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1st. Prize

Mobility Car-Sharing (E)

Environmental and Social Impacts

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Draft version

Mobility CarSharing
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Environmental and Social Impacts

Case N°

This case was written by Kai Hockerts, Adjunct Professor and Research Programme Manager of the Centre for the Management of Environmental and Social Responsibility (CMER), INSEAD, as a basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. The case has received the 2003 oikos Best Case Award www.insead.edu/CMER/publications/OikosAward.htm.

Direct Eco-efficiency of Car-Sharing

Since the early 1990s, Peter Muheim had been wondering about the claim of car-sharing to be an environmentally friendly product. In order to put his analysis on a more stable basis he conducted a study in 1997 for Energy2000, in which he interviewed current users about their mobility needs before and after becoming car-sharing users (Muheim, 1998). He then analyzed the environmental impacts of the different behavior patterns.

In the late 1990s a fifth of the secondary energy consumed worldwide was due to traffic; in Switzerland the number was even as much as a third (Energie-Spiegel, 2002/6). It is thus not surprising that the ecological impacts of car-sharing were studied closely ever since its inception. Several studies existed on the question how far car-sharing helped to reduce energy consumption and consequently ecological impacts. The following considerations are mainly based upon data derived from a comparative life cycle assessment (LCA) commissioned by Mobility (Mertens, 2002), which in turn was based partly on the data from the Energie2000 study (Muheim, 1998).

At first sight there seemed to be no difference between a shared car and one owned privately. *Ceteris paribus*, the environmental impact of a single trip was the same whether it was done with the own car or with a similar car-sharing vehicle. Car-sharing did, however, increase the efficiency of car usage in two ways.

- Firstly, by reducing the number of cars needed to serve a given community it reduced the need for ***parking lots***. This had important consequences for cramped inner-cities. Statistically 2.2 citizens shared a vehicle in Switzerland (Mertens, 2002). CarSharing on the other hand, in 2003, served 57,000 clients with just 1700 cars, averaging 34 clients per car. Considering that some Mobility clients still owned a car, the number fell to one car per eleven users (Mertens, 2002). However, this still translated into a factor 5 reduction compared with the status quo.
- Secondly, by offering a fleet of different automobile types, car-sharing allowed users to pick ***the most efficient vehicle category*** each time. Families owning just one car often bought a large vehicle that could transport all family members as well as the holiday luggage. However, for most day-to-day trips such a large car was not needed. Car-sharing allowed clients to choose from different categories ranging from a two-seater to a large van. As a consequence the Mobility fleet averaged 7.0 litres per 100 km as compared to 9.2 litres in the Swiss average (Mobility DV, 2002: 5). Furthermore, the number of passengers per Mobility car tended to be higher (2.0) than the national average (1.72). Accordingly Mobility's average environmental impact per person km was 40% lower than the Swiss average (Mertens, 2002). Finally, as car-sharing vehicles were used more intensely than private cars they were also replaced faster, thus keeping the fleet modern and up-to-date concerning pollution-prevention technology (Schrader, 2001: 93).

Indirect Environmental Impacts

More important than the direct efficiency gains of car-sharing were its indirect system effects. These had been found to increase considerably the eco-effectiveness of public transportation. Traditionally most car owners perceived public transport as more expensive compared with private car ownership.

- Car-sharing made public transport more attractive from an economic point of view, by destroying the "***price illusion of car-ownership***" (Langendorf, 2002, interview). Most customers, when making a decision about using the public transport or their own car, compared only variable costs such as fuel. They ignored fixed costs of car ownership (taxes, maintenance, insurance, depreciation), which they felt they had to pay anyway, whether they used the car or not. Accordingly the own car was often found to be cheaper than the train or bus. Car-sharing included the cost of car-ownership in the usage fee, thus making the real cost of the car with 40-88 Rappen (about 0.24-0.53 Euro) per kilometre more transparent, and motivating its members to use public transport where this was a viable option, which cost on average only 20 Rappen (about 0.12 Euro) per kilometre (Mobility DV 2002: 5).
- Secondly, car-sharing solved the ***last mile problem*** of public transport. A car allowed traveling from "door to door"; public transport, though, ended at the train station or the bus stop. Car-sharing could bridge the gap between train station and door.
- Finally, car-sharing broke ***behavioral patterns*** and initiated ***learning processes*** (Harms and Truffer, 1998; Meijkamp, 2000; Belz, 2001). The longer people used car-sharing the more they found public transport to be a viable alternative and learned to use it more efficiently for more and more trips. This learning-curve hypothesis was supported by Muheim (1998), who found that two years after joining a car-sharing group clients would on average consume 20% less car-sharing services. Muheim assumed that these car-sharing services were replaced by public transport.

Car-sharing clients used public transport more often, and they drove less often by car. When asked about their mobility mix before and after joining a car-sharing scheme, clients reported an average 1600 km more per year by public transport and 2000 km less by car (Muheim, 1998). Given that public transport consumed less energy per person kilometre than the average car did (see Exhibit 1), it was evident that this change reduced mobility-induced environmental damage.

Harms and Truffer (2000), however, cautioned against a too-naive computation of "before/after" changes. Peter Muheim (2002, interview) also warned against analyses that were too optimistic:

> *"There is a risk that the general growth of mobility offsets the environmental gains from car-sharing. Car-sharing frees parking space and reduces the load on public roads. However, freeing capacity might at the same induce other users to drive more. We know this effect from city planning in the past. Building more roads creates more traffic as people quickly fill up the available capacity. Thus if the capacity gains from car-sharing are to be preserved, we need the public hand to intervene and rebuild parking lots into open spaces."*
>
> (Muheim, 2002, interview)

The ***rebound effect***, as described here by Muheim, might indeed offset some or even all the efficiency gains from car-sharing (Belz, 2001: 226). However, so far there seemed to be little awareness about this effect among city officials. A first attempt to change the situation was undertaken through Mobility's co-operation with the alternative residential project KraftWerk1 (Mobility Journal, 2001/2). By placing three Mobility cars in the newly built housing project, the KraftWerk1 administration was able to reduce the number of cars to an unexpectedly low level. As a result KraftWerk1 was forced to sublet some of the parking lots it had built to people living outside the new area.

The Decreasing Role of Sufficiency

Traditionally car-sharing had always had a 'sufficiency' component. This means that early car-sharing pioneers were interested not only in providing efficient and effective transportation. They were also convinced that cars were inherently environmentally unfriendly and disapproved of "unnecessary" car trips. Many were willing to sacrifice comfort and time to protect the environment. These ideological roots were maintained and reinforced among car-sharing members through the family-like structure of the early user-groups. Members knew each other and the tight user groups allowed one to know who used the car when and how often. Nobody wanted to have a negative ecological image.

Over the years this social control system weakened, as new members were less ideologically oriented. Instead they were interested in cheap and convenient alternatives to car ownership. In the late 1990s, environmental sacrifice motivated only a minority of users. The Muheim study (1998) supported these findings. Only a third of the pioneer clients (i.e. those who joined before 1994) felt that driving a car was "fun". However, among more recent clients this number had gone up to 50%. Furthermore, the exponential growth and structural changes had weakened the social control of the user group. It was now impossible for other clients to see who had used or reserved a car due to the replacement of the board log by the new board computer system.

It can be expected that Mobility's growth has further reduced the ideological motivation of its members and thus also the sufficiency component of car-sharing. This trend also had impacts on Mobility's co-operation strategy. Mobility's long-time partner VCS, Switzerland's green traffic club, felt that Mobility was increasingly distancing itself from deep green ideologies (Brunner, 2002, interview). Realising that too close a link with the VCS would decrease rather than increase the market potential for car-sharing, Mobility started discussions with the

Touringclub Schweiz (TCS), Switzerland's largest mainstream traffic club (Langendorf, 2002, interview).

However, the ideological roots of Mobility still showed at its delegate assemblies. For example, at the 2002 delegate assembly (Mobility DV, 2002) the section Rapperswil / Jona complained about the increasing number of Mobility cars equipped with air conditioning which they felt to cause unnecessary cost and environmental impacts. Delegates from Zurich and Uster demanded Mobility to buy only cars with high-energy efficiency, such as the Volkswagen Lupo which consumed only 3 litres per 100 km but which had a high acquisition costs:

> *"Individual mobility should consume as little energy as possible. [...] A virtual 'tractor' like the Opel Agila is not a good advertisement for this idea. Mobility's philosophy requires the support of ecological mobility, even if that means that we can not always buy the cheapest car."*
>
> (Mobility DV, 2002: 1)

Delegates from the section Kloten finally were concerned about a new digressive price structure whereby the cost per km falls with longer distances:

> *"According to its statutes the Mobility co-operative aims at an energy efficient and environmentally friendly operation of cars (Art. 2). The new price structure (as of 1 March 2002) reduces the cost per km for long distances (as of the 101st km users pay only half the price they would usually pay). This approach motivates users to drive longer distances. This price structure might be economically profitable, however, it is in our point of view in opposition to Art. 2 of the statutes and the international climate convention. It does signify an environmentally unsustainable operation [of cars], as it invites [users] to produce unnecessary CO_2."*
>
> (Mobility DV, 2002: 4)

The examples show that sufficiency considerations remained alive among some of the delegates. Their practical impact on Mobility's strategy, however, was increasingly small.

Social Responsibility within Mobility

Given that many of its founders came from an ecological and activist background, it was not surprising that car-sharing had always considered social responsibility to be important as well. Two aspects stood out, one of which had decreased in importance over time, while the other had increased.

An important element of the early car-sharing activities was its focus on self-help (Hoogma, Kemp, Schot, and Truffer, 2002: 147). In particular, Charles Nufer's ShareCom had been motivated by the desire to promote neighbourly help. In times when many people didn't know

the neighbour next door this had an important impact on ***reviving social networks in cities***. User group members met outside the co-operative activities and would help each other with all kinds of unpaid services. However, as car-sharing emerged as a dominant product this social network idea became less and less relevant. The professionalisation of Mobility and the resulting anonymization made these ties even more difficult to maintain. By 2002, Mobility members were primarily clients. They did not expect to be in touch with other users nor did they need to.

The other aspect concerned ***responsibility for Mobility's staff*** of 150. Mobility had, for example, invested CHF 500,000 in its largest department, the 30-strong call centre, when it was moved to a new location in 2000 (Mobility Journal, 2000/4). Apart from a modern telephone system the new offices were equipped with ergonomic workplaces according to Feng Shui principles, and all were suitable for the handicapped. Consideration of its "social competence" (Mobility Journal, 2001/1) was one reason why Mobility received the ***call centre of the year*** award in February 2001. The call centre was to a large extent the work of Beat Stettler, member of the management team and responsible for customer care.

Stettler had also made a point of hiring handicapped persons. Mobility was now employing seven staff members with very ***different handicaps*** (Hofer, 2002, interview), a figure that was outstanding among enterprises of a similar size. Mobility worked closely with the paraplegic centre to assist individuals with spinal cord injuries and other physical disabilities to achieve independence, self-reliance, and full participation through employment. Although the handicapped programme came out of a genuine feeling of social responsibility, the organisation believed that its social investment had also created motivation and good will among the employees (Hofer, 2002, interview). Involvement of the handicapped had a long tradition for the organisation: "Already in the first ATG team of three employees we had one handicapped person," recalls Langendorf (2002, interview).

Another proactive move of Mobility was its decision in 2000 to offer ***apprenticeships***. Again many small enterprises hesitated to take on apprentices due to the cost constraints. However, Mobility felt that "an organisation that has grown as fast as ours needs to take on the responsibility to train young people." (Hofer, 2002, interview)

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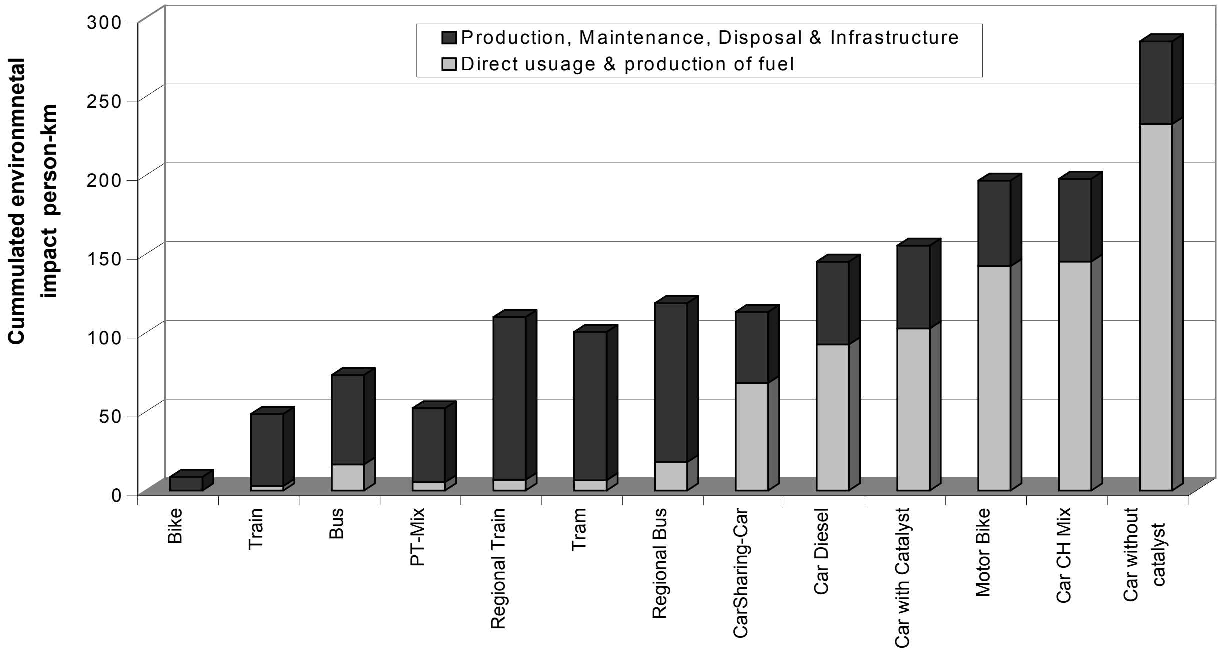
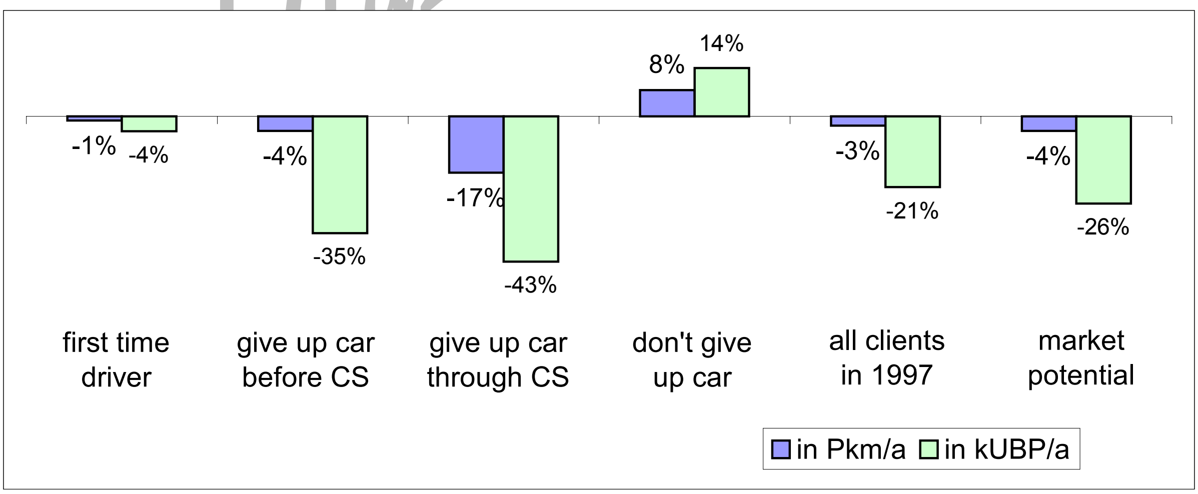
Exhibit E1:
Environmental Impacts per Person-km Cumulated Over the Life Cycle of Different Transportation Options



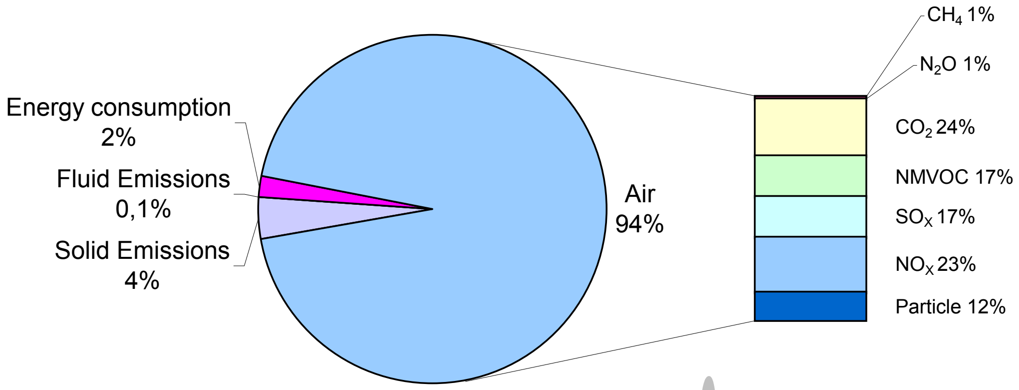
Source: (Mertens, 2002)

Exhibit E2:
Environmental Impacts by Type of Driver



Source: (Mertens, 2002)

Exhibit 3:
Environmental Impacts of car with Catalyst Using the "UBP" Ecological Scarcity Method



Source: (Mertens, 2002)

Exhibit 4:
Environmental Impacts considered in the "UBP" Ecological Scarcity Method

	Eco-factors in UBP/g (BUWAL 297)
CH4 (Methan)	*4,2*
N2O	*62*
CO2	*0,2*
NMVOC	*32*
SOx	*53*
NOx	*67*
Particles	*60,5*
Cd	*120000*
Pb	*2900*
Zn	*520*
AOX	*330*
COD	*5,9*
Primary energy renewable	*1*
non renewable	*1*

Source: (Mertens, 2002)