

ANALYSIS

From ownership to service use lifestyle: the potential of car sharing

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Abstract

The shift from ownership to service use, often promoted in concepts of sustainability, has recently become available in private vehicle mobility. Currently 38 000 people in a number of European cities are participating. This example is used here, to analyze the characteristics of people sharing one ‘material’ product as well as to investigate which services they actually render. Different views on the latter imply different evaluations of the size of the market potential and different conclusions on the effectiveness of various policy instruments. When service use is a separate lifestyle, policy instruments have to ultimately foster it directly, rather than changing economic costs at the margin only. © 1999 Published by Elsevier Science B.V. All rights reserved.

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1. Introduction

Concepts of material throughput reduction and long-lasting product economies quite often emphasize the importance of a change in the attitude towards ownership. In many instances it is not the ‘material’ product that is desired by an individual,

but the service it renders. The economic structure then is to organize the availability of just this service, which can be satisfied on the basis of one ‘material’ product for many users.

Let us look at one example of a demand that is of ecological relevance: mobility. Both the scope of this demand and the way it is met are key determinants of the ecological impacts any human society exerts (see: Button (1993)). Here, the industrialized countries have witnessed the expan-

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sion of a structure fostering individual mobility by means of the automobile. For OECD Europe, for example, each 1% increase in GDP has been accompanied by an increase of 1.74% in road transport and 1.40% in private car traffic (Nijkamp, 1994). In private passenger transport, private cars have won the intermodal competition (c.f. Kurer, 1993). At the same time road transport has been shown to be environmentally most harmful (see Gwilliam and Geerlings, 1992). Various studies emphasize the causal link between car ownership and mileage development (Blaas et al., 1992).

Although substantial psychological forces support ownership of a car, the area of mobility by car is among the first where organizations have developed, that enable the shift from ownership to service use: car-sharing organizations (CSOs). Their members collectively own a car-park and book each single service of car use. CSOs have been sustainably successful and have found a broader basis since the late 1980s. They spread particularly in the German speaking countries, Switzerland, Germany and Austria. In 1996 European Car-Sharing, a cooperation of national and local CSOs in these countries, spread to the Netherlands and in 1997 to Norway, Sweden and Denmark. By mid 1998 European Car-sharing accounts for roughly 38 000 members and 1800 cars.

Car-sharing organizations operate in an environmentally sensitive area and also supply us with the opportunity to investigate the issues relevant in transferring society from ownership to service use. This transfer is acknowledged as a potential solution for modern societies trying to cope with a variety of environmental problems.

In analyzing the example of car sharing to that end, three types of questions arise. First, we are interested in the net impact of CSOs on total mileage per person, i.e. the question to what degree the shift from ownership to service use affects consumption behaviour. Second, we are interested in the membership potential, i.e. the potential of society to change to service use lifestyle. Finally, and this arises as a more general third area of investigation, we are interested in the role of car sharing in the continuous transforma-

tion of the transport sector, i.e. the question of the role of service use in the process of technological change. While the literature to date focuses on the first question, after summarizing the results thereof, our focus will be on the second and third area.

Reviewing the first question, the move from car-ownership to car-sharing is found to trigger significant private vehicle mileage reduction. Survey results are reported by Muheim and Inderbitzin (1992) for Switzerland, Baum and Pesch (1994) for Germany and Petersen (1995) for Berlin, and a field experiment is reported by Steininger and Novy (1997) for Graz. Their conclusions are that in general two groups have to be distinguished. First, there are those who have had better access before membership due to ownership or within-family direct access. They reduce their mileage. Second, there is a group that can only afford to have a car available through a CSO. Their car access is improved. Yet, the absolute per person mileage increase of the latter group amounts only to a fraction (around a fifth) of the mileage reduction of the former group. After adjusting for the relative size of the two groups the net result is found to be a significant mileage reduction due to CSOs; in the studies cited between 42% (Baum and Pesch, 1994) and 50% (Petersen, 1995).

While this answers the first question, the second and third issue—the current and dynamic service use lifestyle transformation—have been analyzed only implicitly in some of the studies mentioned. Our focus will therefore be on these issues.

We will look at (a) the characteristics of current CSO-members, and (b) what this special form of service use experience and its characteristics let us conclude about membership potential and (c) the process of technological change in consumption.

To answer these questions three polls have been carried out. Poll I surveys all current Austrian CSO-members to determine their characteristics. Poll II surveys 350 households in two residential areas in Austria's second largest city of Graz (240 000 inhabitants). It is used to propose different approaches to the (urban) membership potential. Poll III offered a two-month test-membership to the 1200 households in one residential area to

determine the immediately attainable membership share.

The structure of the paper is the following. After a description of the concept of car sharing in Section 2, in Section 3 current CSO-members are featured. Section 4 focuses on different approaches of how to evaluate membership potential, before policy conclusions are drawn in Section 5. A qualitative analysis of the role of car sharing in technological change in consumption is carried out in Section 6. The final section summarizes the main results.

2. Car sharing organizations

Car sharing organizations offer a collectively owned car-park and usually are non-profit organizations. The members' entry deposit, refundable with interest upon exit, is used to acquire the car-park. Before use cars are booked by telephone, arranging for pick-up time, duration and desired pick-up point. Members then pick up and return the cars themselves. Each individual use is charged to a monthly balance, based on two components, hours of use and kilometers driven, with the rate varying with the type of car and the time of the day. There is a small monthly service charge to cover overhead. The organizations operate either on a local or national basis,¹ with most of them cooperating in an international network granting their members mutual car-access also at travel destinations that are farther away.

The motivation for the development of car-sharing organizations was two-fold. First, individuals who only have periodic demand for car use but do not want to do without car use altogether can substantially reduce their fixed costs by sharing a car with other users. This refers to explicit costs, such as depreciation, insurance and

repair, but also to time costs for the multiple responsibilities connected to car ownership. Second, individuals who seek undistorted cost incentives in the choice of their everyday modal split are served, as this system avoids a stimulus that private car ownership induces. With private car ownership, once the fixed costs have been paid, they are correctly regarded as sunk costs. The remaining variable cost component often is lower than, for example, public transport fares on an average cost basis, which induces car use. With car sharing all costs are distributed across use, and thus marginal costs of each single use are close to average costs. This levels the playing field between public transport and private vehicle use.

The history of car-sharing covers half a century already, but profitable organizations on a broader basis emerged only recently. With d'Welles (1951) initial ideas of car-sharing date back to the 1950s but actual implementation did not take before the 1970s: While these first projects were, in general, short lived, the experience gained did provide some of the basis for the currently growing car sharing organizations.²

Car-sharing organizations close a gap in modes of passenger transport. CSO-car trips fit in between those with cabs and rental cars. Cabs, as the one bordering segment, are preferable for one-way trips. That they come with a driver is reflected in trip cost. Rental cars, as the other bordering segment, are available for a minimum period of 24 h, otherwise the formal and organizational booking requirements would not pay off for the rental business and the user. Thus, rental cars are cost-efficient only for long-distance trips and trips lasting longer than at least one day. In between, there is the demand for short-term within-town two-way trips, e.g. for shopping

¹ The specific legal set-up differs among countries, dependent upon national business law and the phase of the organization's life. Similarly, the set-up of the central booking unit differs also across organizations. It may be operated by a small staff, or partly volunteers. In the Austrian case a cab organization has offered the services of its telephone central free of charge, motivated by car-sharers being potential cab customers for one-way trips.

² The largest projects were created both in Europe and the US: PROCOTIP (1971–1973) in Montpellier, WITKAR (1973–1981) in Amsterdam, Purdue Mobility Enterprise (1982–1985) in West Lafayette and STAR (1983–1985) in San Francisco. These projects suffered from low cost-coverage and/or serious management mistakes, or, namely the Purdue Mobility Enterprise, had a scientific purpose implying subsidization and prohibiting any commercial continuation. For a survey on these first projects see Petersen (1995) and Doherty et al. (1987).

transport needs, or for short-to-medium-distance weekend trips. Car-sharing is created as a form of transport, where car use is *complementary* to other modes of transport, particularly public transport, but also walking, cycling and cab and rental car trips.

3. The car-sharers

A questionnaire survey of all CSO members in Austria was carried out after the second year of the CSO's business operation (when some local experience had been gained).³ Based on a return of 70.7% the results on their characteristics are outlined below.

3.1. Age

Members tend to be relatively young; 85% belong to the 25–44 age group. The age structure is given in Table 1.

3.2. Persons per household and age of children

The number of persons per household is not significantly different from the Austrian average (*t*-test-value for mean deviation of 1.2), nor is the number of households with children aged below

Table 1
Age structure of current CSO members

Age class	Share of membership (%)
18–24	4.3
25–29	18.8
30–34	33.3
35–39	18.8
40–44	13.8
45–49	2.9
50–54	4.3
55–59	2.2
60+	1.4

³ The Austrian CSO was founded in 1992. The survey was carried out at the end of 1994 covering the then 198 members. During 1995 and 1996 the Austrian CSO experienced a yearly doubling to a membership at 780.

18. But, given a CSO household with children, their number is significantly above the Austrian average (*t*-test-value 2.9). The same even holds true for children aged 0–3 years (*t*-test-value 5.4). The CSO member households are characterized by—on average—twice the number of small children as compared to the typical Austrian household. This is in contrast to our own pre-analysis expectation of younger children generating increased difficulties with CSO-membership and thus deterring from it. A reason may be found in the higher cost awareness in multiple-children households, but the finding may be also due to the increased importance of the bequest motive with reference to the natural environment.

3.3. Education, employment and income

A very significant percentage of the current 'pioneer' group of CSO members is highly educated. A university degree is held by 45%, 'Matura/Abitur' (university entry level) by 27% and also professional secondary education without Matura is 10%, still slightly above the Austrian average. These three groups together cover 82% of current CSO members, but only 27.5% of the Austrian population.

In terms of full-time and part-time employment there is no significant difference from the Austrian average; unemployment is lower with CSO members. The average income level named by the participants as net income of the full household (28 531 ATS) is above the Austrian average net employees household income (24 200 ATS), reflecting higher education.

3.4. Pre-membership car ownership

Of the current CSO members 52.2% did not own a car prior to membership.⁴ There is no directly comparable data based on car ownership for all of Austria. But combining the available

⁴ Of the current CSO-members 13.57% are 'family-additional' members. If some of them held the assumption of a pre-membership common car for the entire family and filled in the questionnaire correspondingly, the 52.2% rate without car would be too low, and could rise to a maximum 65.8%.

data of 3.479 million passenger cars by the end of 1994 and a population of 6.4 million aged over 18, of which approximately 80% can be estimated to own a driver's license, one arrives at a share of 32% of Austrian driver's license owners not owning a car, if each of them does not own more than one car. Accounting for multiple ownership and correcting for commercial vehicles would increase this value. Even taking these into account, we still expect the share of non-carowners to be higher among those becoming CSO members than it is in the Austrian average.

3.5. Importance of specific characteristics in choice of means of transport

For the following characteristics no relevant data of comparison at the Austrian level is available, but they are available from Poll II of the 350 urban households of two residential areas in Graz (reference group). Out of the five criteria—*cost*, *time demand*, *convenience*, *flexibility* (i.e. availability at any time), and *environmental soundness*—two were found to be of *lower* importance for CSO members: time demand and flexibility. For both of these the average ranking found for them was one 'level of importance' (out of five) lower than for the reference group. It is interesting to compare this result with the answer given by CSO members as to how the total time demand of a CSO-membership relates to that of having one's own car. Here, the evaluations stretched roughly equally across the categories *higher* (31.9%), *the same* (28.2%) and *lower* (39.9%) time demand, with a slight majority pointing out *lower* time demand due to CSO-membership. Thus, while the CSO-entry decision is fostered by a lower priority of time budget for mobility services, membership-experience states that the actually observed time demand is in fact not perceived higher due to membership.

3.6. Motives for CSO-membership

Current CSO members were also asked to state their motives for membership. They were given six explicit reasons and a possibility to name further ones, and were asked to rank them. Of highest

importance were found: traffic mitigation, transparency of costs and good value for money. That the cars are new ones and therefore less polluting ranked at the bottom end.

4. The potential

The most important open question for the evaluation of this new mode of mobility is an inquiry into market segment potential. As mentioned above, the emission reductions and the positive effects on traffic mitigation are significant; as is saving of resources. But if we are looking for the total amount of environmental benefits available by this change from ownership to service use-oriented car consumption, we have to carefully estimate the potential for this new mobility product.

4.1. 'Mileage' as the solely demanded service

As we will see, the size of the potential depends very much on which services we ascribe to the consumption good, 'the car'. If we see the automobile as a mere mode of transportation, taking you from point A to point B, the service rendered by your car sharing organization seems to be a perfect substitute for the service you get from your own car.

Whether train and bus are perfect substitutes too depends on a further specification of the required transportation service: Trains are not assumed to be a very convenient mode of transportation for your grandmother's sofa. While we will not further discuss this topic here, it should be noted that CSO-membership often provides a much broader range of transportation services than your own car, as you have access to the small citycar as well as to a caravan.

If the annual amount of driven kilometers is the only reason why people decide whether to hold a car on their own or not, it is obvious that the costs per kilometer determine the decision for and against your own vehicle. The breakeven point of your own car (new middle-class and full-comprehensive insurance) is calculated by Petersen (1995) for Germany to be at roughly 18 000 km per year. For an average insurance requirement and an

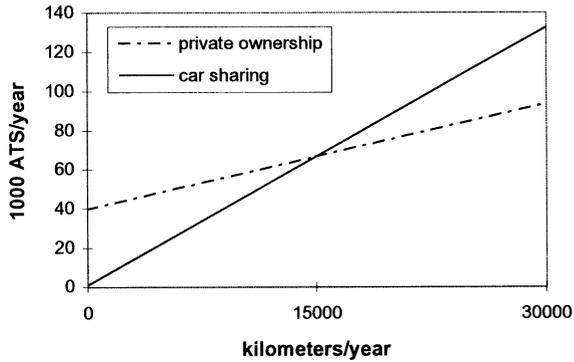


Fig. 1. The cost of mileage-service: private ownership versus car sharing.

average dated car the breakeven point declines to 15000 km a year. Analyzing Poll II of two residential areas in Graz, where the average vehicle mileage is close to the Austrian nationwide one of 13770 km, we find 69% of the households own a car that is driven less than 15000 km a year. The conclusion is clear: Given the above mentioned assumptions and a good organizational structure of the CSO for granted, the potential for car sharing is 69% of the urban households, since 69% of the households could gain financial benefits by entering a CSO (Fig. 1).

4.2. 'Waiting obedience' as additional service rendered by the limousine

But these above mentioned assumptions are false. We do not get benefits from our car only while driving. People also appreciate their roadster being an obedient servant which is waiting for them while they are drinking a cappuccino or—remember the owner of the sofa—they are waiting for grandmother, who is not the fastest during Sunday's promenade in the countryside. Note: A different issue, which we do not consider here, is 'car-availability' of the shared autos which has been observed to be higher than 90% and is supposed even to increase when the CSO-system expands. This is why the availability in your neighborhood will not differentiate the services rendered by your own car from those of the CSO one.

So, the time a car is spending while waiting for us is as much a service we consume as the mileage is. And in fact, given the current organizational structure, a person after leaving the CSO stand has to pay every minute of using the CSO-vehicle. Taking these costs into account for an average user—and not as above for an average CSO-user—Baum and Pesch (1994) calculate the breakeven point at only 5557 to 10160 kilometers. Applying this reference level to Poll II, still 22% of the households would benefit from participation in car sharing.

An alternative method of taking this 'obedience' service into account is sorting out persons with a characteristic modal split and time intensive demand of their car (e.g. commuters). This renders similar numbers. To conclude, our new, much more realistic potential for CSO membership is 22%.

4.3. The 'Prestige'-service or 'identity-promoting'-use of cars

If we are widening our notion towards services rendered by cars again, we soon get into very subtle areas of research. But nevertheless, as e.g. Earl (1986) has shown in *Lifestyle Economics* that the more we learn from psychology and the behavioral sciences the better our theory of the consumer will match reality. This is why inquiries into the field of car-owning versus car-using should no longer believe in the existence of something like a 'car'. In reality there are only Rovers, Chryslers, Toyotas. And of course there is a Mercedes Benz and a Ferrari. But nobody ever bought just 'a car'. Except those, who didn't buy a car but membership in a CSO. So, if we define 'Prestige' as being as much a service as 'Mileage' or 'Waiting obedience', we have to rethink our CSO-potential again. If owning certain cars delivers us services in building up and promoting our identity, we have to cut down our CSO-potential estimation again, for sure. Taking these questions of lifestyle into account, we found that being a member of a CSO is to be treated as identity promoting for the users in the same way as owning a Jaguar is for the Jaguar owner. As Poll I has shown the current CSO-members stress that they

do not only have financial benefits but also feel good because of contributing to traffic mitigation. When testing the households of the non-membership survey (Poll II) we focused on households who not only shared the typical member's social characteristics, age and educational status, but included three 'lifestyle characteristics' (active participation in environmental protective action, never having owned a high-price class car and showing a share of trips by car below 33%). Under this restriction we now find 9% of the households who would benefit from joining a CSO—not only in financial terms but also in promoting their identity.

When the prestige of a high class car comes with ownership more than with use, this could show up statistically. And indeed, it does. Comparing cubic volume of privately owned cars with that of rental cars, we find that the privately owned ones are significantly larger. If you think of a high cubic volume car you want to own it, and not just drive a rented one. Or, of course, you are one of those who have a different source of promoting your identity. Then it might be not owning a car at all, but sharing it, which supplies prestige. Testing cubic volume for this group of people, also CSO cars turn out to be smaller than privately owned cars (see Table 2). It is not because of the cubic volume of the car that you

Table 2
Cubic volume of privately owned cars and CSO cars. Austria, nationwide, 1997^a

Cubic volume (cm ³)	Privately owned cars (%)	CSO cars (%)
≤500	0.1	0.0
501–1000	4.2	0.0
1001–1250	8.3	8.1
1251–1500	23.7	33.9
1501–1750	22.6	29.0
1751–2000	29.5	27.4
2001–2500	8.3	1.6
2501–3000	2.5	0.0
3001–3500	0.5	0.0
3501–4000	0.3	0.0

^a Wilcoxon rank sum test: $H_0: CV(\text{priv}) \leq CV(\text{CSO})$. Rejected at 90% significance level ($w = 1.52$), establishing $H_1: CV(\text{priv}) > CV(\text{CSO})$.

Table 3

Cubic volume of rental cars and CSO cars Austria, nationwide, 1997^a

Cubic volume (cm ³)	Rental cars (%)	CSO cars (%)
≤1400	39.4	29.5
1401–1600	42.4	21.3
1601–2000	12.1	47.5
2000+	6.1	1.6

^a Wilcoxon rank sum test: $H_0: CV(\text{CSO}) \leq CV(\text{rental cars})$. Rejected at 95% significance level ($w = 3.2$), establishing $H_1: CV(\text{CSO}) > CV(\text{rental cars})$.

enter a CSO. However, when you decide for service use on a continuous basis, you can afford your CSO to supply you with more car comfort than would be possible with short-term-oriented service use of rental cars. CSO cars on average are larger than rental cars (see Table 3).

Finally, we tested for the immediately attainable membership rate. When offering a test membership to 1200 households, 18 households participated, i.e. the immediately attainable membership rate was found at 1.5%. This amounts to a sixth of the 'prestige'-potential, but only less than a tenth of that determined under 'waiting obedience' and less than a fortieth if the pure mileage-potential would be the relevant one.

5. Policy implications

The three different approaches to membership potential do not only render different results on the potential, they also imply different conclusions on the effectiveness of policy instruments to change the potential.

Overall we shall assume that the activation of any given potential is mainly a matter of time; i.e. when new stands are installed more residential areas are covered where membership becomes reasonable. Ultimately a dense network of CSO-stands could activate the full potential.

Our focus is on the effectiveness of policy instruments to change the potential itself. Admittedly, as a concurrent effect these instruments will also change the speed of potential activation.

The typical traditional transport policy instruments are gasoline taxes and road pricing used to impact variable costs, and various types of resource taxes and motor-based charges to impact fixed costs. Both types of instruments will be effective to change the potential—but only if the approaches ‘mileage’ or ‘mileage plus waiting obedience’ are the most relevant. Both instrument classes concern the economic costs and shift the breakeven point of car-sharing. An increase in (yearly or acquisitional) fixed costs increases the advantage of sharing these costs among users. When variable costs are increased by government legislation, the impact is a more indirect one. For private car owners such policy will reduce yearly mileage, and thus enlarge the group of those who are below the breakeven point of car-sharing. Thus, an increase in gasoline taxes or a resource tax increase will effectively increase CSO-potential—but only when the decision to join is an economic one done under calculations ‘at the margin’.

Yet, a more careful analysis of consumer psychology gives rise to the third approach of ‘Prestige-Service’. There, membership potential has not only shrunk to 9%, it also hardly changes when only economic cost aspects are addressed. The driver of a high class Volvo continues to drive a Volvo even when fixed or variable costs increase. Why should he give up his status when joining a CSO means being forced to drive, let’s say, a smaller Toyota? The traditional instruments under this view are hardly effective to increase the membership potential.

Two alternatives can be thought of, however. The first is to increase costs of ownership to such a degree that the trade-off between the prestige of car ownership and its cost does reverse the ownership decision for a larger part of the population. At least in the short term such an increase in private vehicle costs appears to be politically unfeasible. If that is true, the potential of shared car use is down to those people who also make use of a very specific ‘Prestige’ service of shared cars. This provides the second alternative in policy instruments: to work towards increasing the number of people for whom the shared use of cars is a significant promoter of their identity. This im-

plies addressing the service use lifestyle directly rather than just improving its attractiveness ‘at the margin’, as traditional policy instruments seek to do.

6. Car sharing as a building block in technological change

Car sharing can be considered an innovation in consumption technology. It is a new organizational form, and implies a different combination of ‘inputs’ in consumption, most evidently changing the shares of private vehicle and public transport mobility. Passenger transport is an economic sector where the necessity for technological change (comprising technical, organizational and infrastructure changes) is particularly evident. Increasing environmental pressure, congestion and limited parking space are among the most important shortcomings of the current passenger transport system. In this process of technological change in transport, what is the role of the concept of car-sharing? Where in this process is car sharing to be placed?

Let us look at the pattern and nature of technological change. The popular public perception is one of revolutionary technical change and heroic inventors. Modern historical studies as well as evolutionary and socio-economic research on technological change, however, all contradict this perception. They find that technological change is much more a cumulative and gradual process, proceeding in quite specific directions. Various reasons can be identified. In economic historical perspective Rosenberg (1976) points out the central role of engineering objectives and imagination. He emphasizes that explorative activities essentially seek to solve current problems and do so under a given technological imperative. In evolutionary economic perspective Nelson and Winter (1977) add inter alia, that there may exist project-specific incentives, when, with a technology already advanced in a certain direction, there are payoffs from further advancing in that same direction. When such incentives are technology-specific they speak of a ‘technological regime’. The idea that a common technological framework

is guiding research activities and innovation, is similarly present in Dosi's concept of a 'technological paradigm' (Dosi, 1982), which is inspired by the 'scientific paradigm' defined in philosophy of science.

Only recently was the socio-economic dimension in the stability of technological regimes pointed out more explicitly. Kemp (1997), states that:

“One of the key reasons why technological progress often proceeds along certain trajectories (defined as technological regime or paradigm) is that the prevailing technology and design has already benefited from all kinds of evolutionary improvements, in terms of costs and performance characteristics, from a better understanding at the user side, and *from the adaptation of [the] socio-economic environment to a certain type of technology in terms of accumulated knowledge, capital outlays, infrastructure, available skills, production routines, social norms, regulations and lifestyles.*” [accentuation by us]

This implies that technological change is slow, but also that innovations need to prove 'survival' in an otherwise—at least initially—unchanged environment in order to succeed at all. New developments need to fit well enough into an environment that is shaped by and adapted to older technologies. Only if innovations fit well enough are they able to grant additional benefits for at least some potential users. Also the private vehicle itself only gradually came to dominate other modes of transport, horse-drawn carriages and later trains, in the last 100 years.

The recent growth in European car-sharing membership proves that car-sharing is a (consumption) innovation that fits well enough into the existing technological and socioeconomic environment to last. It is based on most of the same infrastructure as the dominating privately owned vehicle mobility is, i.e. roads, petrol stations, car manufacturing and maintenance service stations. In addition, it is based on telecommunication for booking and payment, a sector that itself is among those developing fastest. The main point

where it differs from privately owned cars is that there is a complementarity rather than a substitutability with other means of transport, particularly with public transport. One can only cope with not owning a car, if, in addition to one's CSO membership, sufficient and reasonable alternative modes of transport are available.

This difference defines both the limitation of car-sharing, but also the reason why it came into being. The membership potential is limited to 9% to date because for many the socioeconomic environment is one that puts car-sharing at a disadvantage. For example, public transport could be unavailable quantitatively or qualitatively to a sufficient degree, at least in individual perception ('lifestyle'). On the other hand, for those who use alternative modes of transport frequently, and thus need a car only periodically, there was a significant shortcoming before car sharing came into being. They could either own a car, with its inefficient use of time and money, or do without, in which case the inefficiency does not disappear but shifts to comparatively high time or money costs in achieving car-access for each individual demand, be it through family, friends, or rental cars. The observed constraint for this group was large enough that an innovation occurred in the form of shared ownership.

Once in existence, and currently growing, car sharing organizations do have dynamic impacts. They foster their members' further adaptation of their socio-economic environment to this technology. As cited above, this implies each of the aspects: accumulated knowledge, capital outlays, infrastructure, available skills, production routines, social norms, regulations and lifestyles. For example, better routines in the use of public transport are developed, as public transport is complementary to car sharing. Not only the use, but ultimately also the development of public transport itself is thus enhanced, enlarging in turn the attractiveness of car sharing to new segments in the population.

While the above tendency is one of self-re-enforcing growth of car-sharing, obviously at the same time there are also counter tendencies. These originate from that segment in the population

that is dependent on private cars and therefore is changing their socio-economic environment to meet their own needs (e.g. restricting shopping to solely car-centered, peripherally located shopping malls). Therefore the future size of car-sharing is a question of the dynamic development of both segments.

It is interesting in this context that the combined development of both segments as it currently manifests itself appears to be causing a significant growth in one group that represents a market potential for car sharing. In both our surveys on motives among Austrian members (see Section 3) and a qualitative analysis on the younger Oslo car club members' motives (Wilhite, 1997) the result was that environmental motives were of some importance, especially in the beginning, but were not the prime reason for membership. It is rather the offer of a mobility-mix at reasonable cost in terms of both money and time. As Wilhite puts it:

“that car sharing has a potential for growth in Oslo among environmental idealists, but perhaps more importantly among the growing frustrated segment of urban dwellers who are tired of traffic jams, parking problems, and the increasing costs and responsibilities of owning a car.”

While the growth of the service use-oriented organization of car sharing thus appears to be ensured simply by the increase in pressures of the current passenger transport system, in view of the large potential of car sharing to relieve a number of these social and environmental pressures, local governments may well consider also direct support. This can range from immediately effective instruments, such as marking separate parking lots (similar to those of cabs), up to long term-oriented policy, such as fostering appropriate education which influences the development of the socio-economic environment. Policy along these lines employs ‘soft’ steering instruments (also: context-steering), not meant to interfere with the dynamic development of the market, but supplying ‘pushes’ into the direction of development that is socially desired.

7. Conclusions

Analysis of current CSO members makes evident very specific characteristics they share: high education, younger-middle age, environmental awareness and never having owned a ‘high price class’ car. When the membership potential in farther urban areas is sought, different approaches are thinkable. Considering a car to render the service ‘mileage’ alone, the breakeven point of car sharing gives a share of 69% of households surveyed for whom CSO-membership is beneficial. Additionally considering the typical time structure of car use, in our terms ‘mileage plus waiting obedience’, the potential declines to 22% of households. When we allow psychology and behavioral sciences to draw a more realistic picture of our consumer the potential declines to a 9% of households for whom a CSO supplies prestige.

The policy implications are clear. Traditional transport policy measures impacting variable or fixed costs can only increase the potential when the consumer is seen as corresponding to the first two approaches. When identity promotion is the most crucial determinant of car ownership, more subtle policy instruments need to be developed, ultimately addressing the lifestyle of service use.

Technological change in consumption, which car sharing is an example of, is a process of mutual adjustment between the innovation and its socio-economic environment. The current state of technological change in the urban passenger transport sector points to a future of a further growth potential for car sharing. This can serve as a basis for context-steering policy considerations.

Finally, one can transfer the lessons learned from car sharing to define the criteria which consumption goods would have to meet to be eligible for service use without ownership: (a) The respective goods need to be durable consumer goods, with their flow of services limited to a period well within an individual's life, i.e. no asset component is to be involved. For goods with an asset component, such as apartments or houses, the desire for bequest implies ownership first. (b) The goods need to show a significant acquisition value, as otherwise the necessary overhead for sharing (staff and control costs) does not pay off. Bicy-

cles, for example, have repeatedly proven to be an unsuccessful candidate. (c) The specific organization of service use needs to be adapted well enough already to the current socio-economic environment. This is to hold for a group of sufficient size to ensure reasonable service density.

To summarize, as a consequence of the before mentioned criteria CSOs in central Europe have enabled the car to become a successful example of continuous service use without individual ownership.

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