

User needs report

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Moses (Mobility Services for Urban Sustainability) Project

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1. Aims, research questions and methods

The User needs report is a deliverable of the *moses* - project, which aims to promote and implement car sharing schemes in several European cities. The Moses Project consists of the following sites: London (with the boroughs of Southwark and Sutton), Stockholm, Genoa, Palermo and Turin, from the Walloon Region Namur, Dinant, and Ottignies-Louvain-la-Neuve and Bremen. As car sharing up to now is developed the best in central European countries like Switzerland, Austria, Germany and the Netherlands, the composition of the *moses* EU-Project reflects different stages of development concerning car sharing usage. Consequently the available knowledge on car sharing users differs as well between the sites. Therefore the data about the users in this report are to a great extent from Bremen.

This report aims to give a view on the chances of Car Sharing (CS) by providing some knowledge about the (prospective) customers and about some necessary conditions. The report highlights the user perspective in the strict sense of (potential) scheme members.¹ After giving a short description about what CS is (chapter 2) it addresses the following questions:

- Who are the car sharers?
Which are the target groups and what level of car sharing can be expected? (chapter 3)
Which are the socio-demographic characteristics of the car sharers? (chapter 5)
Why are they car sharers? - Background factors and motives (chapter 4)
- How do they use shared cars? - Usage of CS (chapter 6)
- What are the impacts of Car Sharing on their mobility patterns? - Effects of CS (chapter 7)
- How do they assess their Car Sharing Organisation (CSO)? - Expectations, satisfaction, wishes (Chapter 8)

The chances of CSOs are not only connected with general user characteristics but also with the peculiarities of each local CS offer. It is beyond the task of this WP to give a full description of each local scheme but it has asked:

- How CS operators at each *moses* site define their target groups, the user needs and the quality of their CS schemes? (chapter 9)

Apart from the characteristics of the local CSO, the given conditions for accessibility and mobility have to be taken into account. It is argued that the attractiveness of CS is negatively related to the attractiveness of private car usage in a (certain part of a) city. The concluding chapter 10 therefore asks:

- How can the *moses* sites be described in terms of car ownership and usage?
- How can the *moses* sites be described in terms of further urban conditions which foster the growth of Car Sharing? - Location, spatial opportunity structure, public transport provision, parking places, and travel costs.

This report addresses the questions above by referring in the chapters 1 to 9 to existing user surveys and research, mainly concentrating on the situation in Germany for reasons of data availability. Especially in Chapter 4 some theoretical considerations are introduced in order to give a better description of the acting frame of prospective customers.

¹ The needs of other stakeholders such as scheme operators, public transport operators or policy makers are not a subject of this report but of others in the *moses* project (WP 2.1. and WP 5). Nonetheless the results of this report should be of some use for these stakeholders.

Chapter 9 and 10 are largely based on the results of the user needs questionnaire which was distributed among the *moses* sites (see Annex). In addition other statistics are used, i.e. for the description of the Bremen city characteristics or to give national background data.

2. What is Car Sharing?

The basic idea of Car Sharing (CS) is that users share rather than to own a car. To share a product has two implications. It performs a social function, because it requires the interaction and regulation of participating people, and it indicates that the participants can benefit in terms of economic value of efficiency. In the broader sense the term "Car Sharing" denotes various empirical modes of operation. The meaning ranges from informal sharing within the neighbourhood, regulated by the unwritten laws of reciprocity, to the exclusively market orientated forms of renting or leasing cars.

In the narrower sense CS is characterised by an organisational structure, which offers an collectively owned car-park, usually distributed at several stations in urban residential areas. In order to participate the client of a Car Sharing organisation (CSO) has to entry a deposit and sign a membership contract. Afterwards the client can book by telephone (or via Internet) a car, arranging pick-up time, duration and desired pick-up points. Each individual use is charged to a monthly balance, based on two components, hours of use and kilometres driven, with the rate varying with the type of car and the booked period of time.

...in comparison to car rentals

Car Sharing is an automobile service that can defined at the best in contrast to conventional car rental services.² In comparison to rental services CS organisations offer some favourable features, which enables the user a more spontaneous access on the car (see Schwarz 1995).

- stations in the vicinity of users homes (Car rental render only some central stations)
- booking facility around the clock (Car rentals have official hours)
- booking times from 1 hour - or even the half-hour - upwards (Car rentals minimum period is 1 day)
- strong customer relations through organisational bonds

...in comparison to private car ownership

Thus CS is comparatively easy to use, but there is another important difference: CS organisations intend to substitute for private vehicle ownership and reduce car use. Unlike taxi or rental cars, which also render a car service, CS aims to be a everyday alternative for private car ownership, at least for those who have no car of their own or drive less.

CS has some comparative advantages against car ownership:

- CS is cheaper than car ownership for infrequent drivers
- CS makes car costs more transparent
- CSO offers different models
- The client does not have to concern about the maintenance and insurance of the car or about buying a new car someday

Despite these advantages, it is common sense and empirical proven that an average client would not drive as much with a shared car as with a car of his own. This is because CS is mostly regarded as less convenient and because of the relatively high proportion of variable costs for CS car usage. As CSOs replace and reduce private car use they claim political support from urban policy makers and want to be regarded as part of public transport. But this means also that a CSO cannot act like any other market actor. In addition to pursuing the aim of market growth it has to ensure a reducing net effect on car use, otherwise it may lose its political assistance.

² Although the contrast to conventional car rentals shows some highlights some important differences that doesn't mean that car rental companies cannot act as an operator for CS schemes, if the offer fulfil the basic requirements.

...although for a specific demand

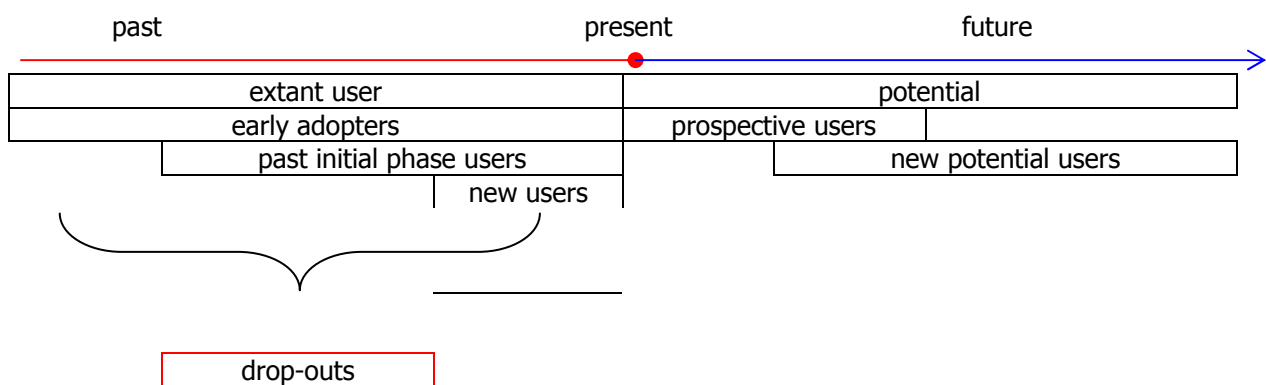
Car Sharing organisations consider their vehicles as an alternative to a private car, CS is in fact only appropriate for people who have a periodic demand on car use. Users of CS always have a high use of other means of transportation except when CS substitutes for a second car. Car Sharing is meant to close the gap, when public transport does not render a satisfying service or when walking and cycling are not convenient. In addition CS is not the best choice for every trip which are made by car. Rental cars are appropriate for long distance trips, whilst taxis are preferable for short one-way trips. Thus CS will be used mostly used for shopping, transport needs and short to medium distance weekend trips (see for example: Prettenthaler and Steininger 1999)

3. Car Sharing user groups

It is clear that the users of Car Sharing are the subscribers of a CSO. But, in order to evaluate past experiences and future expectations about the development of CS it is useful to make further differences among the users. Along a time axis, 5 user groups can be differentiated. The extant users can be separated into early adopters, past initial phase users and new users and the potential into prospective users (those who have already contacted a CSO) and other potential users. Another group consists of the drop-outs, former clients who have left the CSO. The figure below tries to locate the different user groups along a time arrow.

The distinction is important as the Car Sharing schemes in the *moses* sites are at different stages of development. The CSO in Bremen has existed more than 10 years, while the other sites have just started or are about to start their Car Sharing measures. Ideally the sites which just start should learn from the experiences of existing CSO as the characteristics of the target groups of new CSOs would correspond to those of early adopters of aged CSOs. But these characteristics are not simply transferable, as both the the CSOs and the demands and attitudes of the users likely have changed over the years.

Figure 1 User groups



3.1. Early adopters

Early adopters were historically in the early nineties strongly tied to the organisation. For Switzerland Harms and Truffer (2000) stated: "Car Sharing providers and participants were identical at those times. Every member purchased a share of the co-operative and thereby brought in the needed starting capital. Everybody took over specific tasks on a voluntary basis (car operations, billing, introducing new members etc.) highly identified with the system and was a potential multiplier of it (173)". Without this close relationship and the engagement of the participants, CS would not be what it is today in Germany and Switzerland.

When later CSOs took over more and more the necessary tasks becoming a professional service to their clients, some of these early adopters desert the organisation while others appreciate the new services. In general, when bigger CSOs change "from an ecological project to a service" (see Franke 2000) this often goes with a high fluctuation rate of membership.

In the context of the *moses* project the question of the first members is crucial. Most sites that launch a CS scheme will offer a full service. They will not refer to existing patterns of Car Sharing at the local level. It is one the interesting questions, whether it will succeed in getting clients without having the voluntary support from grassroots participants.

3.2. Target groups

In the beginning shared-use cars are mostly driven by residents, who use them for private purposes. They normally have a CS station nearby their homes. Residents are clearly still the main user group of existent Car Sharing schemes. CS highlights the affordability of car use, for people who do not drive too much. From this it follows that CS should be of particular interest for those groups, which have some distinct social, travel, spatial and attitude characteristics which are depicted in Table 1. Besides this main group other user groups like employers, independents, and even commuters and tourists are aimed at by CSOs.

Table 1 Target groups

Target groups		Characteristics
<i>Residents</i>	Social	low to average income
		carless
	travel	low mileage
		high use of public transport, bicycle and walking
		parking problems
spatial		good opportunity structure
		carfree residential area
attitudes		critical towards/discontent with car use
<i>Employers</i>		appropriate as company cars
<i>Independents(self-employed)</i>		low mileage
<i>Commuters</i>		(special CS offer required)
<i>Tourists</i>		(special CS offer required)

Ideally affordability of CS is a big advantage to private car ownership (Litman 1999) and it should be therefore of interest for low income households. However, it should be considered that the calculation is not only dependent on the mileage but also on the quality of the car. If a poor household wants to have a car of his own it can buy also buy a relatively cheap used (second-hand) car.

Carless households are both a source and an outcome of Car Sharing. For those who do not possess a private auto a shared use car is an additional travel option. On the other hand, CS membership reduces the need of having a private car. After membership, clients often purchased their car or did not buy as planned (see effects 7.1). Since there is a significant relationship between income and car ownership, carless households often have low budgets. On the other hand, 40% of carless households in an urban area stated that they can afford a car (Reutter 1995: 69).

There is a relevant group of urban citizens who voluntary got rid of their car, because they see less pluses than cons for private car ownership, in terms of costs, convenience and ecological effects (Burwitz, Koch, Krämer-Badoni 1992). They are discontented with car-usage and see life without a car not as a sacrifice but as a benefit, as they gain new experiences in travelling and having more sensory perceptions of themselves and the environment (Krämer-Badoni 1995). In some small urban groups a high willingness to change travel behaviour by reducing car-usage already exists. For them Car Sharing is a good option if it should be necessary. It can serve as mobility insurance in emergencies and as a means of satisfying occasional vehicle needs.

People who use public transport as their main mode often have problems in reaching destinations, which are not served by PT either in terms of space (dispersed locations) or time (reduced service at night or weekend). When other modes like taxi or bike are not suitable, CS is the "missing link" to fill the "mobility gap" (Glötz-Richter 1999).

People may also choose to drive less or not at all in cities where facilities are easy to reach by foot or bicycle. Thus CS is particularly attractive in areas where there are a lot of such facilities within walking (or biking) distance.

Another group for Car Sharing are those who do without a private car, because of parking problems. Typically these problems occur in terms of costs and space in densely populated areas, within city centres and at interchange points like railway stations and airports. People living or working at these places should also be target groups of CS.

A very special target group consists of people who live in a car free residential area or in a car free housing block. People who want to rent or buy a flat in such a location are normally obliged to abstain from car ownership. A CS station near their place of living helps these residents to have access to a car as well and prevents feelings of being disadvantaged in terms of mobility.

Normally CS is not regarded as a means of transport for regular journeys. Consequently those who depend on a car in order to travel to (or for) work are not seen as a target group. But under three conditions CS can be used for purposes of work mobility as well: (a) if the user works seldom outside of his place of residence. This is true for some independents and self-employed people who make up a big share of CS users (see ch. 5). (b) if the CS vehicle is used as a company car. In this case not the user but his employer is the member of the CSO. The public or private employer saves with CS the high costs of car acquisition. (c) if the car sharing vehicle can be used by others in the time span, when the user is at his place of work. If this would be possible, the time charge for the user can be reduced. Another target group for CS could be tourists, for example, if a hotel serves as the CS operator.

3.3. Potential

As Car Sharing is relatively new, it is important to know, how many future users can be gained. There are different ways to measure the potential. Potential and market analyses mostly ask people, if they are (or would be) interested in joining a CSO. It is clear that the number of those who agree to those questions is much higher than the number of those who actually contact a CSO. One must not lose sight of the fact that to most people in most places the idea of sharing one's car in some way is a strange and at first glance a hardly appealing concept. Moreover it is difficult to estimate the demand of new products when customers have no experience with the product. Determining the demand for shared cars is especially difficult, because it implies some reorganisation of a household's travel patterns and lifestyle.

Market analyses have investigated the demand for CSOs, not only for established CSOs, but also for other organisational forms and as a part of comprehensive mobility services (see Table 2). The highest potential is predicted, if Car Sharing is operated by car traders, as they can provide the necessary infrastructure of cars and services. In fact in the RWI-study all people having a driving license are potential customers. Other surveys exclude some user segments, namely those living in villages and those who depend on a car for commuting. Moreover CS is worthwhile only for people who drive less and who are open minded for the unusual condition of use; moreover they must have heard about CS. A very high interest can be assumed for people, who are interested in living in a car free area. Table 2 gives an overview on some potential studies. The right column shows the break even point at which it should be advantageous to change from a private car to a shared car. This is a very crucial point for becoming a car sharer (see also page 13).

Table 2 Overview on potential studies

Survey (country)	Kind of Car sharing	Potential CS (% of population)	break even point (km/year)
RWI (Germany)	km leasing car by call from car traders	47,6% market potential* 8,95% would use it	
Pesch (Germany)	conventional Car Sharing		6830
Prognos (Switzerland)	combination of regional PT usage with Car Sharing plus additional offers plus half price for trains	9,2% market potential** 1% interested 0,2% disposition to buy	
Muheim (Switzerland)	conventional Car Sharing	23,8% market potential 5,1% quite interested 3,6% very interested	9000
Thøgersen, Norre (Denmark)	conventional Car Sharing	26% may be interested*** 7% are interested***	
Stadt Köln (Germany)	Car Sharing in car free areas	40% find CS very important**** 24,9% find CS important****	

Sources: see surveys in references * = persons with a driving license; ** own calculations; figures only for metropolitan areas available; *** only urban population, **** of those who are interested to live in a carfree area.

Looking at the high numbers in the Table it is clear that the predicted market potential is not yet realised. In the next section we shall therefore have a closer look on the conditions for becoming a car sharer.

4. Reasons and motives for becoming a car sharer

In order to understand why people become a member of a CSO it may help to refer to social theory. In the social sciences there are two basic concepts, which seek to explain human acts (compare for example: Schimank 1999): The concept of the "homo sociologus", saying that men act accordingly social norms, mostly taking a role and do what is expected from them. The other important idea refers to the "homo oeconomicus". It highlights the freedom of human choices between several options. It assumes that individuals seek for purposeful subjective utility and that they avoid costs when making their decisions. These sociological concepts may help us to understand why people join or do not join CS organisations. Another theoretical approach comes from innovation diffusion research, which looks at the process, of how innovations are adopted by users.

4.1. Car Sharing as a rational choice

From the homo oeconomic point of view, people consider alternatives. They compare different options by weighing its costs and benefits. When acting economically, not purely monetary costs are considered, but also losses in time, convenience etc. Regarding Car Sharing we can now ask, which are the typically aims and options of potential clients. We can simply assume that the aims of the client are based on their specific mobility needs, that is making journeys they want and they have to make for different activities. For this given mobility needs they can choose between different means of transportation. If Car Sharing seems to be a good option in fulfilling some of the users' specific mobility needs, he will likely compare the Car Sharing option with similar car options. These other options are private car ownership, conventional rental car, borrow a car from friends, and taxi. Then the user will choose that option from what he is subjectively expecting the highest utility.

The rational choice model is very attractive for explaining CS membership. Particularly in comparison to private car ownership it claims rationality in terms of being more cost efficient and avoiding the "irrationality" of a prestige good.

4.2. Car sharing as an lifestyle element

From the "normative" view of the homo sociologus people search for orientations which give them confidence. They do what they should, what the society or "their" social group is expecting from them. Applied to CS this concept opens up other prospects of explanations. The decision for Car Sharing will be a question of social norms. On one hand the opinion through all social classes that car ownership is a worthwhile property is so widespread, that it is almost a social norm. This is so called normative power of the facts. On the other hand in opposition to this common sense Car Sharing can be a quite common or at least a conceivable idea of specific social groups, for example those, which lifestyles include a strong feeling for environmental issues or a tendency to rent services. The concept of social norms and orientations indicates that people who join a CSO not only share cars but also common values.

4.3. Car sharing as an adoption of an innovation

Car Sharing is for most people a new idea, and it is not risk free to become a member of a CSO. Research on the diffusion of innovations has indicated that the likelihood and rate of the adoption of an innovation is determined by the potential adopters' perception of it on five dimensions. Four of these dimensions involve the match between the innovation and the potential adopter and, hence, influence the likelihood that a particular individual will become an early adopter of a particular innovation. These four dimensions are relative advantage (over the entity the innovation supersedes), value compatibility (with the adopter's values, needs, and experiences), complexity (how difficult it is to understand and use), and

trialability (can it be tested without or with limited costs). The fifth dimension, observability, mainly influences the likelihood that others will adopt when the viability of an innovation has been demonstrated by the early adopters.

A number of studies have found that potential adopters' perception of an innovation on these dimensions are better predictors of adoption than personality and demographic characteristics. However, demographic characteristics may add depth to the understanding of who the early adopters are. It is, for instance, often claimed that young people, people with higher education, and high income people are more open to try new things than their reverse (see: Thøgersen & Norre 1999 for further references) These findings converge with the socio-demographic description of the car sharers (see: ch. 5)

4.4. Decisions and routines

In sociology another basic distinction is made between decision and routine. Most everyday acts are governed by routines. Routines are habits, which help individuals to act in everyday situations by avoiding spending too much time thinking about alternatives. They reduce complexity and therefore it is often very persistent. Travel behaviour, in particular mode choice, is often taken as an example to illustrate habits. Journeys where the same travel mode is used over and over again in the past can be characterised as routinised or habitual actions³.

But it is obvious that habitual decisions are the product of an earlier, more reasoned strategy that have become mechanical or automatic. Instead, **new** behaviour is assumed to be under the control of intentions and guided more by cognition. It is excited if there are situational determined reasons that enhance decision makers' motivation to consider alternatives and engage in relatively effortful decision making. Such motivational instigation may occur when individuals are confronted with novelty, obstacles obstructing the usual performance of behaviour or decisions that have important consequences (see i.e. Aarts 1995 for further details). With regard to CS two categories of decisions can be investigated namely the decision to become a member of CSO and partly the decision to use a shared car.

4.5. Dissatisfying travel habits

Car Sharing is a new idea and one that in many ways challenges established behaviour patterns and perceptions about the good life. Before some one asks himself whether or not he should join a CSO, he is likely to be somewhat dissatisfied with his current mobility patterns and at the same time willing to consider new and unusual options.

The potential car sharers can be carless or car owners. Concerning car owners research has shown that the withdrawal from car usage is a continual process lasting sometimes several years. The weakening of users liaison to the car seems to be necessary for reflecting ones own habits (see Burwitz et al. 1991, Franke 2000). The more or less continual and stressing experiences of traffic jams, shortage of parking space and aggression on the road and what is more high driving costs and pollution usually start such a process of reflection and of questioning ones own habits.

³ Behaviour that has been performed successfully and satisfactorily many times tends to become habitual. As a consequence, subsequent behaviour may be simply guided by stimulus - response associations and therefore may be enacted without the person's conscious awareness and without mediation by an elaborate decision process. Ronis, Yates and Kirsch (1989) propose that the habitual nature of repeated behaviours is established only " ... if the behaviour has been repeated both frequently (at least twice a month) and extensively (at least 10 times)" (P. 213).

For the carless, CS can be a new travel option in situations when other modes are poor and not satisfying. But as empirical research work has shown CS do not produce additional journeys of the carless. Instead car sharer replace other modes of car usage like informal car borrowing from friends and relatives, car rental and taxi. One of their motives to change to a CSO is not be satisfied with these other modes in terms of convenience, privacy and costs. CS comes for them, as an all in one solution as far as car usage is concerned.

4.6. *Crucial experiences*

The actual shift to Car Sharing is often triggered by a change in biography, by crucial experiences, by private car damages or simply by last straw which breaks the camel's back. An example for a biographical change is the move to a new location, which can sometimes alter drastically the conditions of travel behaviour (Koch, 2001). Car Sharing then can be a useful option for those car owners, whose travel needs decrease as a consequence of the travel conditions at their new place of residence. Crucial experiences which trigger a shift to Car Sharing are described in the trip diaries of several households in Bremen in the early nineties. They indicate that open minded car owners enjoy walking, biking and PT usage, if they are asked to encounter these travel modes. The experiences of the usefulness of these alternatives made it easier for the car owners to get rid of their own car and to join a Car Sharing organisation. The breakdown of a car is sometimes a cause to change travel habits. Instead of buying a new one people decide to join a CSO.

4.7. *Awareness of Car Sharing*

Whether someone can join a CSO requires some knowledge of it. The highest degree of awareness is registered in Switzerland, where 70% are familiar with the term "Car Sharing" or other synonymous terms. Fifty percent also know what is meant by Car Sharing. These numbers are likely to be utopian in some other European countries, but they show that the awareness can rise very high, when the availability is, like in Switzerland, very high.

Numbers on the sources from which car sharer have come to know about this mobility service are displayed in Table 3. The most striking result is perhaps the high proportion of people who heard of CSO from personal testimony. People became aware of and concern themselves with Car Sharing through the experiences and judgements of others who are likely to already be clients. This stresses the importance of the social context of CS (see below). If people are not really sure about an offer they tend to take advice from their circle of acquaintances. As CS is a relatively new thing and is also a part of public transport, it is regarded as a common affair, on which the press is reporting frequently. This source of information seems to be at least as successful as advertisements and information that comes directly from the CSO to the prospective customer by various sources.

Table 3 Sources for awareness of Car Sharing (% , multi-response question)

	cambio	Munich
press	40.9	30
personal recommendation	37.8	29
Info-booklet, advertisement	33,2	23
CS-station	8	8
Info-event, Info-stand	9,2	7
employer is CS-client	3.6	4
other	23,6	22

Source: Cambio survey (Bremen, Aachen, Cologne) 2000; MVV (Munich) 1996

4.8. Prevailing motives

Surveys have asked for customers' motives for becoming a member of a CSO. Table 4 shows the considerations of the members of the German cambio CSOs. There are two aspects which are stated the most: ecological concerns and inadequate private car usage in terms of money and time. Many car sharers are public transport users, for whom CS is a complement, and more than quarter stated that they have parking problems when they use a private car. These four aspects should be discussed in more detail.

Table 4 Motives for becoming a car sharer (% of clients, multi-response question)

	%
ecological motives	61.6
Private car too expensive	56.6
Private car rarely used	45
Complement to public transport	37
Parking problems	25.4
clear view on costs	9.1
Better car availability	9
Better image	4
Employer is CS-customer	3

Source: Cambio survey (Bremen, Aachen, Cologne) 2000

4.9. Costs

CS is a service offer people have of course to pay for. Provided that someone is in a decision situation, he will compare the costs of his anticipated CS use with the costs of other modes. Litman (1999) presents the different forms of costs combined with the degree of convenience for several options. Although the Table is about the conditions in USA/Canada, the data apply relatively to the European situation as well.

Table 5 Vehicle Use Options Compared

	Car Sharing	Private Ownership	Conventional Rental	Taxi	Public Transit
Convenience	Medium	High	Varies	High-Medium	Medium-Low
Fixed Charges	\$100/yr	\$2,000-4,000/yr	None	None	\$600/yr max
Time Charges	\$1.50/hour	None	\$20-40/day	None	None
Mileage Charges	20-400	10-150	5-100	\$1.00	0,21 \$

Source: Litman 1999:2

One of the CSOs' qualities is to enable the client to have a clear view of his car travel costs. They have a more undistorted look on travel costs, because with Car Sharing nearly all costs are distributed across use (variable costs), in contrast to private car ownership which has a very high share of fixed costs.

Car usage can be measured by the amount of driven kilometres. There have been made many calculations to determine at what point it is better to change from private automobile to a shared car. The point where it is equally expensive to cover one's transportation needs by means of a private car and by being member of a CSO (keeping the type and age of the car constant) ranges from 5557 km/year to 15.000 km/year. On average, private cars in Germany are driven around 18,000 km/year (BMBVW 2000), but the median is bound to be substantially lower.

The importance of costs cannot to be denied. Indeed Pesch (1996: 39) argues that the economic dimension in the traffic market is becoming more and more important. Attitudes towards means of transportation are more objective, rational and functional nowadays than

in the past. But non-economic aspects have also to be considered and private automobile ownership is not only a matter of costs. Statistical data in Britain reveals that there is a clear relationship between household income and car ownership although this does not appear to be symmetric. This means that households tend to keep their cars, even if their income declines. Dargay arrives at the following conclusion: "Rising income makes it easier for households to own cars. They become accustomed to car use, and this trend is not easily reversed as income falls. The acquisition of a car is seen as a luxury, but once acquired the car becomes a necessity, so that disposing a car is much more difficult. Car ownership is clearly associated with habit and resistance to change." (Dargay, 2001:819)

What does this mean for the decision to join a CSO? On one hand one may argue in favour to CS, that the resistance to change depends on some dissatisfying qualities of other modes and that CSO offers establish a new mode which is a real alternative. On the other hand Car Sharing requires the change of habits, which is generally difficult and which would have to result in a more planned travel pattern. It is also difficult, to relate collectively owned vehicles to luxury and status representation as evident for private ownership.

Beyond monetary costs the term cost also includes so called transaction costs. Transaction costs can be defined as the costs which accrue in terms of information, communication and co-ordination before a prospective client can use the CS service⁴. Table 6 gives an overview of the different activities which a client has to do, if he wants to be car sharer.

Table 6 Transaction costs of Car-Sharing

cost category	activity which causes costs
Initiation	obtain information calculation search for the party of contract (CSO) to get in touch with the organisation
agreement	reception meeting take notice of the usage conditions contract completion
settlement	fix point in time for Car Sharing usage estimation of the period of time for usage booking via telephone or internet journeys to and from the CS station removal / deposit of the car keys (if a chip-card is not in use) look for car damages fill in damage list fill in the journey data (name, km, time)
Control	observe price trends and changing conditions control of the invoice
Adaptation	looking for alternatives, if CS vehicles are not available

Source: Pesch 1996

Car ownership also causes transaction costs, which includes registration, insurance contracts etc. Pesch (1996) suggested that prospective users will assess transaction costs by four criteria: speciality, uncertainty, frequency and atmosphere. The speciality is high, when a

⁴ Transaction costs consist of ex ante and ex post costs. In the market the ex ante costs include the expense of searching for a trading partner, specifying the product(s) to be traded and - most importantly - negotiating the price and contract. The ex post transaction costs are incurred after the contract has been signed but before the entire transaction has been completed. These include late delivery, non-delivery or non-payment and - most importantly - problems of quality control (Casson 1987).

vehicle is used for other purposes than transport (i.e. prestige). Thus solely transport orientated users will prefer CS⁵. Compared to private car users car sharers face a higher uncertainty about having a car available. They have "costs" in coping with situations, when no car is available. Another aspect is uncertainty about the action of other clients. Will they be punctual when I need the car? Are they taking care of the cars? It seems that car sharers are a little more confidential than other people. Thøgersen and Norre (1999: 103) found out "that the early adopters of Car Sharing have significantly more faith in other people taking good care of the common cars than a random sample of non-adopters." Non-adopters are more interested in Car Sharing the more they trust others and the less they transport themselves by car. That expressions of interest can be traced back to factors that have also been shown to determine the actual decision to become member of a Car Sharing organisation lends credibility to these expressions. (102)

The importance of frequency is evident. CS is the proper choice, if people seldom use cars. The atmosphere finally is characterised by social and technological aspects. If there is a good social relationship between the users, they will more likely take care of the common property which again will reduce costs for control. Technology can lower some transaction costs for car sharers. Particularly, the electronic booking process, the keyless car-access, and the electronic record of travel dates makes the use for car sharers more convenient.

4.10. Ecological concerns

Most car sharer state that they joined a CSO because of their intention to behave in an environmentally responsible way. On one hand one may argue that they do so because attitudes towards the environment are socially well accepted feelings. Car sharers like to present themselves as environmentalists, but this actually is not an important reason for joining a CSO. Research in Denmark indicates for instance, that environmental concerns do not differ between members and non-members. For both groups the research results indicate relatively high environmental concerns. (Thøgersen/Norre 1999: 101 ff) On the other hand one should not underestimate the role of attitudes and value orientations towards the environment. Research has shown that environmental concerns are less related to overt travel behaviour but to the acceptance of travel restrictions (Nilson et al. 2000:229)

The intention to reduce car usage for environmental concerns constitutes often a social dilemma. In an environment, where most people choose to drive, a single person who considers abstaining from the car will not significantly reduce pollution levels. As Wolfgang Sachs (1984: 4) puts it: "all the abstainer has achieved is to declassify himself!" A solution to this problem may be in building a trust between persons willing to engage in environmentally friendly behaviours. CSOs can transform an anonymous car driver in a member to a small group where people have likely similar attitudes to environmental issues.

4.11. Complement to public transport and parking problems

If people use public transport as their main mode, they normally do not drive much by car. For them CS is a profitable completion as they do not bear the costs of car ownership. Research has revealed clear distinct usage patterns between public transport and Car Sharing. Whereas public transport is mainly used for commuting and journeys to and from work the city centre, shared cars are used for transporting heavy loads and for dispersed destinations. This suggests the strong need of public transport users to have this completion. Even if the fulfilment of everyday travel needs is organised around public transport, problems often arise in case of unexpected situations and extraordinary travel wishes. A car

⁵ On the other hand one may argue, if CSOs offer a wide range of car types, so that the customer can get cars for different purposes, i.e. transport, leisure, holidays, fun.

seems to be a good option then and instead of organising it from friends, neighbours, relatives, car rentals, the user has with CS a reliable and convenient opportunity.

Parking problems are also lead to people for joining a CSO. These problems are both a matter of space and of costs. Particularly in high populated, old, inner city boroughs space for cars is scarce (see 10.8). People who live there cannot count on getting public parking spaces. This can cause, as it is well known, a lot of stress. Thus they have to rent lots in garages or park their cars on their private plot, which both carry costs. CSOs offer those people a guaranteed parking lot.

4.12. Summary

What can be concluded from that concerning a Car Sharing offer? Any CS scheme should take into account that most prospective customers face a specific situation, has specific attitudes and experiences. This specific background of prospective customers can be characterised as follows:

More than the average population prospective customers are likely to

- encounter a lesser need for car usage
- face problems with car usage
- think about alternatives likely for a long time and take CS into account
- face some kind of change in their lives, i.e. a move or a separation.
- be very aware of car usage costs.
- be open minded towards innovations and ready to face some unusual transaction costs
- trust other people and be ecological concerned.

Marketing campaigns should consider that the potential need for CS occurs is bound to these specific prerequisites, experiences and situations.

5. Socio-demographic characteristics of car sharers

User characteristics are important to know, because one can see by them which parts of the population use CSOs. In the following, some socio-demographic characteristics of the customers of cambio will be discussed. Cambio covers the German cities Cologne, Aachen and Bremen.

Table 7 shows that cambio has more male than female members. But, given that women have still less frequently a driving license and a car of their own than men, CSOs seems to attract particularly female drivers. Mainly middle aged people are clients. The proportion of individuals below 30 is small, because the emotional need to have a car on its own is higher in this age group than in the others. On the other hand younger people often do not have the financial means to buy a car, which makes them a target group for CSOs.

Car Sharing is mainly used by singles and couples. But considering that the car dependency for bigger families is extremely high, the high proportion of bigger car sharer households is quite strikingly. ⁶ At least in Germany car ownership rises significantly with household size - nearly all families with 4 or more persons have a car of their own.

Table 7 Gender, age, size of household (%)

Gender	%	Age (years)	%	Size of the households	%
female	47	up to 30	14.1	1 person	30.9
male	53	31 to 40	46.2	2 persons	35
		41 to 50	28.9	3 persons	17.4
		51 to 60	8.4	4 persons	11.9
		> 60	2.4	5+ persons	4.9

Source: cambio user survey (Cologne, Aachen, Bremen) 2000

Table 8 shows the numbers for occupation, education and income of cambio clients. Most of the car sharers are employed or partly employed. Nearly 10% stated that they are students. Noticeable is the high amount of independent, self employed people who might have no need for commuting. The proportion of workingmen is very small, which could be because they value the car much more for prestige purposes than other professional groups. Maybe they are not pleased with the image and the marketing of CSO.

Car shares tend to be more educated than the general public high educated with 66% of the cambio car sharers having a university diploma compared only with 36% of the corresponding age segments of the population in Bremen.

The income situation of Cambio car sharers can be defined as average or as a little bit above average in comparison to the local population. This contradicts findings in Switzerland, which note that car sharers have a lower income than the average population. But it seems clear that the potential of CS among the low income target group is not yet realised in either country.

In summary the socio demographic characteristics indicate that CS currently is more or less used by certain social groups. In particular in terms of education and occupation car sharers diverge from the average population. It is likely that these socio-economic variables do not directly predict a predilection for CS but are connected with certain attitudes not only towards Car Sharing, but more generally towards environmental friendly transport, towards

⁶ Although some bigger households are likely to replace a second car by car sharing (see Table 12).

utilisation of services and towards (social) innovations. Moreover car sharers are mainly urban people with travel needs often met by a good accessibility and opportunity structure (see ch. 10).

Table 8 Occupation, education, income (%)

Occupation (multi-option)	%	Education	%
full-time employment	45	general secondary school (10 years)	15
part-time employment	15.1	grammar school (13 years)	18.9
housewife; -man	5.4	university	66
unemployed	2.7		
vocational (professional) education	1.3		
student	6.3		
retired	2.6		
independent, self-employed	20.3	Monthly household income	%
employees, officials (white-collar)	34.4	up to 1250 Euro	20.1
worker (blue-collar)	1.4	1250 -2500 Euro	47.5
		2500+ Euro	32.4

Source: cambio user survey (Cologne, Aachen, Bremen) 2000

6. Usage of Car Sharing

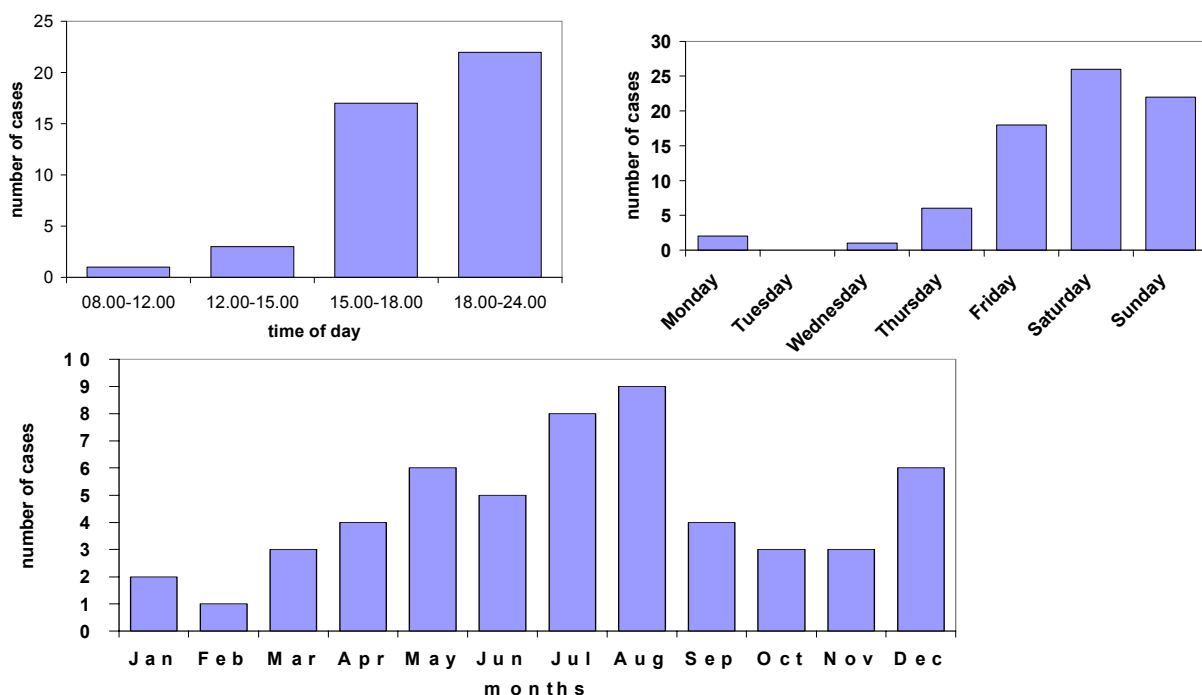
The usage of Car Sharing can be described by variables like membership turnover, booking times, booking risks, ways of booking, description of trips (time, distance, destination, frequency), use of different car types, use of different tariffs⁷.

6.1. Membership

As in any business or club there is also in CSOs a turnover of members or customers. In Bremen the turnover of membership was estimated about 10% per year meaning that 10% need to be recruited just to maintain numbers. This fluctuation rate was even higher in the initial phase in Bremen: A follow up survey found out that within one and a half year 52 of 126 members (= 41,3%) had left the Bremen CSO; nearly half of them were "founders" of the CSO in Bremen. (Projekt "StadtAutoanalyse" 1995:38).

There are several reason to leave a CSO. Stadtauto Drive mentioned 3 reasons. Firstly, members have moved out from the inner city to the countryside where public transport is limited. Secondly, some members realised that they require a shared car only on rare occasions. This does not justify a membership fee anymore. Thirdly, other members require vehicles so often for trip making that the effort to reserve and access shared used cars becomes too great a burden. (Harms and Truffer 1998)

Figure 2 Times of peak demands on CS vehicles (number of time-spans mentioned by CSOs)



Source: Pesch 1996

⁷ Despite CSOs having a lot of corresponding "transaction" data, they refused to make them available, because they fear comparative disadvantages with competitors. Thus, the presented information is limited to the available data which in some cases is not up to date.

6.2. Booking times

Customers of CSOs make use of the CS cars at certain peak times. Figure 2 depicts some results of investigation on CSO about times on peak demands (Pesch 1996: 96) Most organisations stated that the peak demands appear in the afternoon or in the evening. The users prefer days on weekends, especially Saturday, rather than days of the working week. This indicates that shared cars are mostly used for social and leisure activities. During the year the peak demand is in summer. In Bremen the seasonal demands varies so much that the supply of cambio cars is in summer about one third higher than in winter.

6.3. Booking risk

One of the most important tasks of a CSO is to ensure that the customer can get a car when he wants to have it. This is often a problem in times of high demand. The user can reduce the risk by planning his journeys and booking the car early. The more spontaneous and the more short-term the decision, the higher his risk of not getting a car. Twenty-two percent of the reservations were made less than one hour before trip and 50% less than one day before trip. (Petersen 1995:149) CSOs have several strategies to manage this problem of providing a sufficient number of cars. They can offer the customer a car at another station, which should be a good alternative provided that there is existing a dense net of stations and the user does not have a too inconvenient journey to the station. Moreover CSOs can provide additional cars in seasons of higher demands. Another strategy is to co-operate with car dealers who can help out with cars when they are needed. There are no official statistics on the booking risk from the CSOs available. The assessment of the users is shown in user satisfaction section. (ch. 8.2).

6.4. Reserving a car

Most users book their CS vehicle via telephone, which is possible everyday round the clock, as this service is often run by call services of taxi operators. This is the usual way of booking, because the availability of telephones is very widespread by now and it can be taken for granted that CSO customers will have one. Recently some CSOs introduced the opportunity to make web-reservations. This can ease user's trip-planning, because information on availability of cars at wished times/stations, time-tables for public transport and maps can be readily provided online. The integration of online booking and online trip-planning enables the users to compare different means of transports in terms of availability and costs, so that he can make the right choice. Particularly younger people are pulled by this service and find it important.

6.5. Journeys to station

Idealistically the next shared car should be within walking distance, but this requires a high number of clients who live in the vicinity of a CS station. In the cambio cities Bremen, Aachen and Cologne nearly half of the members can get to the station in a distance below 500 meters (see Table 9). Table 10 shows the modes which car shares in Munich use in order to get to the CS stations. Cycling, walking and PT are nearly used to the same degree for accessing the station.

Table 9 Distance to station (classes, %)

0 to 500 m	47.3
500 to 1.000 m	32.1
1.000 to 3.000 m	13.8
3.000 to 6000 m	4.4
more than 6.000 m	2.4

Source: Cambio survey 2000

Table 10 Travel mode to CS station (% , multi-resp.)

walking	43
bicycle	40
public transport	40
other	2

Source: MVV (Munich) 1996

6.6. Trips (length, times, purposes)

Shared used car trips tend to be of short to medium duration and distance. For example 77% of StadtAuto Drive (Berlin, Hamburg) "rentals" are fewer than 24 hours in length, and 56% range between 19 and 100 km. For very short trips, the booking procedure may be an embarrassment to the user and for long-distance trips trains or conventional car rentals are often a better option. Shared used cars are mainly used for non everyday purposes like weekend trips to the hinterland for visiting friends or relatives, bulk buying and transports (see Table 11).

Table 11 Activities (purposes) with Car Sharing by customers in % (multi-response question)

Bremen BK+AC subscribers		Car Sharers from Munich	
Trips to the hinterland	66,1	weekend trips	43
Shopping (wholesale buying)	60,6	visits of friends/relatives	38
Transports of heavy or bulky objects	60,6	wholesale buying	33
Visits of do-it-yourself stores or furniture markets	59,6	leisure / sports	25
Leisure activities	27,5	work/education	14
Other errands	26,6	cinema/theatre etc.	3
Accompany of other persons	24,8	pubs	2
Vacation	13,8	others	7
Official trips	11,0		
Work / education	3,7		
Everyday shopping	0,9		

Source: BK+AC survey (Bremen)⁸ 1998

Source: MVV (Munich) 1996

⁸ The *Bremer Karte plus AutoCard* (BK+AC), combines CS and the local transport operator, BSAG, to offer a new intermodal service with a common CS / BSAG smart card as a monthly or annual pass for public transport, but it also includes the „car-on-call“, with electronically controlled access. In contrast to normal CS users, customers of the (BK+AC) are mainly public transport users. They do not have to pay the basic fee for a deposit, but have slightly higher costs for driving.

7. Effects of CS

When someone becomes a member of a CSO he is likely to change some of his mobility's prerequisites and patterns. The most drastic change affects car ownership and usage. CS reduces car ownership. Fears that Car Sharing would generate more automobile traffic did not come true. Even if it is correct that CS is a new mobility option for those who are non car-owners, the net effect normally shows a decrease on both car ownership and car usage.⁹

7.1. Effects on car ownership and usage

The Table 12 shows the considerable impacts which CSOs have on car ownership. Being a member of a CSO, a car sharer often doesn't buy a car or gets rid of it. However these effects seem to become smaller when the organisation has been operating for several years as in the case of cambio. The numbers for the BK+AC (see footnote 8) apply mainly to public transport users, from which a great part belongs to carless households. Positive effects on the environment result also from the environmentally friendly CS vehicles that often have lower emissions and consume lower fuels than average automobiles.

Table 12 Effects CS membership on vehicle ownership

	Pesch (1996)	BK+AC (1998)	cambio (2000)
would never buy a car	12,9	53,1	17.2
given up their car independent of Car Sharing	31,5	26,2	42.1
forgone the planned purchase of a private car due to CS	23,0		10.9
given up a private car because of CS	29,7	8,5	20.5
continue to own a private car	3,0	12,3	9.3

Sources: see surveys in references

Car sharers drive comparatively less. Actually there are two reported effects. Firstly the car usage decreases compared to the situation before membership. In Table 13 is shown that the car mileage per year of the subscribers of the BK+AC has fallen off by 32%. The mean per year reduced from 5060 to 3433 km. The figures for CS are quite similar. The km savings are mainly caused by users giving up their cars and by the fact that clients do not use cars of friends or rental cars anymore. But secondly, there is a effect of driving less as the result of a long-term membership. Car Sharer learn to plan their car usage and try to avoid unnecessary car trips. For some users CS has been a step on their way to abstain totally from car usage.

Table 13 Car kilometres per year of customers (mean and % of change)

km per year	Bremen BK+AC	Switzerland mobility
Before CS	5060	5540
With CS	3433	3540
Difference (%)	- 32%	-36%

Sources: BK+AC Survey (Bremen) 1998 ** Mobility Survey (Switzerland) 1998

⁹ If the CSO consists mainly of carless households, it was found in some places like in Gothenburg that the car usage increased due to CS. (J Agren, personal information)

7.2. Effects on use of public transport

CSOs increases the use of public transport as people, who get rid of their private car due to CS, often discover public transport as important to themselves. But the use increases even, when CSOs make a special offer to regular public transport users like cambio did in Bremen in 1998. The impacts of the *Bremer Karte plus AutoCard* (see footnote 8) have been investigated in various aspects.

The users of the combined offer have been mainly PT users before subscribing. This was intended by the offer and meets its expectations. Nevertheless the public transport operator could gain new customers who will use buses and trams more regularly. According to Table 14 78% of the subscribers use an annual ticket in combination with Car Sharing. Only 54,7 % of the subscribers have had an annual ticket before subscription.

Table 14 Availability of PT tickets before and after CS (%)

	Before CS	After CS
PT annual ticket	54,7	78,1
PT monthly season tickets	21,9	21,9
other season ticket	14,1	-
single tickets	9,4	-

Source: BK+AC survey (Bremen) 1998

Subscribers of the BK+AC make a higher use of public transport (buses & trams) after joining the CS organisation. On average (mean) the distance, clients made by public transport, will raise from 3534 to 3704 km per year which amounts to a growth of 4,8% (Table 15). Also the frequency of public transport usage increases. Roundabout a quarter of the subscribers use PT more often than before. This affirms that CS does not compete against PT but is a good complement and intensifies the use of public transport. However the usage of trains decreases. Probably the clients replace weekend and holiday trips by CS for which formerly trains were taken.

Table 15 Kilometres per year by public transport and German railway (mean, % of change)

	public transport	German Railway
km per year	mean	mean
Before using the BK+AC	3534	6089
After using the BK+AC	3704	5610
change in %	4,8%	-7,1%

Source: BK+AC survey (Bremen) 1998

Table 16 Change of the frequency of use of public transport (%)

	%
Use public transport more often	26,2
No change	72,3
Use public transport more rarely	1,5

Source: BK+AC survey (Bremen) 1998

One effect of the combined offer could have been that the public transport is only used during rush hours and it will lose customers on weekend or at night. This is partly true, as the increase in use of public transport is observable mainly on workdays, whereas Car Sharing vehicles are used more often at weekend (Table 17). This is why at weekend the destinations are more dispersed (leisure, visiting friends) and the PT offer is not so advantageous. But as Table 17 shows the share of people who never have used public transport has become very small as a result of the BK+AC. Some people have tried to use

the public transport system, including on weekends, so that they could encounter it and base their judgements on personal experiences.

Table 17 Times, when public transport is used (customers of BK+AC), %

Use of PT	Weekend			workdays at rush hours			Workdays not at rush hours		
	before CS	with CS	Change%	before CS	with CS	change%	before CS	with CS	change%
often	46,3	46,3	-	74,4	85,5	17,8	45,0	51,2	14,8
seldom	48,8	52,0	8,5	21,5	12,9	-38,5	49,2	44,6	-8,5
never	5,0	1,6	-66,7	4,1	1,6	-60,0	5,8	4,1	-28,6

Source: BK+AC survey (Bremen) 1998

7.3. Effects on mobility

Someone's mobility is not only characterised by the choice of the means of transportation and the distances for journeys, but more generally by the resources and opportunities to carry on a wide range of activities. In the BK+AC survey the changes of the frequency and diversity of activities and the change of travel distances were sought (see Tables 18 to 20). Most of the customers stated that they had encountered no change in their mobility. If something has changed, then the characteristic numbers for mobility increased rather than decreased. This is most clearly illustrated in the case of mobility diversity. One third of the customers said that the diversity of their mobility has grown. The Tables also show that the carless face the most significant growth in terms of frequency, diversity and distances, while the car owners' mobility growth is smaller. Customers who gave up their private car have a slight reduction in the frequency of their activities and destinations' distances.

Table 18 Change of activities' frequency as a result of CS (%)

	increase	decrease	no change	total
carless	20.0	0.8	58.5	79.2
given up a private car	1.5	2.3	4.6	8.5
car owners	1.5	0.0	10.8	12.3
total	23.1	3.1	73.8	100.0

Source: BK+AC survey (Bremen) 1998

Table 19 Change of activities' diversity as a result of CS (%)

	increase	decrease	no change	total
carless	31.5	0.8	46.9	79.2
given up a private car	1.5	1.5	5.4	8.5
car owners	1.5	0.0	10.8	12.3
total	34.6	2.3	63.1	100.0

Source: BK+AC survey (Bremen) 1998

Table 20 Change of distances to destinations as a result of CS (%)

	increase	decrease	no change	total
carless	25.4	4.6	49.2	79.2
given up a private car	0.8	2.3	5.4	8.5
car owners	1.5	0.0	10.8	12.3
total	27.7	6.9	65.4	100.0

Source: BK+AC survey (Bremen) 1998

8. Car Sharing judged by (prospective) customers

Customer surveys consider 3 dimensions, to obtain an assessment of the qualities and attractiveness of the CSO's supply. Firstly, they ask, how important people find the various characteristics of CS, secondly, to what degree the clients are of satisfied with these qualities and thirdly, what improvements clients wish or need.

8.1. User expectations

Car Sharing organisations render their clients a transport service which is characterised by various quality marks. In Table 21 the features are listed which customers and prospective customers¹⁰ of the BK+AC in Bremen find from their point of view very important. Certainty of having car access at the demanded time is what the car sharers want the most. Other essentials are to have detailed invoices, a departure without delay and trouble-free booking. Both customers and prospective customers require these qualities. Less important for customers is to have the choice between different car models. However while this facility is a big advantage over private car ownership, it is not seen as imperative, likely because it is a more an additional value for rare situations. Also less important - but only for customers not for prospective customers -, is the opportunity to have the car at the desired station. It seems that some customers can tolerate situations when the car is not available at the demanded station, but is at least at another one. Other significant differences refer to the fares and the available booking times. Prospective customers expect relatively lower fares than customers. Thus this seems to be a reason why they have not joined the CSO. In contrast to customers the prospective customers find it not so important to have the possibility to book a car at any time. This service, which is an advantage over conventional car rentals, is obviously liked by the customers.

Table 21 Very important characteristics of CSOs in the view of (prospective) car sharers (%)

	customers	prospective customers	difference
to get a car at the time you want	95.4	93.9	-1.4
that the booked car is at the station	93.8	97.8	3.9
to have detailed invoices	90.0	89.5	-0.5
a departure without delay	90.0	92.7	2.7
trouble free booking	89.2	87.3	-2.0
have friendly and helpful administrative staff	83.1	77.7	-5.4
have a high level of maintenance and safety of the car	82.3	79.0	-3.3
to have low fares	80.8	90.8	10.0
to start the car easily	76.2	79.3	3.1
an easy use of the chip card and the board computer	76.2	75.8	-0.4
have short distances to Car Sharing stations	73.8	74.5	0.7
to book cars around the clock	63.8	53.2	-10.7
to get the car at the place you want	52.3	77.4	25.1
to have the choice between different car types	40.8	34.7	-6.1

Source: BK+AC survey (Bremen) 1998

Pesch (1996) asked prospective customers in Germany about their demands on CSOs. The results (Table 22) reveal some differences to the BK+AC survey. The most important CS quality for prospective CS customers is a station in the vicinity to their home.¹¹ People in

¹⁰ The BK+AC survey includes subscribers and people who have asked for additional information but actually did not subscribe (= prospective customers): Thus a comparison between these two user groups can deliver useful insights.

¹¹ A preference survey with prospective users in Calgary (Canada) has shown that "respondents had a measurable preference for Car Sharing near their home instead of the other location they identified as

households with no automobiles are a little bit less sensitive to the distance to the station, perhaps because they are accustomed to walk or bike longer distances.

Prospective customers require a very high likelihood to get a car at the place and time they want to have it. They would also want lower tariffs. The cost side is more important for prospective customers, who do not have a car. In summary the car owner desires that the use of CS should be as similar as possible to private car use, while the non-car owner would appreciate a more cost effective CS offer.

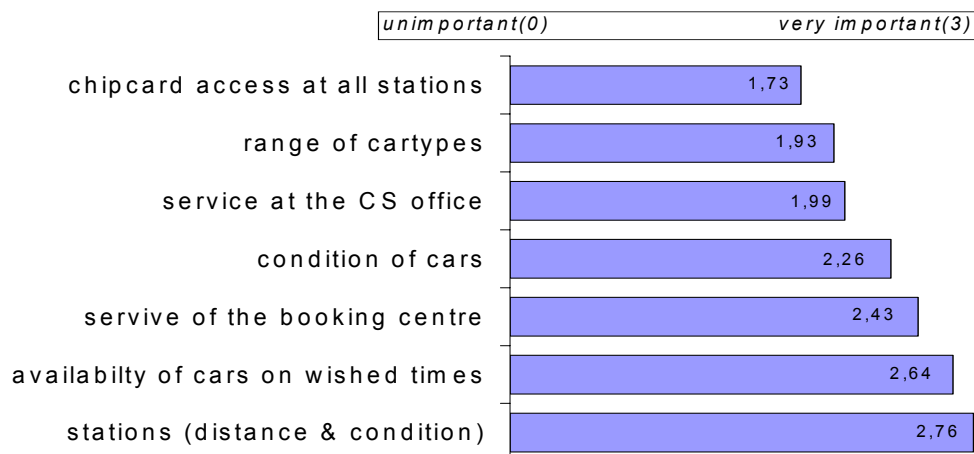
Table 22 Demands of prospective customers on CSOs in Germany (% , multi-resp.)

	car owner	non-car owner
station nearby residence	71,2	64,0
app. 100% likelihood of car access	44,7	37,4
reduction of tariffs	30,3	45,8
reduction of the admission fee / deposit	8,2	31,1
well cared vehicles	7,3	17,6
safe and reliable vehicles	28,2	28,4
more medium and high sized cars	5,9	2,3
added offers	2,5	1,6
easier access to CS vehicles in other cities	8,9	10,6
booking flexibility	22,6	17,2

Source: Pesch (Germany) 1996

The findings produced by the cambio user survey are depicted in figure 3. These clients highlighted, like the prospective customers from the Pesch survey, the importance to have the CS cars at stations nearby and the availability of cars on wished times. To have options between a range of different cars or an access via chip-card they regard as being less important.

Figure 3 What is important? (mean, 0 = not at all important...3 = very important)



Source: cambio user survey (Cologne, Aachen, Bremen) 2000

being attractive to Car Sharing (This is further reinforced by the fact that some respondents could not identify any other attractive location.) Workplaces, LRT stations and shopping centres were most commonly listed as other locations. The sheer number of potential customers at these sites might make them viable as Car Sharing locations in spite of the greater preference for neighbourhood based Car Sharing." (Abraham 1999: 10)

8.2. User satisfaction

Table 23 shows the experiences of the BK+AC customers, which can be regarded as indicators of their satisfaction. The ranking of what customers find important and of what is fulfilled by the CS0's offer is quite similar. Clients are satisfied with the most of qualities they found important¹². The crucial point is the reliability of getting the car at the demanded time. A lot of clients have had the experience of not getting a car at the requested time. This is likely to be more annoying than not to get the car at the desired station, which happens more often but is not seen as so important. Another weakness is that customers can not always select between different car types. Usually there are several different cars at one station. In the case of a spontaneous booking the customers runs the risk that he has to book the remaining cars. 17,9% of the customers of the BK+AC do not live near to their local CS station. These are foremost the customers who live outside the inner districts, where the net of stations is rather coarse-meshed (see ch. 10). In general the user opinions witness that the usage of CS is not always perfect. But it should be taken into account, firstly, that BK+AC clients are new users and therefore some of their troubles is due to lacking experiences and, secondly, that the usage of a private car or as well any other means of transportation is not always trouble free.

Table 23 Experiences with CS (% , multi-response question)

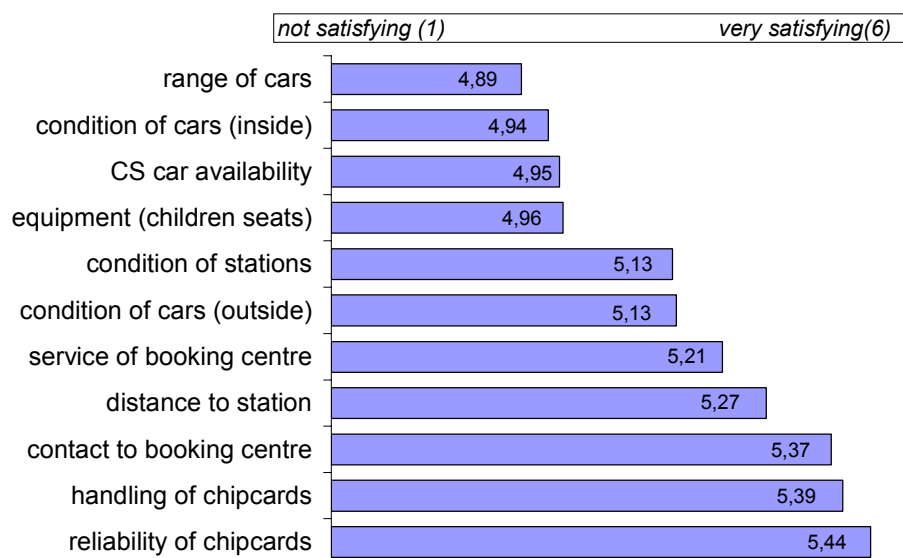
Do you encounter?	agree	partly agree	not agree
to have detailed invoices	90.8	6.4	2.8
to book cars around the clock	89.2	9.9	0.9
that the booked car is at the station	88.8	11.2	
trouble free booking	84.3	13.9	1.7
an easy use of the chip card and the board computer	83.5	12.2	4.3
a departure without delay	80.9	16.5	2.6
to start the car easily	76.7	19.8	3.4
have friendly and helpful administrative staff	73.3	23.3	3.4
to get a car at the time you want	70.7	28.4	0.9
to have low fares	65.5	30.1	4.4
to have a high level of maintenance and safety of the car	61.2	37.9	0.9
to have short distances to Car Sharing stations	60.7	21.4	17.9
to have the choice between different car types	47.4	50.9	1.7
to get the car at the place you want	29.3	62.1	8.6

Source: BK+AC survey (Bremen) 1998

The average cambio user seems to be highly satisfied with CS qualities in particular with the reliability and the handling of the chip cards (see figure 4). It has been proposed that the judgement has an positive bias which is caused by the strong ties between the organisation and the car sharers. Car sharers feel obliged to their organisation and they are therefore uncritical and charitable. Nevertheless cambio also reports that some users faced severe problems as the chip-card technology has been introduced. Also the car availability is seen by cambio as not fully satisfying and they are trying to improve it (see cambio journal 2001/4:4).

¹² This is can also be explained psychologically. People adjust their wishes to what can be realised. Thus they reduce cognitive dissonance.

Figure 4 Cambio user satisfaction (mean, 1 = not satisfying 6 = very satisfying)



Source: cambio user survey (Cologne, Aachen, Bremen) 2000

8.3. Users' wishes

Table 24 shows what (prospective) customers of the BK+AC wish from a CSO. Most important for both groups is the opportunity to leave the car not at the same station they started from. Also quite strongly desired is to have the cars delivered to the customers. But this can hardly be realised by CSOs, because it requires a lot of additional organisational work which will increase the costs. Prospective customers also stress that they wish a personal introduction of how to use CS technology. This may indicate that it is better not to start a CSO with too much new technology as a lot of new customers are likely to be not used to it. Thirdly, there seems to be no need for having closer contacts to the CSO. This may be a consequence of the fact that CS has existed in Bremen for a long time already.

Table 24 Wishes of (prospective) customers of the BK+AC (% , multi-response question)

	prospective customers	customers
leave the car at an other station	47.8	52.3
Personal introduction how to use the chip-card and the onboard computer	34.4	13.1
Personal introduction how to use CS	29.9	13.1
better access to CS stations by bus or tram	22.6	13.1
bring the car to customers place	22.3	22.3
book cars via Internet	15.9	15.4
better/more information on using CS	13.1	10.0
more personal contact between the CS organisation and the customer	11.5	5.4
higher safety standards	3.2	2.3

Source: BK+AC survey (Bremen) 1998

The Cambio user survey has asked about some new features, which are partly introduced by now. Table 25 shows that the majority of the clients regard these new features as not essential for their usage of CS. Most promising for them would be the possibility to use their chip card in other cities. Internet booking and a phone box at the station can improve the communication between CSOs and their clients. Internet booking is not found important by the majority yet, but is likely to become more important since the access to the Internet will

rise and especially younger clients use it. A telephone at a station makes sense in cases, when clients have problems with the availability of cars or would like to book a taxi for their way home. On the other hand more and more clients have mobile phones which make them independent of phone boxes.

Table 25 Assessment of new features by cambio customers (%)

	Internet booking	telephone at the station	Usage of the CS chip-card in other cities
very important	17.8	22.5	30.8
quite important	22.9	31.9	37.5
not really important	44.6	37.2	28.2
unimportant	14.7	8.3	3.5

Source: cambio user survey (Cologne, Aachen, Bremen) 2000

In general the usage of the new information technology is very important for transportation. Some argue that the electronic and wireless communication systems will be the catalyst for a coming era of "smart transportation" (see Sperling, Shaheen, Wagner 2000). The rise of CSOs in the nineties converges with the drastic improved information and computing capabilities. Software booking systems, chip-card technology and on board computers have nearly become a standard for CSOs. Thus the development requires car sharers, who are to some extent open minded for the usage of new technologies. More than private car user a car sharer depends on the usage of new electronic forms as he has to communicate and interact with his transport provider.

9. Assessment of target groups, user needs and quality of Car Sharing schemes by the *moses* sites

The *moses* sites have been asked to state what they think about their main target groups, the needs of their prospective customers and the quality of their Car Sharing plans. Table 26 demonstrates that Palermo and Stockholm are not primarily aiming at residential areas. The main target group in Stockholm are people working in the municipality and in Palermo persons who live outside the city and come to the city for various purposes (work, study, shopping etc.) All sites regard commercial customers as at least being important for them. Also households without a car are important but not so much if they have low incomes. Consequently, most sites take people into account who are looking for an alternative not only for their first but for their second car. It seems that they aim at relatively wealthy users, who can afford a car. Only Namur, in contrast, tries to target customers, who are unemployed and who live in social housing. Public transport users are a very important target group in Bremen, while they do not play any part in the London CS schemes.

Table 26 Important target groups for Moses CS schemes (1=very important ... 4 = not at all important)

	Genoa	Palermo	Bremen	Stockholm	London	Namur
Residents	1	4	1	2	1	1
Commercial customers	2	1	1	2	2	2
Tourists	3	1	3	3	3	3
persons > 10,000 km/y by car	4	5	2	3	2	-
persons < 10,000 km/y by car	1	2	2	3	1	1
low income households	3	4	3	3	2	-
Households without cars	2	2	2	2	2	-
persons with parking problems	1	1	2	2	1	1
as an alternative to private car	1	1	2	2	1	1
as an alternative to second car	1	1	2	2	1	1
Public transport users	2	3	1	2	4	1
Others:		City visitors		People from the municipality		unemployed

Source: *moses* survey 2001

The responsible local authorities at the *moses* sites have been asked to assess what wishes their (prospective) car sharers have. The estimations are quite realistic if the survey data on user needs and expectations are taken into account. To get a car at the demanded time, short distances to the stations and booking around the clock are regarded as most crucial user wishes. One exception is Stockholm because this site is mainly targeting employees of the municipality. The opinions on some other user wishes vary a lot, i.e. the importance of internet booking or of leaving the car at another station.

Table 27 User needs assessed by *moses* sites (1 = very crucial ... 4 = not at all crucial)

Users wish to...	Genoa	Palermo	Bremen	Stockholm	London	Namur
...get a Car-Sharing car at the time they want	1	1	1	3	1	1
...have short distances to Car-Sharing stations (less than 500 m)	2	2	1	1	1	3
...have easy to the Car-Sharing stations by public transport	1	3	2	2	1	1
...have the choice between different car types	3	2	2	2	2	3
...have the choice between different Car-Sharing stations	2	1	3	2	2	2
...book cars around the clock	1	2	1	1	1	1
...book cars via the Internet	4	3	2	1	3	2
...have a high level of maintenance and safety of the vehicles	2	2	2	1	1	1
...be well informed how Car-Sharing works	1	1	3	1	1	1
...have friendly and helpful administrative staff	2	2	2	2	1	1
...have individual choice between different membership rates	2	2	3	4	2	2
...make use of open-end booking	2	3	3	4	2	1
...have access to special offers	4	2	3	4	2	1
...have a high safety standards at the stations	2	2	2	2	1	1
...receive information on public transport facilities	2	2	3	3	1	1
...leave there car at a station different to the one they got it from	1	1	3	4	2	3

Source: *moses* survey 2001

The sites also assessed to what degree their schemes meet the expected user needs. For the three most crucial wishes the sites are confident to offer a good quality. An exceptions is Palermo which cannot guarantee short distances and a booking facility 7 days 24 hour. In summary Palermo is the most self-critical site while Stockholm supposes that their CS schemes will keep the customers most satisfied. But these different assessments are also a consequence of the distinct target groups.

Table 28 Quality of local CS scheme assessed by *moses* sites (1 = very good ... 4 = very poor)

Car Sharing offer is...	Genoa	Palermo	Bremen	Stockholm	London	Namur
...get a Car-Sharing car at the time they want	1	2	2	1	1	1
...have short distances to Car-Sharing stations (less than 500 m)	2	4	2	1	1	2
...have easy to the Car-Sharing stations by public transport	1	1	3	2	1	1
...have the choice between different car types	3	4	2	1	1	2
...have the choice between different Car-Sharing stations	1	3	2	1	1	1
...book cars around the clock	2	3	1	1	1	1
...book cars via the Internet	4	4	1	1	2	1
...have a high level of maintenance and safety of the vehicles	2	2	2	1	1	1
...be well informed how Car-Sharing works	1	4	2	1	1	2
...have friendly and helpful administrative staff	2	2	2	1	1	1
...have individual choice between different membership rates	2	3	2	2	-	1
...make use of open-end booking	2	3	4	4	3	3
...have access to special offers	4	3	3	2	-	1
...have a high safety standards at the stations	2	1	2	1	2	2
...receive information on public transport facilities	2	3	3	2	3	1
...leave there car at a station different to the one they got it from	1	2	4	4	3	4

Source: *moses* survey 2001

10. City characteristics - conditions of growth for CS

The *moses* sites consist of some European cities which have several distinct characteristics and thereby may provide also different prerequisites for CS schemes. In the user needs survey the sites were asked to deliver data about their cities, the transport infrastructure, modal split and travel costs. Table 29 shows some characteristic numbers for the *moses* cities. They illustrate that the Car Sharing schemes face very different conditions, most obviously between a global city like London and small Belgium towns. Up to now, Car Sharing has been successful in greater cities, but, as the example of Switzerland demonstrates can also exist in smaller towns or even in the rural area. More important for the success of Car Sharing is the population density (inh./ha), which is very high in Genoa. There are also differences in the car density and job density among the sites which could influence the need and the demand for CS. For a more detailed discussion see following the sections.

Table 29 City characteristics of the *moses* sites

	Population (inhabitants)	Area (ha)	jobs	cars	inh./ha	cars/inh.	jobs/inh.	
Genoa	636104	7353	241384	365569	86.51	0.57	0.38	
Palermo	686551	16011		377898	42.88	0.55	n.a.	
Bremen	540330	32655	115888	231297	16.55	0.43	0.21*	
Stockholm	743700	18700	515500	275200	39.77	0.37	0.69	
London	Borough of Sutton	177600	4342	56100	74253	40.90	0.42	0.32
	Borough of Southwark	238700	2886	153500	107124	82.71	0.45	0.64
Belgian cities	Namur	105000	17600	53690	n.a.	5.97	n.a.	0.51
	Ottigniese-Louvain-La-Neuve	27694	3336	850	11300	8.30	0.41	0.03
	Dinant	12796	10000	n.a.	n.a.	1.28	n.a.	n.a.

Source: *moses* survey 2001

*probably higher, no complete data available

10.1. *Car Sharing and automobility, accessibility and car dependence*

Even though CS is based on the technical infrastructure of the automobile system, CS organisations see themselves not as a part of the car system, but as part of the system of integrated transport. This is because CS is only for infrequent use, it is necessarily complementary to other modes of transport. Car Sharing normally is an alternative to the private car only in combination with other modes like public transport, cycling and walking.

From this it follows, that **the chances of CS are good in areas where people have a high use of non - automobile modes and a low car usage respectively**. This will be normally the case under conditions that hinder to some extent private car usage or, to put it positively, under conditions of a good accessibility¹³ for non car modes.

Automobility as a social and technological system has had an enormous impact on modern societies. On the one hand it has permitted by "shrinking the distance" multiple socialities, of family life, community, leisure, the pleasure of movement and so on. On the other hand moving cars forces people to arrange their mobilities and socialities across long distances. Apart from other aspects automobility necessarily "destroys the proximity". It divides workplaces from the home so producing lengthy commutes, splits home and shopping and destroys local retailing outlets to which one might have walked or cycled, and separates

¹³ Accessibility refers to the ease of movement between places. As movement becomes less costly - in terms of money, time, convenience etc - between any two places, accessibility increases. Accessibility also includes the concept of attractiveness: the opportunities or activities that are located in a given place. Thus accessibility is a function both of spatial structure and of the transportation system.

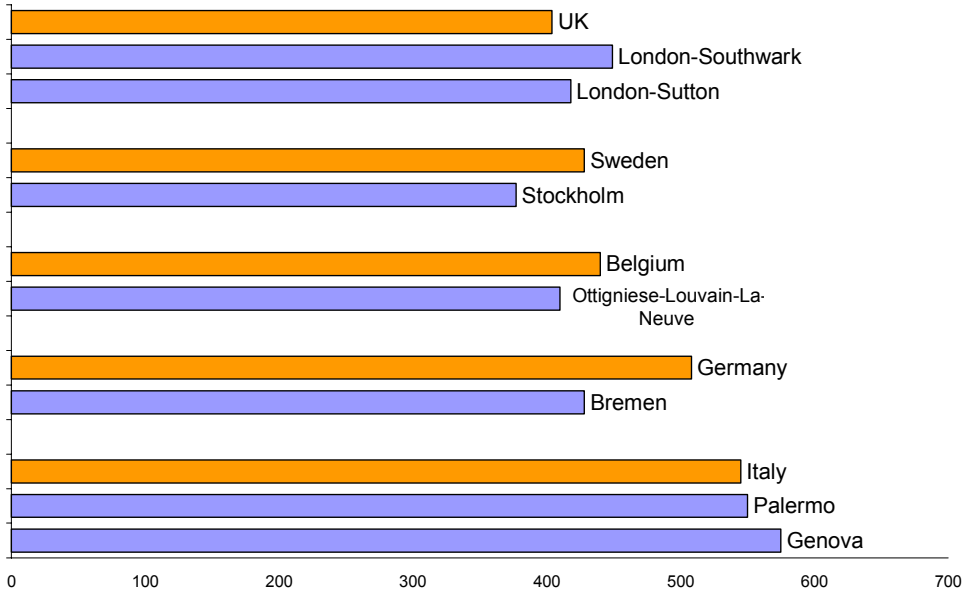
home and various kinds of leisure site which are often only available by motorised transport (Urry 1999).

Although automobility is important to social life in all advanced societies there is a considerable variation in car dependency. It varies on the spatial location (i.e. middle class suburb in contrast to "gentrified" inner city area), on the journey purpose (journeys to work vs leisure trips). In addition the extent of car dependency is partly a result of the form and level of public transport provision.

10.2. Variations in car ownership

Indicators for car dependence are car ownership and car usage. Both vary on national, urban and district levels. This applies also to the *moses* sites. Figure 5 depicts the numbers for car ownership in the *moses* sites and their corresponding countries.

Figure 5 Car ownership (Cars per 1000 inhabitants)



Source: *moses* survey 2001, Eurostat 2001

The main differences can be discovered on the national level. Italy has a high number of cars per 1000 inhabitants, whereas the UK has relatively low numbers. The numbers for the Italian cities correspond to their national level, in contrast to Stockholm and Bremen, where car ownership is below national level and to Southwark and Sutton where it is above the national level.¹⁴

Car ownership also varies at smaller spatial units. In Bremen there are 19 residential districts¹⁵ (see Table 30) having on average a car ownership rate of 428 per 1000 inhabitants, ranging from 339 (Gröpelingen) to 619 (Mitte = City Centre). Research on other European cities (Wickham 2001:3) has shown that generally the inner city areas of European cities have a lower proportion of household car ownership than the outer city areas. This finding can be partly supported by the situation in Bremen, where most inner city districts

¹⁴ Table33 shows (with data of a different source) that total London has a significantly lower car ownership rate than Sutton and Southwark.

¹⁵ equal all districts with more than 1 inhabitant per ha.

have a lower rate of car ownership than the whole city average.¹⁶ But there also some outer city areas with low car ownership. From this follows that car ownership within a city is influenced by other factors as well as location, i.e. wealth, population density, length of journeys to work, and provision of public transport. For differences in car ownership among cities and among countries transport policies and background factors of climate and cultural issues have to be considered too.

Table 30

Bremen districts	cars/1000 inh.	inh./ha	location: inner or outer Bremen	CS vehicles
Neustadt	400	28,1	inner	26
Ostl. Vorstadt	353	90,2	inner	26
Schwachhausen	438	43,2	inner	17
Findorff	351	57,6	inner	15
Mitte	619	48,3	inner	12
Hemelingen	527	14,4	outer	6
Walle	403	32,3	inner	6
Gröpelingen	339	35,3	outer	3
Burg Lesum	416	13,4	outer	2
Horn-Lehe	477	16,2	outer	2
Veegesack	431	28,9	outer	2
Huchting	415	2,8	outer	1
Blumenthal	421	14,7	outer	-
Borgfeld	552	3,0	outer	-
Oberneuland	514	6,6	outer	-
Obervieland	457	23,0	outer	-
Osterholz	383	30,7	outer	-
Vahr	356	61,4	outer	-
Woltmerhausen	408	28,4	outer	-

Source: Statistisches Landesamt Bremen 2001

10.3. Car ownership and wealth

If car ownership varies, this is caused by different opportunities to use a car - or not to use a car, but also from restrictions on having a car. Car ownership is clearly related to wealth. As wealth increases of a population in a country, a city or a district, so normally does car ownership. But on the level of European cities there is a lot of variance. Table 31 reveals the notable differences in car ownership between London and Turin, although they are similarly wealthy. Stockholm is the wealthiest *moses* site, but has only an average number for car ownership. This indicates that car-ownership is strongly influenced by political measures and cultural habits.

Table 31 Wealth and car ownership in *moses*-sites

	Cars per 1000 people	Metropolitan gross domestic product per capita (USD)
Turin	625.09	22083
Stockholm	386.01	33437
London	331.95	22363

Source: Kenworthy 1997

Within the cities the impacts of wealth on car ownership also differ. Even if nowadays in the European cities social inequalities do not result in a strong spatial segregation, as they did at the end of the 19th and in the beginning of the 20th century (see Kaelble 2002), there are still typical middleclass areas or areas where poverty concentrates. It seems reasonable to

¹⁶ Please note that we measure car ownership by cars per inhabitants. If we would measure it by cars per households the difference between inner and outer districts would be more clearly, as the size of the households decreases with the proximity of their place of residence to the city centre. This is likely to be the reason, why there is in Southwark (highdense, inner London) a higher car ownership ship rate (cars/inh.) than in Sutton (lowdense, outer London).

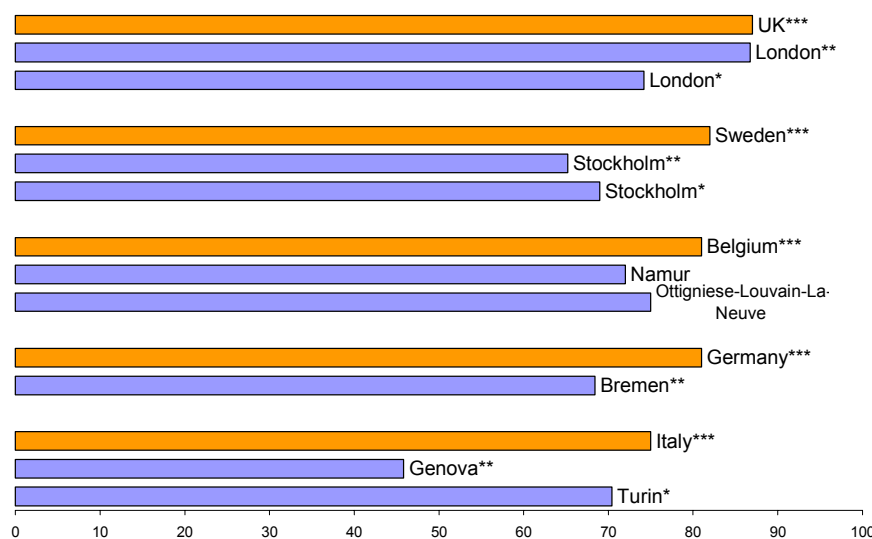
explain for example that the low car ownership in Groepelingen a traditional working class area near the harbour, by the relative low income of its inhabitants. Likewise the wealthy district Oberneuland has a high car ownership rate. But a relative wealthy population does not necessarily have a high number of cars. This is often the case in 'gentrified' inner city areas (for instance in Bremen in districts like Oestliche Vorstadt, Findorff and Neustadt) where low car ownership seems not to be a question of affordability but of usage conditions.

10.4. Car usage

The usage of cars within the countries of the *moses* sites reveals some differences. The UK has the highest (86%) car modal share of motorised journeys and Italy has the lowest (74%). This is quite surprisingly because the proportion of car ownership between these countries is the other way round. Italy has the highest car ownership and the lowest car modal share of the participating countries. The usage of cars for motorised journeys in Belgium, Sweden, and Germany is nearly the same.

Except London all *moses* sites have a significant lower car usage in terms of modal share than the average of their countries. This is true, if car usage is measured by passenger car kilometers. The figures available (no table) for *moses* sites are 5463 p.km/person (London) and 8,460 p.km/person (Stockholm), which are both below the national average. This is due to a lower car dependency in urban than in rural areas.

Figure 6 Car modal share (only motorised journeys (car, bus, motorbike))



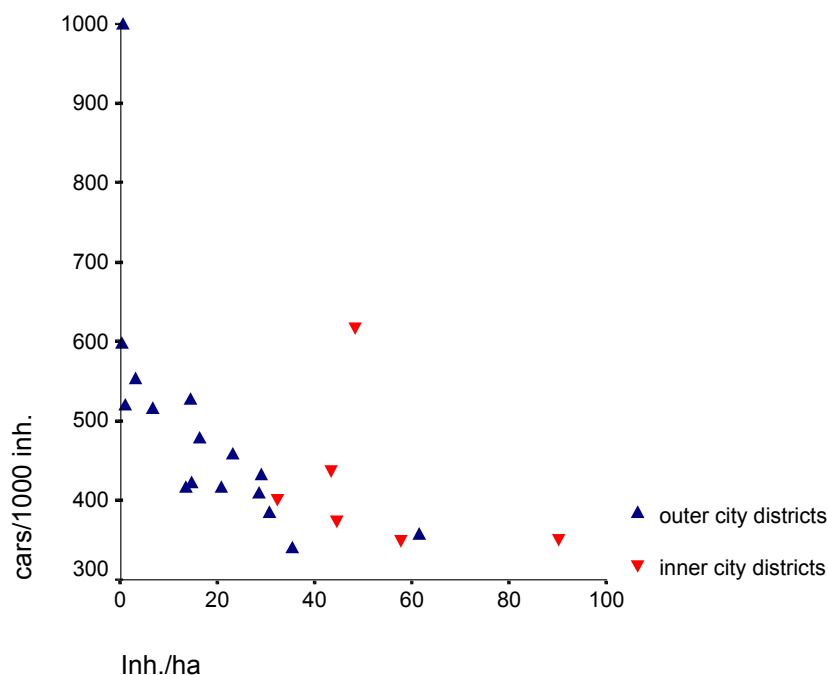
Source: ***Eurostat 2001, ** *moses* survey 2001, *Kenworthy1997

10.5. Car dependence in urban space

The condition to use and/or to need a car differs among places where people live. Normally inner city areas are older than outer areas. Inner city residential areas, which are built after the midst of the 20th century, when the automobile became the dominant transport mode, are seldom found. In contrast to suburban residential areas, built to meet the demands of the automobile system, the inner city areas were able to resist to some extent the powers of the car-based system. The living patterns are not as de-localised as they are in the suburbs. The car dependency is lower, as cars are harder to use due to the shortage of parking places and less urgently needed because of a good supply and accessibility to leisure and shopping facilities.

Normally these inner city areas are more densely populated than the outer areas. This is true for Bremen: in the 7 inner city districts live on average 43 inhabitants per ha, while in the outer districts the figure is only 19. Figure 7 shows the inverse relationship between car ownership and population density for these districts. The outer districts (displayed green) have a low population density with high car ownership, whereas the inner districts (displayed red) are characterised by a high population density and a relatively low car ownership.

Figure 7 Car density and population density for Bremen districts



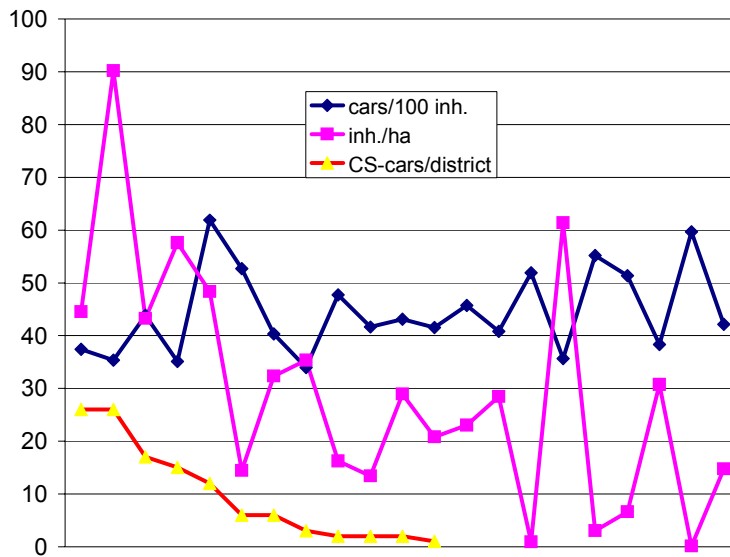
Source: Statistisches Landsamt Bremen 2001

10.6. Car sharing in inner districts

The assumption that Car Sharing schemes are most successful in areas with low car dependency is illustrated by figure 8. It presents the characteristic numbers of inhabitants, private cars and Car Sharing vehicles per each city district in Bremen. One can see on the left the districts, where CS has been successful (yellow line), which are highly populated and have low car ownership. It looks like Car Sharing growth relies more clearly on a high population density (pink line) than on a low car ownership density (blue line).¹⁷ The most successful CSOs are located in inner Bremen as the map (figure 9) shows.

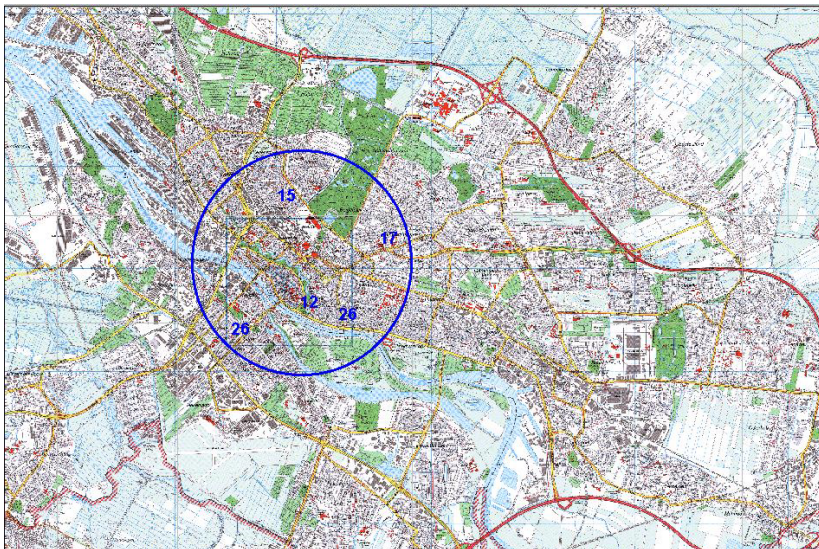
¹⁷ The graph omits the harbour and airport areas, where less residents live but where car density is high, because of registered company cars. The high car rate in case 6, which is the city centre, is also due to company cars. Case 16, district Vahr, is also an exception from the trend showing high population density and low car ownership but no shared cars. This is probably the case because this district is populated by relatively poor and elderly people. It is a rather untrendy residential area with buildings from the 1970s.

Figure 8 Car ownership, population density and supply of CS vehicles in Bremen districts



Source: Statistisches Landesamt Bremen 2001, cambio data

Figure 9 Main CS catchment area, number CS vehicles in City Centre, Neustadt, Oestl. Vorstadt, Schwachhausen, Findorff



10.7. Car Sharing, spatial opportunity structure and lifestyles

There is a strong relationship between the location of the districts and the implementation of Car Sharing. CS can mostly be found in inner Bremen. These Car Sharing catchment areas are likely to have further characteristics, that are a good supply of workplaces, leisure and shopping facilities. Table 32 shows the number of non-industrial jobs per ha in the five inner Bremen districts, where most shared cars are situated. All districts which have a rather high number of Car Sharing vehicles also have, compared to the Bremen average, a high number of non-industrial jobs per ha. This gives a clue that in these areas a mixture of jobs and opportunities is persisting. Although it is unlikely that everyone or even the majority of the

residents work in the districts they live in, the effects of this relatively high number of jobs in the service sector on leisure and shopping opportunities cannot be neglected.¹⁸

Table 32 Employees in handcrafts, trade (non industrial) in some Bremen districts (number/ha)

City Centre	26,8
Neustadt	3,3
Oestl. Vorstadt	7,3
Schwachhausen	2,6
Findorff	4,2
Bremen (total)	1,8

Source: Statistisches Landesamt Bremen 2001

As mentioned earlier, city districts differ in their inhabitants' wealth. In a broader sense this is also true for lifestyles which are a set of shared patterns of behaviour that flow from a common, underlying worldview. These behaviours define the boundaries of the group. Lifestyles consist of clusters of activities with particular characteristics. There is usually a strong connection between people's life styles and where they choose to live. People living in one neighbourhood often have almost nothing in common in terms of values and- lifestyles with people in another neighbourhood only a few miles away. Yet they might share a great deal with people living a thousand miles away in another region, state, or city even on the other side of the continent (See : Tepperman, Wilson 1996: 177).

Though it is unlikely that the usage of shared cars is a common value of a whole neighbourhood¹⁹, it requires at least a neighbourhood that tolerates this kind of car usage. Shared experiences of restrictive private car usage, an opportunity structure which is not depending on the private car, and an attitude of not wanting to abstain from car usage totally could bring about this social climate for Car Sharing.

10.8. Car Sharing and public transport

Another condition which influences the use of Car Sharing is public transport. Good public transport service levels, fares and qualities are an important requirement for the growth of Car Sharing. In general, a satisfying public transport system reduces the need to travel by car and thereby makes CSOs more attractive. It has been found that a sufficient public transport service "had a small but possibly important effect on car ownership " (Goodwin 1993). To reduce car dependency in residential a dense network of public transport lines is required so that the users have access to the stops within 10 minutes walk (500 m radius). Because of its radial network infrastructure, public transport is generally better in terms of stop density in the city centre than in the outer districts. People living near to the city centre usually have more lines and stops available than people living on the suburbs. On the other hand, public transport competes more in the inner city districts with walking and cycling.

The integration of public transport into CS has several aspects. Firstly, the location of CS stations should be accessible by public transport users. The CS station should be near to a public transport stop so that residents who live far from the next station, can reach it by public transport. This is necessary, as long as the net of CS stations is less close-meshed than that of the public transport stops. In Munich for example 42% of the car sharers need less

¹⁸ This may not in any case reduce traffic, but increase it, if the opportunities attract people from other districts. To live in a city involves living both in an immediate locality or neighbourhood and using some places within the city as a whole.

¹⁹ This may be the case in car free areas, where people get together who want to live without a car.

than 10 minutes in order to get to the next CS station, but 82% can get to the next bus/tram stop in this time span (MVV:19).

It is also desirable to locate CS stations at central city interchange points to enable public transport users to reach places where mass transit services fall short. In this case the user is likely to combine public transport and Car Sharing. In Germany the model of combi car is based on this idea. The working to capacity of the shared cars shall be enhanced, by attracting public transport riders to use them during public transport peak hours.

Another way of bringing Car Sharing and public transport together is through co-ordinated tariffs. There can be given special offers to those who use both transport services. For example the Bremer Karte plus AutoCard, presents an easy access to Car Sharing without any deposit fees for regularly public transport users. On the other hand it may be desirable to reduce public transport charges for car sharers. Technically this could be easily accomplished by a combined chip mobility card.

The *moses* cities were asked to give some data about the quality of their public transport system. These data could only give an poor impression of the local qualities. They cannot be used in order to predict the success of CS at each site either. Table 33 shows the available data on the speed of public transport. The differences in speed seem to depend on the size of the cities. Bigger cities like Stockholm or London have a faster PT which results from the availability of the metro.

Table 33 Average speed of public transport km/h

Genoa*	15
Bremen*	19.4
Stockholm**	28 (buses); 35 (metro)
London**	16,5(buses); 31,5 (metro)
Palermo*	13.5

Source: **moses* survey 2001, ** Kenworthy 1997

Another useful indicator for comparison the quality of public transport is the number of passengers who use the public transport system during the year in proportion to the number of inhabitants and in proportion to the size of the area (Table 34). From the data the Bremen residents use public transport most frequently but if the city size is considered then public transport is operating most closely to capacity in Genoa. This latter result is because of the relatively very high population density in Genoa (compare Table 29).

Table 34 Public transport use rated to urban population and size

	PT passengers in y/inh	PT passengers in y/ha
Genoa	246,5	21324,6
Bremen	479,5	7934,5
Stockholm	212,4	590,1
Palermo	103,9	4454,1
Namur	265,9	1586,3
London*	380,5	-

Source: **moses* survey 2001, ** Kenworthy 1997

10.9. Car Sharing and parking places

Due to mass automobility at least in cities there is usually a shortage of parking places. This problem becomes more crucial, if a district is densely populated and has a high car ownership. Parking spaces can be offered for public or private companies. The available data on parking places for public use show considerable differences between the *moses*-sites.

Public parking places seem to be sufficient in Genoa and in the Belgian cities. But this likely a legal question (what is defined as public parking place) and does not give a clue about the actual number of available parking places.

Table 35 Parking places for public use per inhabitants

Genoa	0.50
Stockholm	0.03
Sutton Town	0.02
Wallington Town	0.04
Palermo	0.04
Namur	0.27
Ottignise-Louvain-La-Neuve	0.23

Source: **moses* survey 2001

Publicly owned parking places normally will be used for CS station. Thereby the city can support the growth of Car Sharing Organisations or even public authorities organise Car Sharing as a part of public transport system. However the position is not uniform across the EU. In some states the cities have public parking places at their free disposal in others they are restricted in what they do by the law. (see WP 7)

10.10. Travel costs

As Car Sharing operates on the transport market it has to compete with other travel modes especially private cars and public transport in terms of costs (see ch 4.9). Generally, as this report has often argued, CS has better chances to develop, if the usage of cars is restricted and the use of public transport is encouraged. Tables 36 and 37 suggest that these conditions vary a lot among the sites. Following the data delivered from the *moses* sites the costs for car driving (measured by Euro) do not vary much between Genoa Bremen and London. A different picture is drawn when the costs are related to the wealth of the city population (measured by the gross domestic product 'GDP' per capita '= person'). In this view in Stockholm the driving costs for a car are more than twice as high as in Hamburg. The proportion between costs for a car trip to public transport trip is shown in right column of Table 37. It indicates that in terms of costs it is six times more expensive to use a car in Stockholm than public transport, while in London the user costs for driving and using public transport are nearly the same.

Table 36 Travel costs (Euro)

	Costs of driving for a 1,4 litre car	Costs of using public transport for a short journey of 1 km	Costs of an urban monthly ticket
Genoa	0.5	0.77	25.82
Bremen	0.4	0.77	34.8
Stockholm			42
Sutton	0.41	1.13	162.03
Southwark	0.41	1.13	£106
Palermo		0.77	41.32
Namur		1.04	25.83
Ottignise-Louvain-La-Neuve		1.04	25.83
Dinant			25.83

Source: *moses* survey 2001

Table 37 Travel costs per average car/public transport trip

user costs	of a car trip (% per capita GDP/trip)	of a public transport trip (% per capita GDP/trip)	Cost of car trip / public transport trip
Belgium (Brussels)	149.41	29.7	5.0
Germany (Hamburg)	100.89	32.72	3.1
Italy (Bologna)	139.75	18.07	7.7
Sweden (Stockholm)	225.64	37.78	6.0
UK (London)	121.35	94.96	1.3

Source: Kenworthy 1997

Car usage requires parking facilities, which are often a scanty supply in cities. Therefore local authorities control public parking places, especially in the city business districts (CBD). Car drivers from the moses countries have to pay the highest charges in London (Table 38). As CSOs offer guaranteed parking lots, parking shortage and parking charges have an impact on the attractiveness of CS. The right column of the Table shows that the fines for parking in no parking zones vary a lot among some cities of the moses countries. The fines in London are 10 times higher than in Hamburg.

Table 38 Parking costs

	Maximum charge for on-street parking in the CBD	Maximum charge for off-street parking in the CBD	Fine for parking in no parking zone
	% per capita GDP/h	% per capita GDP/h	% per capita GDP
Belgium (Brussels)	48.55	145.65	0.12
Germany (Hamburg)	74.8	74.8	0.04
Italy (Bologna)	57.21	57.21	0.13
Sweden (Stockholm)	67.38	89.83	0.18
UK (London)	103.97	173.28	0.42

Source: Kenworthy 1997

10.11. Summary

The moses cities with their transport infrastructure and opportunity structures provide the framework conditions for the transport users. But is difficult to draw conclusions from these conditions about the chances of CS in each moses city, especially as some sites are aiming partly at different target groups to city dwellers, who are the prevailing subject of this report. Therefore this report basically assumes - and proves to some extent by means of the Bremen example - that the chances of CS are negatively related to the attractiveness of private car usage. Following this assumption it can be said that that CS is successful under the following urban conditions:

In terms of transport low car dependency means that the usage of cars is restricted by the cities through a shortage of parking place and/or high driving costs as well as through a good provision of public transport and a satisfying infrastructure for walking and biking.

In terms of space CS should be located preferably in

- the inner city rather than in the outer city
- gentrified areas
- densely populated areas
- areas which have a favourable opportunity structure

More generally the chances of CS should be better in bigger cities than in smaller ones, because the former are likely to be more densely populated and are characterised by higher

use of public transport. It seems likely that the use of CS is strongly connected with life styles which again are connected to urban space. CS should be mainly offered in neighbourhoods which have their minds open to accept Car Sharing.

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12. Annex:

12.1. BUCHAREST

Introduction

The City of Bucharest is since 2003 further partner in the Moses project. The joining should also be reflected in the user needs report. For this purpose this chapter will be added to the annex of user needs report after the latter has been finished. The content refers to a dissemination of Dragomir et al. for the TOSCA EU-project and to information on Bucharest from the internet.

Bucharest metropolitan area includes the city of Bucharest (with an area of 228 km²) and the suburbs (365 km²). The population is 2.149 million persons (1998) which accounts for about 10% of the whole country. Since the 1960s and following the 1977 earthquake, large parts of the historic inner city 'sadly fell victim to demolition' and, to date, have only partially been rebuilt. Bucharest's large, central inner-city complex of high-quality apartments that form the boulevard leading towards the new parliament building (planned by the former dictatorship) is probably unique in Europe. Within the city, housing conditions differ greatly. Spacious, low-density areas with villas and garden-city appearance can be found alongside low-rise, post-war 'in-fill' developments of high environmental quality. The city centre, the historic urban core, consists of dense and high-rise, post-1960 urban blocks lining the roads, as well as pre-war city housing.

In contrast to the western cities Bucharest has not been exposed to rapidly growing car traffic until 1990. Residential areas built up to then were not planned for a motorised population. Even the peripheral residential areas do not have parking facilities. Like in other east European cities the task for passenger transport has been assigned predominantly to public transport. Today more than half of all trips in Bucharest are still made by public transport, composed of metro (since 1979), tram, trolley and buses.

Since the end of the communist rule and the start of the transformation process Bucharest has to cope with an immense increase in car ownership and car use causing immense problems in terms of pollution, congestion and on street parking, notably in the densely populated city centre. In 2000, 650.000 cars (owned by private person and private company) were registered in Bucharest, that is 302 cars/1000 inhabitants. It is often stated that people see the car as an extremely desirable expression of new economic freedom, new wealth, new status and that they make up a leeway. In this situation it is extremely difficult to offer alternatives. Car sharing could be one.

Conditions for car sharing

Some of Bucharest's city characteristics are likely to foster the use of Car Sharing. The public transport is still the main mode so that car sharing organisations would have a strong partner in meeting the mobility needs of their clients. There is a high demand for parking facilities in Bucharest. As shared cars will be parked in a fixed parking lot they are more likely to be used than private cars.

Potential users

In order to find out what kind of car sharing organisation is most desirable and which people will join a car sharing organisation a lot of research has been carried out in Bucharest. Four research areas, located from the city centre to the edge of the city, have been selected, all supposed to have a high potential for car sharers. This means they include most of the following characteristics: dense population, high car ownership rate, visible and safe parking

facilities for "shared" cars, and a relatively high rate of companies and offices. 246 people between 25 and 60 years living in these selected areas and having a driving licence were surveyed to estimate the potential car sharers in Bucharest. Moreover stakeholders of a future car sharing scheme like the PT operator, ITS developers, car rental were interviewed.

The results of the stakeholder survey show in many aspects no differences to surveys with stakeholders from Western European countries. The advantages of a shared car in terms of cost savings and ecological benefits are globally obvious. But keeping in mind that car sharing started first and is most successful in Switzerland, a very wealthy European country, the starting point in Bucharest is quite different, as the majority of the inhabitants are relatively poor. Therefore car sharing in Bucharest could be more a service for citizens who cannot afford having a car of their own. This is the opinion of some stakeholders and they fear an increase in car use which generates an even higher pollution level. On the other hand they expect that car sharers will miss the feeling of private property so that car owning users are more reluctant to join a CSO. This psychological aspect may be of a high importance in a transition society.

The surveys with the potential users reveal that the concept of car sharing is best understood by households who have an income above average and who are very dependent on a car. Consequently these potential users expect to drive a lot (more than 100 km a week) if they should join a CSO and do not use their own car. Marketing strategies for those groups are likely to be successful, notably when the people live in districts with many public transport routes and interchange points. In these areas the use of public transport has been increasing again in last years, so the inhabitants are a target group for a bimodal package "public transport -car sharing". Another target group are small business owners, who will need to use car sharing for freight transport as well.

Potential effects

The success and the effects of a car sharing scheme in Bucharest are not clearly to anticipate. However the quantitative research estimates 535 persons with a high probability of becoming a car sharer. Approximately 30% of them will renounce to buy a new car. Bucharest researchers calculated a saving of 40 tons of CO₂ given a car sharing scheme with 60 shared cars.

Questionnaire for *moses* - sites

To provide us with sufficient data for the user needs report within WP 2, we would like to ask all *moses* sites to please fill in the following questionnaire.

It consists of two sections. **Section 1** will allow us to explore the knowledge and expectations you have on your (future) Car-Sharing users and their specific needs. As in most *moses* sites Car-Sharing is not in operation, the answers will rely mostly on your personal assessments.

Section 2 deals with the various pre-conditions of Car-Sharing. Here, the answers require official statistical data.

Please fill in this document on your computer and send it back by e-mail until 15th September 2001 to hkoch@kua.uni-bremen.de. Thank you for your assistance!

Use the "tab" key or the mouse to move through the questionnaire!

Section 1

1. Is there a **Car-Sharing system in operation** at your site? yes no
2. **How many Car-Sharing users** do you **currently** have? fill in number
3. **How many Car-Sharing users** do you expect **by the end of *moses***? fill in number
4. Any additional **comments**: please write in
5. Which of the following **target groups** do you consider important for your Car-Sharing scheme?

Please tick one box per row.

	Very important	Quite important	Not really important	Not at all important	Do not know
Residents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
commercial customers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tourists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
persons who drive a lot (more than 10,000 km per year)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
persons who drive little (less than 10,000 km per year)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
low income households	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
households without cars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
persons who have problems finding parking space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
users who wish an alternative to their private car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
users who wish an alternative to their second private car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
public transport users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
others: write in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
others: write in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Please describe **further details** of your main Car-Sharing **target groups**.
Please give short description

7. Which of the following **motivations** do you consider as important **for joining** your **Car-Sharing organisation**?

Please Tick one box in each row.
Users wish ...

	Very important	Quite important	Not really important	Not at all important	Do not know
to reduce mobility costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
to show commitment towards the environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
to have no more stress with maintaining a car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
to avoid problems finding parking space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
to react on (altered) mobility needs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
others: write in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
others: write in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Which of the following **needs** do you consider to be crucial for the future Car-Sharing users at your site?

Tick one box in each row.

Users wish to...

	Very crucial	Quite crucial	Not really crucial	Not at all crucial	Do not know
...get a Car-Sharing car at the time they want	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have short distances to Car-Sharing stations (less than 500 metres)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have easy to the Car-Sharing stations by public transport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have the choice between different car types	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have the choice between different Car-Sharing stations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...book cars around the clock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...book cars via the Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have a high level of maintenance and safety of the vehicles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...be well informed how Car-Sharing works	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have friendly and helpful administrative staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have individual choice between different membership rates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...make use of open-end booking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have access to special offers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have a high safety standards at the stations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...receive information on public transport facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...leave there car at a station different to the one they got it from	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
others: write in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
others: write in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. How would you rate the **quality of your Car-Sharing scheme** to meet CS user needs?

Please tick one box in each row.

Users wish to ...	Car-Sharing offer is ..				
	very good	Good	poor	very poor	Do not know
...get a Car-Sharing car at the time they want	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have short distances to Car-Sharing stations (less than 500 metres)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have easy to the Car-Sharing stations by public transport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have the choice between different car types	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have the choice between different Car-Sharing stations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...book cars around the clock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...book cars via the Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have a high level of maintenance and safety of the vehicles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...be well informed how Car-Sharing works	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have friendly and helpful administrative staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have individual choice between different membership rates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...make use of open-end booking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have access to special offers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have a high safety standards at the stations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...receive information on public transport facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...leave there car at a station different to the one they got it from	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
others: write in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
others: write in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. What data do you have on existent or potential Car-Sharing users and their needs on your site?

	<i>please tick</i>	<i>undertaken when (please fill in dates)</i>
market research	<input type="checkbox"/>	
potential analyses	<input type="checkbox"/>	
customer surveys	<input type="checkbox"/>	
others: write in	<input type="checkbox"/>	
others: write in	<input type="checkbox"/>	

11. On which data with regard to the user needs, if any, is your Car-Sharing scheme based upon?

Please give a short description

Section 2

The Table below intends to provide data for a description of the pre-conditions of Car-Sharing in the different *moses* sites. It requires data on characteristics of the city, transport infrastructure, travel behaviour and travel costs important for Car-Sharing schemes. The data should relate to the Car-Sharing catchment area, which is the area in which the existing or potential Car-Sharers live. If the catchment area contains several districts, please try to match the data and fill in average figures. If there is no data available for the district level, please use data of the city level.

Characteristics / Indicators	measurement	CS area write in city district(s) where the CS users live	City write in
City			
Population (inhabitants)	number	fill in No	fill in No
Area	km ²	fill in No	fill in No
Employment opportunity/ Places of work	number	fill in No	fill in No
Car ownership or access/ Registered cars	number	fill in No	fill in No
Comments: please write in			
Transport Infrastructure			
Parking spaces for public use	number	fill in No	fill in No
Parking spaces for private use	number	fill in No	fill in No
Public transport service/ Commercial speed	average km/h	fill in No	fill in No
Public transport service/ Passengers per year	number	fill in No	fill in No
Comments: please write in			
Travel behaviour			
Mode choice* between car, public transport, bicycle, motorbike, other <i>all purposes</i> description in percentage			
Mode choice* between car, public transport, bicycle, motorbike, other <i>for purpose work/education</i> description in percentage			
Distance to place of work	Average km	fill in No	fill in No
Mileage by car (user based)	Aver. km p.a.	fill in No	fill in No
Share of car drivers, who drive less than 10,000 km per year	Pct	fill in No	fill in No
Comments: please write in			
Travel costs			
Costs of driving for a 1,4 litre car**	Euro/km		fill in No
Costs of using public transport for a short journey of 1 km	Euro	fill in No	fill in No
Costs of an urban monthly ticket	Euro		fill in No
Costs of parking: Off street	Euro/hour	fill in No	fill in No
Costs of parking: On street	Euro/hour	fill in No	fill in No
Costs of parking: average fine for unauthorised parking	Euro	fill in No	fill in No
Costs of parking: Total sum of fines for unauthorised parking	Euro/ year	fill in No	fill in No
Comments: please write in			

*based on user surveys **not** on counting of vehicles

** including costs as petrol, maintenance, insurance and vehicle depreciation.

Please also give a short description of further characteristics important for the success of Car-Sharing at your site: **please write in**

Contact

Site Name: please write in

Name of your local authority or organisation: please write in

Name of the person in charge: please write in

E-mail: please write in

***Please send this document by e-mail until 15th September 2001 to
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