Ball et al. (2005, 3-16) as 87,7 percent of his respondents agreed to be concerned about environmental issues.

In the following chapter the key findings and theoretical contribution is presented along with managerial and institutional recommendations and limitations and further research suggestions.

## 5 DISCUSSION & CONCLUSIONS

This thesis contributes to the marketing, transport and sustainability science literature. The aim of this study was to gain better understanding on the demographic and behavioural characteristics of Finnish car sharing users and to compare the results with international findings. This was done by drafting a research framework based on international car sharing literature and by using it to compare international car sharing knowledge with the data gained from an empirical questionnaire gained from a user base of a Finnish CSO. To perform this task the following three research questions were drafted:

- What are the demographic characteristics of Finnish car sharing users?
- What are the demographic characteristics of Finnish car sharing users?
- Are the demographic and behavioural characteristics of Finnish and International car sharing users similar?

The three research questions and research findings are further discussed in following parts of theoretical contribution and key findings of the study and managerial and institutional recommendations chapters below. In the end limitations further research suggestions are presented.

### 5.1 Theoretical contribution and key findings of the study

As already mentioned the thesis findings indicate that car sharing within demographics and behavioural characteristics largely follow the conclusions made of car sharing users from other countries.

According to the thesis results car sharing in Finland is slightly more of interest to males than females. According the scientific literature it appears that females represent a larger share of car sharing users in North America, while in Europe males are more frequent users (Katzev 2003, 70; Millard-Ball et al. 2005, 3-5; Voltti 2010, 11). Thesis respondents belong to the middle age groups (35-44 & 45-54), which has also been discovered to be the major age range of car sharing users worldwide. The thesis results support the age findings in the majority of academic literature (See eg. Katzev 2003; Millard-Ball et al. 2005; Voltti 2010).

Most of the users (89,9 %) that responded in the survey earn on average as much or more than what the national middle income of Finland was in 2013, which was 27 933 €/year (Tilastokeskus 2015). Moreover the majority of the respondents were highly educated as 83,5 % of respondents had a “Secondary degree” or “Graduate experience”. For instance Katzev (2003, 70) concluded that the majority of his respondents were college graduates and that they had professional positions earning a median monthly in-

come of 3000 - 4000 \$. (Katzev 2003, 70.) With current exchange rates this amount equates to a range of approximately 31 600 - 42 100 €, which means that in 2003 Katzev's American car sharing respondents already earned more than average yearly income on Finnish residents the 2013. Millard-Ball's (2005, 3-6) and Shaheen's (1999, 159, 164-165) studies both support the findings of high-level of education and above average income.

As the thesis questionnaire was directed to customers of a car sharing company who mainly operates in the capitol area of Finland it is understandable that the majority of respondents (77,3 %) lived in Helsinki. In Shaheen's (1999, 157) study most of the respondents lived in large to small cities, which seems appropriate as car sharing mostly seems to work in cities where good public transport supports car sharing.

As earlier mentioned the starting year of car sharing has been seldom studied by scientific studies. As the main operator in the Finnish market started operations in 2001, growth in car sharing has mainly ensued after this event. This statistic however shows that accelerated growth has occurred in 2008 when the percentage of people joining a CSO reached double digits that year, where the growth rate has stayed ever since.

The thesis findings are also largely in line with international findings about car sharers behavioural characteristics (See eg. Millard-Ball et al. 2005; Schaefer 2013; Shaheen 1999; Volti 2010). Car sharing users in Finland seem to be mostly driven by value-seeking, convenience and environmental based motivations, while they lifestyle related motivations play a lesser part in defining their usage patterns. The factors that rank highest on an importance scale on a general level from the inquired questions are "fleet size", "gas efficiency", "reasonable prices", "everything included in in service", "pay per use & monthly billing", "reserve first", "designated parking", "flexible use", "quick and easy transportation", "access without ownership", "easy to calculate costs", "spend less than for own car", "replacement for own car", "reduced co2 emissions", "small distance to next vehicle", "availability", "reliability", "being able to go careless", "save money", "have money for other things", "save time" and "environmental awareness". When genders, age groups, educational backgrounds and income levels are compared with product and service attributes of car sharing some difference exists in the importance level preferable characteristics. Females in general seem to be more a bit more cost and environmentally conscious than men, while respondents in the lowest income brackets are more environmentally conscious than people in the high income brackets.

The principal theoretical contribution of this thesis is the framework constructed from car sharing theory, which can be seen in Figure 17. It compiles the demographic, behavioural, geographical and political and institutional dimensions in to a framework that provides a good theoretical basis for understanding car-sharing users and what guides their behaviour.

## 5.2 Managerial and institutional recommendations

The present study widely supports international car sharing research findings and thus managerial and institutional recommendations follow largely what has been suggested in international publications.

As this study measures the demographic and behavioural characteristics of current car sharing users the gained marketing insight may be used to promote usage within existing Finnish car sharing users. A general perception is that car-sharing users are well-educated and well earning citizens that look for convenience, value and environmental factors in car sharing. Based on this finding marketing messages directed to car-sharing users should be drafted in a way that emphasizes the aforementioned attributes.

Lifestyle related usage motives seem to be quite irrelevant to Finnish car sharing users. Importance differences exist among Finnish car sharing users, when for instance gender, age, income and educational groups are compared and this information may be used for more targeted marketing to different user segments. For instance when targeting marketing messages for female users environmental and cost benefits should be highlighted as they seem to be more important for female users than males. The same applies for users in the two lowest income brackets. They also perceive environmental motives to be more important than among wealthier income brackets.

As car sharing is a complement to other transport modes, institutional efforts that support car sharing may be required to support further growth of car sharing in Finland. A multitude of policy instruments, such as environmental taxes may encourage car sharing. High parking and gasoline fees, as well as a good public transport network along with limited car access to city centres may drive car usage towards car sharing. (Mont 2004, 141.) However such examples show that the success of car sharing is largely bound to national institutions that govern the incentives for increased car sharing.

Even though the success of car sharing ventures is largely bound to favourable institutions, CSOs can also affect their success. Millard-Ball et al. (2005) has suggested few factors to encourage car-sharing growth, some of which are relevant to an established CSO. Private or public partnership may be helpful in car sharing promotion. City Car Club has for instance partnered with the Helsinki's public transportation operator that grants a discount to City Car Club members on public transportation. Another good partnership could be with bike sharing organizations that offer added options to people figuring out their mobility options. Moreover partners may be beneficial in marketing car-sharing services to the crowd. In the case of organizational promotion of car sharing identifying a thought leader with an organization may be beneficial in promoting the benefits of car sharing to organization members. (Millard-Ball et al. 2005.)

### 5.3 Limitations and further research suggestions

There are several factors that hinder the generalizability of the results of this thesis. First and foremost the research audience was a group of existing car sharing users within a user base of a CSO. This means that the results may be only generalized to the customer population of the CSO or to existing Finnish car sharing users. Moreover all available theory was not initially used in drafting the survey questionnaire, based on which the questionnaire did not cover all demographic or behavioural aspects of car sharing. Moreover because of financial constraints the researcher did not have access to the newest research regarding car sharing, as the University did not have access to relevant databases. Due to this the most relevant or newest theory about car sharing may not be included in the thesis.

Improved consideration on research methodology choice could also have been done, as the methods used in this thesis may not be optimal to answer the research questions. The questionnaire could have been improved by offering more open-ended question options and by not forcing questions on the respondents. The analysis would have however become much more difficult by offering open-ended questions. Forcing questions upon respondents may be partly approved as widely recognized international car sharing theory uses similar questions as in the questionnaire. The drafted and used questionnaire is however adequate and sufficient in answering the main research question and sub-questions. In addition to these research suggestions a mixed method approach on usage motives of car sharing could be useful to gain deeper understanding on usage motives and simultaneously gain a means of generalizing this knowledge to a larger user base.

Further research in the area could tackle issues such as how to decrease the barriers of adaptation of car sharing internationally or how public institutions may be beneficial in promoting car sharing. Moreover research on car sharing adaptation should be conducted in emerging markets as implementing sustainable transport strategies, such as car sharing early on could mitigate adverse environmental consequences from traffic. Moreover further research should be conducted about the applicability and size of effect of different sustainable transport means. Such research would be beneficial to be conducted, as the means that exist to promote sustainable transport are all meaningful or not applicable globally.

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## APPENDICES

### Appendix I Survey in Finnish

33% valmiina

#### **Yhteiskäyttöautoilijan käytön motiivit ja suhtautuminen omistusautoon.**

Pyytäisimme sinua vastaamaan lyhyeen tutkimukseen, jonka aiheena on yhteiskäyttöautoilu ja City Car Club asiakkaiden käytön motiivit. Tämä kysely on osa tutkimusta joka käsittelee yhteiskäyttöautoilun käytön motiiveja ja näkemyksiä auton omistamisesta. Yhteystietosi on nuodettu asiakasrekisteristämme ja sitä ei käytetä muihin tarkoituksiin.

Kyselyn kesto on n. 10 minuuttia ja vastauksesi käsitellään täysin anonymisti. Täytä kysely ja lähetä se 28.6.2013 mennessä.

**Paitsi että voit konkreettisesti vaikuttaa palvelumme kehittämiseen, voit myös voittaa Lexuksen viikonlopuksi käyttöösi.** Kaikkien vastaajien kesken arvottava palkintoauto on noudettavissa perjantaina toimistoltamme klo 13-17 välillä ja palautettavissa maanantaina klo 9-10 voittajan valitsemana viikonloppuna elokuussa. Palkintoauto ei sisällä polttoaineita.

#### **Vastaajien taustamuuttujat**

**1. Mikä on sukupuolesi? \***

- ☐ Mies
- ☐ Nainen

**2. Mikäli on ikäsi? \***

- ☐ 18-24
- ☐ 25-34

- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 64+

**3. Mikä on arvioitu vuosiansiosi? \***

- ☐ Alle 25 000 euroa
- ☐ 25 001 - 40 000 euroa
- ☐ 40 001 - 55 000 euroa
- ☐ 55 001 - 70 000 euroa
- ☐ 70 001 - 85 000 euroa
- ☐ 85 000 - 100 000 euroa
- ☐ 100 000+ euroa
- ☐ En tiedä
- ☐ En halua vastata

**4. Mikä on koulutustasosi? \***

- ☐ Peruskoulu
- ☐ Ammatillinen
- ☐ Perustutkinto tai ammattikoulu
- ☐ Ylioppilas
- ☐ Ammatillinen tutkinto
- ☐ Opistoasteen tutkinto tai ammattikorkeakoulututkinto
- ☐ Alempi yliopiston tai korkeakoulun akateeminen tutkinto
- ☐ Yliopiston tai korkeakoulun ylempi akateeminen tutkinto
- ☐ Yliopiston tai korkeakoulun ylempi akateeminen jatkotutkinto
- ☐ Joku muu
- ☐ \_\_\_\_\_
- ☐ En osaa sanoa
- ☐ Ei halua sanoa

5. Mikä on kotitaloutesi koko? \*

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5+

6. Mikä on ammattisi? \*

- ☐ Työton
  - ☐ Opiskelija
  - ☐ Työntekijä
  - ☐ Alempi toimihenkilö
  - ☐ Ylempi toimihenkilö
  - ☐ Johtaja
  - ☐ Yrittäjä
  - ☐ Muu
  - ☐
- 

7. Mikä on kotikuntasi? \*

- ☐ Helsinki
- ☐ Espoo
- ☐ Vantaa
- ☐ Kauniainen
- ☐ Hyvinkää
- ☐ Järvenpää
- ☐ Kerava
- ☐ Kirkkonummi
- ☐ Nurmijärvi
- ☐ Sipoo
- ☐ Tuusula

☐ Vihti

Joku muu

☐

---

**8. Minä vuonna olet aloittanut yhteiskäyttöautoilun? \***

☐ 2013

☐ 2012

☐ 2011

☐ 2010

☐ 2009

☐ 2008

☐ 2007

☐ 2006

☐ 2005

☐ 2004

☐ 2003

☐ 2002

☐ 2001

☐ 2000

☐ 1999

☐ 1998

☐ 1997

☐ 1996

☐ 1995

☐ 1994

☐ 1993

☐ 1992

☐ 1991

☐ 1990

☐ 1989

☐ 1988



- ☐ 1987
- ☐ 1986
- ☐ 1985
- ☐ 1984
- ☐ 1983
- ☐ 1982
- ☐ 1981
- ☐ 1980
- ☐ 1979
- ☐ 1978
- ☐ 1977
- ☐ 1976
- ☐ 1975
- ☐ 1974
- ☐ 1973
- ☐ 1972
- ☐ 1971
- ☐ 1970
- ☐ Ennen 1970

**9. Mikä seuraavista syistä vaikutti yhteiskäyttöautoilusi aloittamiseen? \***

- ☐ En ole koskaan omistanut autoa
- ☐ Olen lykännyt auton ostopäätöstä yhteiskäyttöautoilun vuoksi
- ☐ Korvaan toista autoa yhteiskäyttöautolla

**10. Miksi käytät yhteiskäyttöautoilua tällä hetkellä? \***

- ☐ En halua omistaa autoa
- ☐ Olen lykännyt auton ostopäätöstä yhteiskäyttöautoilun takia
- ☐ Korvaan toista autoa yhteiskäyttöautolla

**11. Miten usein käytät yhteiskäyttöautoa? \***

- ☐ Päivittäin
- ☐ Viikoittain
- ☐ Kuukausittain
- ☐ Silloin tällöin

12. Milloin yleensä käytät yhteiskäyttöautoa? \*

- ☐ Aamulla
- ☐ Päivällä
- ☐ Illalla
- ☐ Viikonloppuisin

13. Mikä on sinulle yleisin käyttötarkoitus? \*

- ☐ Käytän työaikana
- ☐ Käytän vapaa-ajalla

14. Mitä muita kulkuvälineitä käytät kuin yhteiskäyttöautoa ja kuinka usein?

\*

	Päivittäin	Viikoittain	Kuukausittain	Vuosittain	En koskaan
Kävely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pyöräily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Moottoripyörä	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Julkinen liikenne	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Joku muu	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Yhteiskäyttöautoilijan käytön motiivit ja suhtautuminen omistusautoon.

Mitkä seuraavista asioista ovat sinulle merkityksellisiä asioita yhteiskäyttöautoilussa?

15. ...Puhuttaessa yhteiskäyttöauton AUTON ominaispiirteistä? (1 = ei tärkeä, 5 = erittäin tärkeä) \*

	1	2	3	4	5
Näkyvä merkintä/ Erottuu selvästi että on yhteiskäyttöauto	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Erityinen muotoilu	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pieni koko	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Polttoainetehokkuus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Autojen määrä	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. ...Puhuttaessa yhteiskäyttöauton PALVELUJEN ominaispiirteistä? (1 = ei tärkeä, 5 = erittäin tärkeä) \*

	1	2	3	4	5
Kohtuullinen hinta	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kaikki on sisällytetty palvelun hintaan	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maksu per käyttökerta. Laskutus kerran kuussa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Varaat ensin. Käyttö varausvahvistuksen jälkeen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Käyttö lennosta. Varaus auton vierestä/ Adhoc käyttö	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Autojen vapaa pysäköinti	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Autojen osoitettu pysäköinti/ merkityt paikat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. ...Puhuttaessa yhteiskäyttöauton KÄYTÖN SEURAUKSISTA? (1 = ei tärkeä, 5 = erittäin tärkeä) \*

	1	2	3	4	5
Yhteiskäyttöauto mahdollistaa auton joustavan käyttömahdollisuuden	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yhteiskäyttöauto on nopea ja helppo liikkumismuoto	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Auton käyttö ilman omistusta	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kustannusten laskemisen helppous yhteiskäyttöautoilussa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Edullisempi vaihtoehto kuin oman auton omistaminen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vaihtoehto omalle autolle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yhteiskäyttöautojen helppo tunnistettavuus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minulla on mahdollisuus tunnistaa muut yhteiskäyttöautoilijat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Muut yhteiskäyttöautoilijat pystyvät tunnistamaan minut	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vähentyneet hiilidioksidipäästöt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lyhyt etäisyys seuraavalle kulkuvälineelle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vähemmän kävelyä	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yhteiskäyttöauton saatavuus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yhteiskäyttöauton luotettavuus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. ...Puhuttaessa yhteiskäyttöauton MUISTA KÄYTÖN SEURAUKSISTA? (1 = ei tärkeä, 5 = erittäin tärkeä) \*

	1	2	3	4	5
Yhteiskäyttöautoilun hauskuus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yhteiskäyttöautoilun tuottama huolettomuuden tunne	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vastuuttomuus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ei huolehtimisen tarvetta	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ei pulassa olemisen tunnetta	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yhteenkuuluvuuden tunne	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Puheenaihe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Rahan säästäminen	○ ○ ○ ○ ○
Rahan säästyminen muihin asioihin	○ ○ ○ ○ ○
Säästää aikaa	○ ○ ○ ○ ○
Et menetä mitään	○ ○ ○ ○ ○
Mahdollisuus keskittyä tärkeisiin asioihin elämässä	○ ○ ○ ○ ○
Ympäristötietoisuus	○ ○ ○ ○ ○

19. ...Puhuttaessa yhteiskäyttöauton ARVOISTA? (1 = ei tärkeä, 5 = erittäin tärkeä) \*

	1	2	3	4	5
Mukavuus	○	○	○	○	○
Turvallisuuden tunne	○	○	○	○	○
Elämänlaatu	○	○	○	○	○
Yhteenkuuluvuus	○	○	○	○	○
Tunnustus	○	○	○	○	○
Statussymboli	○	○	○	○	○
Ammattimaisuus	○	○	○	○	○
Kestävä kehitys	○	○	○	○	○
Säästäväisyys	○	○	○	○	○

100% valmiina

### **Yhteiskäyttöautoilijan käytön motiivit ja suhtautuminen omistusautoon.**

20. Miten ihmiset näkevät yhteiskäyttöautoilun suhteessa auton omistamiseen? (1 = Täysin eri mieltä, 5 = Täysin samaa mieltä) \*

	1	2	3	4	5
Yhteiskäyttöauto on suhteellisesti parempi vaihtoehto kuin omistusauto	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yhteiskäyttöautoilu on yhteensopiva oman arvomaailmani kanssa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yhteiskäyttöautoilu on helpompaa kuin auton omistaminen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yhteiskäyttöautoa on helppo kokeilla ennen sitoutumista	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yhteiskäyttöautoilun positiiviset vaikutukset on helppo nähdä	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Appendix II Survey in English

33% completed

### Usage motives of car sharing and perception towards car ownership

We would like to invite you to take part in a short survey about car sharing and City Car Club usage patterns. This survey is part of research which studies "Car sharing usage motives and perceptions towards car ownership". Your contact information is retrieved from our customer database and it will not be used for any other purposes.

It takes only about 10 minutes to answer and all answers as well as respondents will be assessed anonymously. Please fill and send the survey latest on the 28th of June 2013.

**You can not only in a concrete way take part in improving our service, but also be a lucky winner of a weekend Lexus!** By answering, you can take part in a lottery and win a Lexus for your choice of August weekend. Pick-up will be between 1 pm and 5 pm Friday and return on Monday between 9 am and 10 am. Gas is not included.

**Background characteristics of people who use car sharing?**

1. What is your gender? \*

- ☐ Male
- ☐ Female

2. What is your age? \*

- ☐ 18-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 64+

3. What is your yearly income? \*

- ☐ Less than 25 000 euro
- ☐ 25 001 - 40 000
- ☐ 40 001 - 55 000
- ☐ 55 001 - 70 000
- ☐ 70 001 - 85 000
- ☐ 85 000 - 100 000
- ☐ More than 100 000
- ☐ I don't know
- ☐ I refuse to answer

4. What is your level of education? \*

- ☐ Primary School
- ☐ Secondary School
- ☐ Post-Secondary School
- ☐ Professional school
- ☐ High School
- ☐ University of Applied Sciences

☐ University

Other

☐

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☐ Unaware

☐ Not willing to respond

5. How many people permanently live in your household? \*

☐ 1 person

☐ 2 persons

☐ 3 persons

☐ 4 persons

☐ 5+ persons

6. What is your profession? \*

☐ Unemployed

☐ Worker

☐ Student

☐ Lower official

☐ Higher official

☐ Manager

☐ Entrepreneur

Other

☐

---

7. What is your area of residence? \*

☐ Helsinki

☐ Espoo

☐ Vantaa

☐ Kauniainen

☐ Hyvinkää



- ☐ Järvenpää
  - ☐ Kerava
  - ☐ Kirkkonummi
  - ☐ Nurmijärvi
  - ☐ Sipoo
  - ☐ Tuusula
  - ☐ Vihti
  - ☐ Other
  - ☐
- 

8. What year have you become a car sharing customer? \*

- ☐ 2013
- ☐ 2012
- ☐ 2011
- ☐ 2010
- ☐ 2009
- ☐ 2008
- ☐ 2007
- ☐ 2006
- ☐ 2005
- ☐ 2004
- ☐ 2003
- ☐ 2002
- ☐ 2001
- ☐ 2000
- ☐ 1999
- ☐ 1998
- ☐ 1997
- ☐ 1996
- ☐ 1995
- ☐ 1994

- ☐ 1993
- ☐ 1992
- ☐ 1991
- ☐ 1990
- ☐ 1988
- ☐ 1989
- ☐ 1987
- ☐ 1986
- ☐ 1985
- ☐ 1984
- ☐ 1983
- ☐ 1982
- ☐ 1981
- ☐ 1980
- ☐ 1979
- ☐ 1978
- ☐ 1977
- ☐ 1976
- ☐ 1975
- ☐ 1974
- ☐ 1973
- ☐ 1972
- ☐ 1971
- ☐ 1970
- ☐ Before 1970

9. What is the main reason why you started using car sharing? \*

- ☐ I have never owned a car
- ☐ I have postponed the purchase of a car due to car sharing
- ☐ I am substituting a second vehicle with car sharing

10. What is the main reason why you currently use car sharing? \*

- ☐ I do not want to own a car
- ☐ I have postponed the purchase of a car due to car sharing
- ☐ I am substituting a second vehicle with car sharing

11. How often do you use car sharing? \*

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☐ Occasionally

12. When do you usually use car sharing? \*

- ☐ In the morning
- ☐ During the day
- ☐ In the evening
- ☐ During the weekends

13. What is the purpose of your car sharing use? \*

- ☐ Work-related use
- ☐ Leisure

14. What other means of transport besides a car do you use and how often? \*

	Daily	Weekly	Monthly	Never
Walking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bicycle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Motorcycle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public transport	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

66% completed

## Usage motives of car sharing and perception towards car ownership

**How important are the following attributes to you? (1 = Not important, 5 = Very Important)**

**15. ....When you consider the VEHICLE that is used in car sharing? (1 = Not important, 5 = Very Important) \***

1   2   3   4   5

Visible labeling of vehicle   ○ ○ ○ ○ ○

Distinct design of vehicle   ○ ○ ○ ○ ○

Small size of vehicle   ○ ○ ○ ○ ○

Gas efficiency of vehicle   ○ ○ ○ ○ ○

Fleet size of vehicles   ○ ○ ○ ○ ○

**16. ....When you consider the SERVICE PROCESS of car sharing? (1 = Not important, 5 = Very Important) \***

1   2   3   4   5

Reasonable prices of service   ○ ○ ○ ○ ○

Everything included in service   ○ ○ ○ ○ ○

Pay per use of service. Billing once a month   ○ ○ ○ ○ ○

Reserve first. Use after receiving permission to use the car   ○ ○ ○ ○ ○

Ad-hoc usage enabled. Ability to reserve a vehicle when next to the car   ○ ○ ○ ○ ○

Free parking   ○ ○ ○ ○ ○

Designated parking

○ ○ ○ ○ ○

**How important are the following to you? (1 = Not important, 5 = Very Important)**

**17. ...When you consider the FUNCTIONALITY of the car sharing. (1 = Not important, 5 = Very Important) \***

1 2 3 4 5

Flexible use ○ ○ ○ ○ ○

Quick and easy transportation ○ ○ ○ ○ ○

Access without ownership ○ ○ ○ ○ ○

Easy to calculate costs ○ ○ ○ ○ ○

Spend less than for own car ○ ○ ○ ○ ○

Replacement for own car ○ ○ ○ ○ ○

Easy identification of vehicles ○ ○ ○ ○ ○

Recognize other drivers ○ ○ ○ ○ ○

Be recognized by others ○ ○ ○ ○ ○

Reduced CO2 emissions ○ ○ ○ ○ ○

Small distance to next vehicle ○ ○ ○ ○ ○

Less walking ○ ○ ○ ○ ○

Availability ○ ○ ○ ○ ○

Reliability ○ ○ ○ ○ ○

**18. ...When you consider the OTHER CONSEQUENCES of car sharing. (1 = Not important, 5 = Very Important) \***

1 2 3 4 5

Fun ○ ○ ○ ○ ○

No worries ○ ○ ○ ○ ○

No responsibility	○ ○ ○ ○ ○
Being able to go careless	○ ○ ○ ○ ○
Not feel stranded	○ ○ ○ ○ ○
Sense of community	○ ○ ○ ○ ○
Something to talk about	○ ○ ○ ○ ○
Save money	○ ○ ○ ○ ○
Have money for other things	○ ○ ○ ○ ○
Save time	○ ○ ○ ○ ○
Not miss anything	○ ○ ○ ○ ○
Focus on important parts of life	○ ○ ○ ○ ○
Environmental awareness	○ ○ ○ ○ ○

**19.** ...When you consider the VALUES of car sharing. (1 = Not important, 5 = Very Important) \*

	1	2	3	4	5
Comfort	○	○	○	○	○
Security	○	○	○	○	○
Quality of life	○	○	○	○	○
Belonging	○	○	○	○	○
Recognition	○	○	○	○	○
Status	○	○	○	○	○
Professionalism	○	○	○	○	○
Sustainability	○	○	○	○	○
Thriftiness	○	○	○	○	○

100% completed

## Usage motives of car sharing and perception towards car ownership

**How people perceive car sharing in relation to owning a car?**

**20.** How do you perceive car sharing in comparison to owning a car? ( 1 = I completely disagree, 5 = I completely agree) \*

1 2 3 4 5

Car sharing is relatively a better choice than car ownership ○○○○○

Car sharing is compatible with my personal values ○○○○○

Car sharing is easier than owning a car ○○○○○

Car sharing is easy to try ○○○○○

The positive effects of car sharing are visible ○○○○○