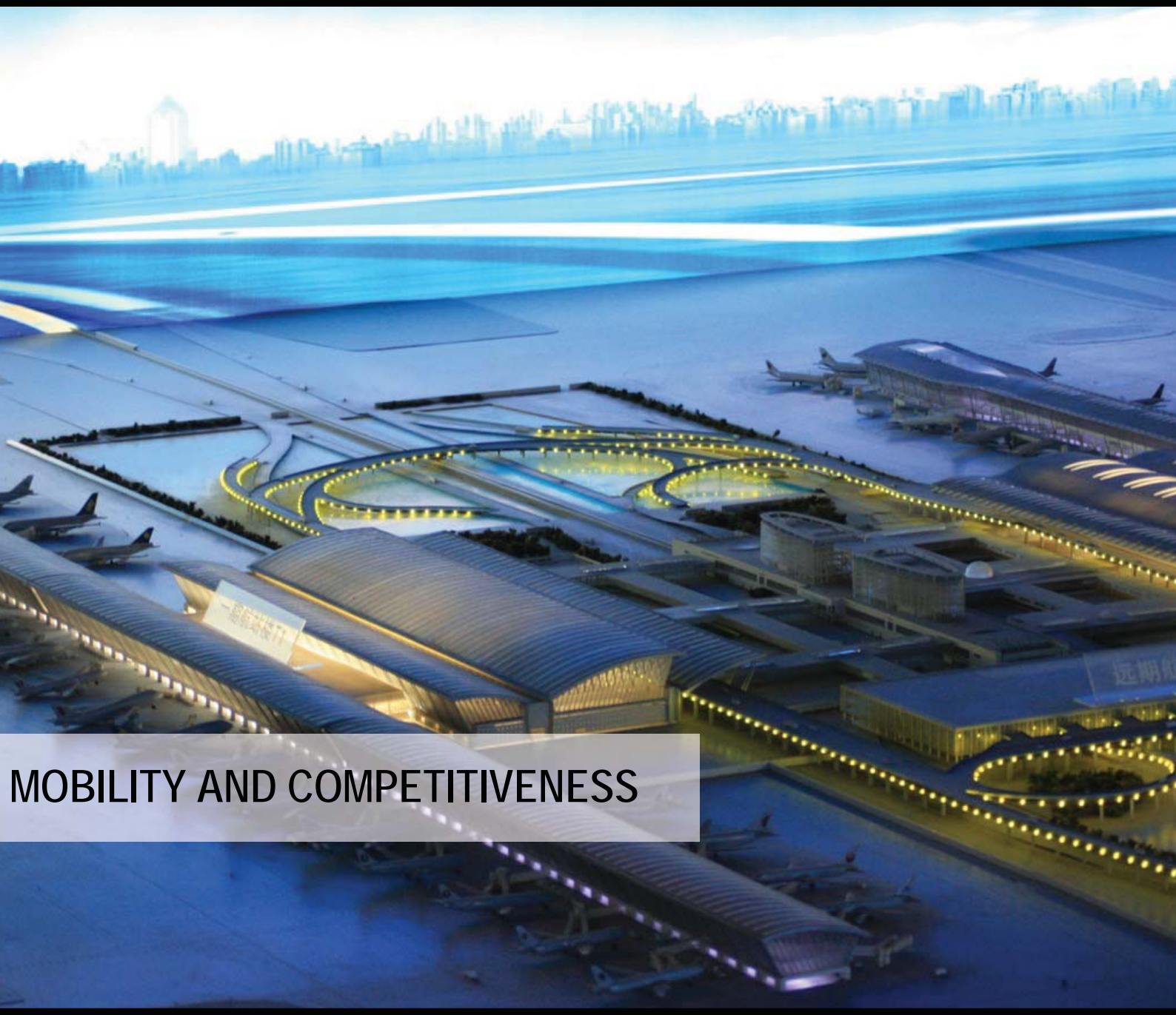


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MOBILITY AND COMPETITIVENESS

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THE ITALIAN WAY TO CARSHARING

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ABSTRACT

Carsharing is increasing its role worldwide as an alternative and more sustainable transport mode. After focusing on the main characteristics of carsharing, starting from the analysis of the literature on this topic, this paper studies the Italian carsharing experiences, trying to understand its development and growth and possible limits and weaknesses of existing experiences. The presence of a national coordination structure (Iniziativa Carsharing - ICS), unique in Europe, surely helped the development of the system. Summarising the conclusion, in the first part we discussed the peculiarities of ICS based on the concepts of standardisation of the service and interoperability among different operators. We saw how carsharing in Italy has great potentiality that now is limited in part due to a scarce integration of the service within broader transport policies and in part due to cultural reasons, as many Italian drivers still seem to consider their car as a "good" rather than as a "service". In the second part we deepened the case of Milan's carsharing that, to date, represents the most successful initiative in Italy. Context characteristics and the introduction of toll schemes (Ecopass, and then Area C) seems to suggest that other mobility policies, external to carsharing itself, might have a significant role in its development and in general the available data suggest great potentiality for the service in the future. Concluding, it seems that the result of carsharing initiatives will depend largely on mobility policies that both the national government and municipalities will introduce in the future to promote both sustainable mobility and a cultural change aimed at changing transport behaviour.

KEYWORDS:

carsharing, sustainable mobility, urban mobility

1 INTRODUCTION

Carsharing¹ (hereafter CS) is increasing its role worldwide as an alternative transport mode (Costain et al., 2012), that could contribute to a more sustainable urban mobility. This paper studies the Italian carsharing experience, analysing its development and growth, and possible limits and weaknesses of existing experiences. The paper first discusses the main characteristics of CS; then a literature review will be presented, followed by an analysis of the current situation in Italy evidencing the essential role of the national coordination structure *Iniziativa Carsharing* (hereafter ICS) created by the Ministry of the Environment to boost car sharing initiatives. In the last part we will focus on the case of Milan's CS, then final considerations will be drawn.

A traditional CS organization maintains a fleet distributed in neighbourhood locations, users rent cars and usually pay electronically on a time and distance basis² (TCRP, 2005). Vehicles are used by different people in different moments of the day, whereas private cars are in general parked for the majority of the time consuming urban space. The typical CS organisation relies on a centralised system for bookings, data collection and billing; users reserve the car by internet, by phone or call centre deciding the location and the usage time (Sullivan and Magid, 2007). Since CS members pay only variable costs (if there is no annual fee), they can estimate the cost of an auto trip in advance and compare it with the alternative transport modes (public transport, car rental, taxi, etc).

2 CHARACTERISTICS OF CARSHARING: A LITERATURE REVIEW

In the last decade the application of CS schemes worldwide has been positive, but it is still far from a level that can deliver significant aggregate benefits (Duncan, 2010). According to the results of the European Project Momo (Loose, 2010), at the beginning of 2009, there were approximately 380 000 CS participants in Europe. Users are usually driven by environmental reasons when joining CS, but economic considerations have gained increasing importance in time too (Loose, 2010).

The majority of the studies on CS are based on surveys among the members of CS organizations, however in many cases the sample dimension and differences in data collection and study methodology make it difficult to compare the results. Many researches focus on the analysis of existing experiences deepening the characteristics of both the users and the system, evidencing the peculiarities that can make CS a viable alternative in urban contexts (TCRP, 2005; Sullivan and Magid, 2007). Other studies tried to analyse the market potential of this service (Shaheen, 2001; Shaheen and Martin, 2006; Shaheen et al., 2008), the socio-economic characteristics of the users (TCRP, 2005; Andrew and Douma, 2006) and the overall impacts determined by the system (Cervero et al., 2007; Shaheen et al., 2007a; Martin et al., 2010a, 2010b).

Starting from the literature review, in the next paragraphs we will present the main characteristics of typical CS systems (user profile, overall impact on mobility and environment).

¹ Different expressions are used in literature; carsharing, car-sharing, car sharing and car clubs (in the UK) here we will use the first one.

² This in order to consider both the cases of high mileage trip during short rental time and low mileage time during long rental trip (VTPI, 2010).

2.1 CARSHARING: DEMOGRAPHIC AND TRAVEL CHARACTERISTICS OF USERS

The typical carsharing users show some common characteristics worldwide, here we report the main ones (further information can be found in the cited studies):

- Carsharing seems more attractive to men (Harmer and Cairns, 2011; TCRP, 2005; Loose, 2010);
- Average age of the user is 25 – 45 (TfL, 2008; TCRP, 2005; Huwer, 2004; Muhr, 2009);
- The majority of members are singles or live in small households (TCRP, 2005; Cervero and Tsai, 2003; Harmer and Cairns, 2011; Loose, 2010);
- Members are in general well educated people with median or higher than average income, cost sensitive and environmentally conscious (TCRP, 2005; Andrew and Douma, 2006; Cervero et al., 2007; Muhr, 2009);
- Users live in location well served by public transport and CS is seen as a mean to increase members mobility, it is mainly used for recreation/social activities (Synovate, 2007; TCRP, 2005; Cervero and Tsai, 2003);
- Trips frequency and average miles per year are quite low (less than 10 000 km) since members use public transport for the majority of their trips (Haefeli and Matti, 2006; TCRP, 2005);

In general, CS users rely on public transport for daily commuting trips for work and study reasons (Synovate, 2007); a recent survey in the UK (Harmer and Cairns, 2011) evidenced that the average frequency of use made by members is quite low (75% of the members hire a car up to 5 times a year) with a distance travelled up to 40 kilometres per trip (64% trips). In Belgium, surveys in Brussels (Muhr, 2009) and the Wallonia Region (Muhr, 2010) evidenced that the majority of members use CS cars at most three times per month, mainly during their free time. These results are similar to the Italian ones, where – at the national level – the frequency of use of CS is about 1 run³ per member per month, with an average trip length of about 40 km and 6 hours in duration (Mastretta, 2010a).

2.2 IMPACTS

Even if an agreed methodology for evaluating CS still lacks, there is general agreement about some benefits entitled by CS:

- Reduction in vehicle ownership⁴ (TCRP, 2005; Martin et al., 2010a; Martin and Shaheen, 2010b; Shaheen et al., 2008);
- Saved transport costs (Shaheen et al., 2008; Cervero et al., 2007; Barth and Shaheen, 2002);
- Reduction in vehicle miles or kilometres travelled (Cervero and Tsai, 2003; Cervero et al., 2007; TCRP, 2005; Shaheen and Cohen, 2007b; Koch, 2001);
- Increase in public transport use (TCRP, 2005; Shaheen et al., 2008; Shaheen and Cohen, 2007b; Koch, 2001);
- Reduction in pollutants emission (Martin and Shaheen, 2010b);
- Reduction in parking spaces requirements (Sullivan and Magid, 2007);

Regarding the number of vehicles removed from the transport network per CS vehicle, a homogeneous quantification is difficult, nevertheless there are several estimates ranging from 6.8 (Cervero and Tsai, 2003) to 10.8 (Lane, 2005) but considering also the cars sold or not purchased, the number of cars taken off the streets could be nearly 20 per CS vehicle (Harmer and Cairns, 2011). Concerning the decrease in pollution,

³ With run we mean the use of CS after a reservation

⁴ Both in terms of vehicles sold after joining carsharing than in terms of avoided car purchasing.

the data usually presented focused mainly on CO₂ reduction, while data on local pollutants (PM₁₀, PM_{2,5}, NO_x, etc.) are less common.

3 THE ITALIAN WAY TO CARSHARING

3.1 THE ROLE OF *INIZIATIVA CAR SHARING*

In Italy, CS has gained increasing importance thanks to the institution, unique in Europe, of a national co-ordination structure known as *Iniziativa Carsharing*⁵ (hereafter ICS), promoted by the Ministry of the Environment in October 2000. Before the institution of ICS, the only initiative active in Italy was the one promoted by the environmental association “Legambiente” in Milan.

ICS derives from a broader legislative Decree⁶ regarding sustainable mobility aimed at “*promoting the implementation of structural changes to permanently reduce the environmental impact of traffic, through the introduction of sustainable mobility solutions*”.

ICS is a legal agreement among municipalities, in the form of a co-ordination structure among the main Italian cities, supporting the set up of local CS services integrated in a standardised operational scheme. In particular, ICS offers⁷ to the cities:

- technical and legal consultancy;
- project support for designing the system and the service;
- communication and promotional support on a national level (a specific logo known as “Io Guido Car Sharing” has been created to characterize the national circuit of ICS);
- promotional, communication and marketing support on a local level;
- call centre services;
- technologies for the management of the fleet and the service;
- assistance during the initial operational period.

ICS works on a federative basis (ICS, 2003), so municipalities can choose their own Local Company for the CS service which has responsibility over operational, commercial and managerial aspects. In particular, local operators maintain responsibility for site specific aspects like prices and market policy, vehicles maintenance and cleaning, planning investments, customer satisfaction and cooperation with other mobility services companies. In order to promote CS initiatives, the Ministry of the Environment provided an initial funding of approximately 9.3 million Euro in 2000 and further 10 million Euro in 2005⁸. ICS is responsible for administering the funding and assigning the grants in order to finance the start-up of new CS organizations. In the first phase of the program, in order to avoid the proliferation of different standards and solutions, ICS directly provided assets and services to the operators (Mastretta and Burlando, 2007a); now ICS provides support mainly through reimbursement of the expenses incurred directly by the organisations for the purchase of assets and services that meet the standards, operating rules and requirements of ICS (Mastretta and Torriani, 2005). In general, even if the co-funding could reach the 50% (ICS, 2003), in practice it is normally a maximum 20-25% of profit and loss account (Loose, 2010).

⁵ For further information on ICS see <http://www.icscarsharing.it>

⁶ Decree n.267 of 27th March 1998 by Italian Ministry of the Environment.

⁷ ICS website accessed March 14, 2012.

⁸ ICS website accessed March 14, 2012.

3.2. ICS NUMBERS

To date, there are twelve cities actively involved in ICS⁹, which have to respect some parameters:

- interoperability among operators;
- homogeneous interface towards the consumer for all the normal service access operations;
- unitary service identity;
- fixed homogeneous standards regarding services, emissions and safety (ICS, 2003).

Fig. 1 represents the members' trend in the Italian cities included in the ICS circuit from 2003 to February 2012; a constant growth can be observed in part due to the activation of new services during the years and in part due to the development and improvement of older initiatives.

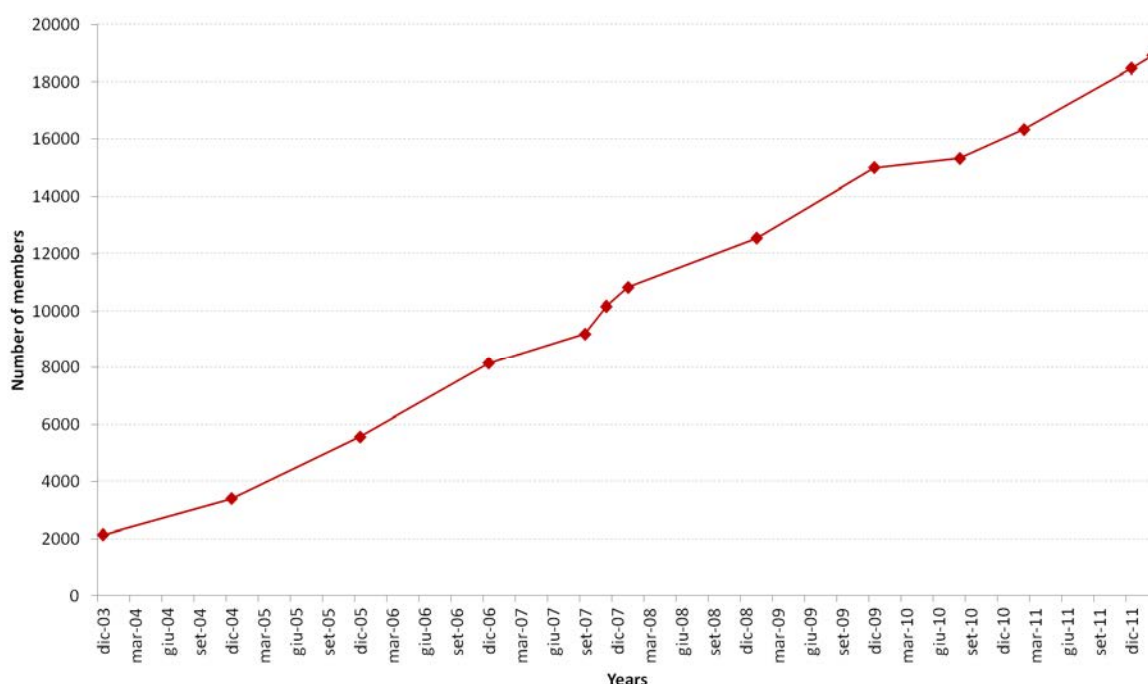


Fig. 1 - ICS members' trend (Source: our elaboration on Mastretta and Burlando 2007a, Mastretta and Burlando 2007b, Mastretta 2008b, Mastretta 2009, Mastretta 2010a, Debandi 2010, ICS website (February 2011 data), ICS website (December 2011 data))

Comparing (Tab. 1) the Italian values (at the beginning of 2009) with those of other similar European countries in terms of population (France, Great Britain and Germany), differences, in terms of number of members, emerge with respect to the nations where the service is older and much more developed (values for France are probably underestimated). As pointed out by Burlando (2012), the Italian model differs from the one used in many European experiences where the development of CS systems has, in general, followed a two phase process¹⁰; the Italian case is characterized by a strong public intervention and it is based on many independent local operators instead of a national centralized structure.

⁹ ICS is opened to any institution that has approved the constitutive convention of ICS and the agreement subscribed with the Ministry of Environment; to date 29 cities and 3 Provinces joined ICS (ICS website accessed March 2012).

¹⁰ An initial phase based on small organizations followed by an expansion phase through the merger of different companies to reach a stronger entrepreneurial organization (Burlando, 2012).

COUNTRY	POPULATION ON 1 ST JANUARY 2009	CS MEMBERS	CS VEHICLES	MEMBERS- VEHICLE RATIO	% OF CS CUSTOMER ON POPULATION
Austria	8 355 260	11 000	169	65	0,13%
Belgium	10 753 080	6 932	248	28	0,06%
Denmark	5 511 451	5000*	225	22	0,09%
Finland	5 326 314	2 232	38	59	0,04%
France	64 350 226	13 000**	700**	19	0,02%
Germany	82 002 356	137 000	3 900	35	0,17%
Great Britain	61 595 091	64 679	1 459	44	0,11%
Ireland	4 450 030	63	9	7	0,00%
Italy	60 045 068	15 850	498	32	0,03%
Netherlands	16 485 787	27 000**	1 832	15	0,16%
Portugal	10 627 250	100	12	8	0,00%
Spain	45 828 172	2 504	127	20	0,01%
Sweden	9 256 347	14 889	more than 492	30	0,16%
Switzerland	7 701 856	84 500	2 200	38	1,10%

*approximated, ** estimated values in Loose, 2010.

Tab. 1 - Carsharing in Europe (Source: our elaboration on Eurostat Statistics (website accessed April 2012, Loose 2010))

Table 2 provides data for the twelve cities of ICS where a service is available today (in grey we evidenced the cities where the service is no longer available)

CITY	START UP	CORPORATE ORGANIZATION	POPULATION*	PRIVATE CARS PER 1000 INHABITANTS**	CARS	MEMBERS	PARKING LOTS
Bologna	August 2002	LPT	383 251	522	44	1 166	31
Brescia	February 2010	PS	193 879	657	6	187	3
Florence	April 2005	PS	373 446	549	23	842	28
Genoa and Savona*	July 2004, June 2009*	M	607 906 and 62 553	467 and 571	78	2 347	55
Milan	September 2001	LPT	1 324 110	548	134	4 882	77
Modena	April 2003	M	185 706	630			
Padova	September 2011	P	214 125	580	10	40	10
Palermo	March 2009	LPT	654 735	599	36	663	44
Parma	February 2007	P	188 258	591	18	368	12
Rimini	March 2003	PS	144 301	599			
Rome	March 2005	P	2 761 477	693	104	2 232	68
Turin	November 2002	M	907 563	618	121	2 600	82
TOTAL					618	18 921	422

Tab. 2 - ICS organizations at February 2012 (Source: Mastretta 2010b, *Italian National Institute of Statistics 2011 (website accessed March 2012), **Comuni-Italiani.it elaboration on Automobile Club d'Italia 2009 data (website accessed March 2012), ICS website February 2012 data (website accessed May 2012)). LPT = Local Public Transport Agency, PS = Private subject, P = Public subject, M = Private-Public subject.

The overall number of members is 18 921 with 618 cars and 422 parking lots. Milan has the highest number of members, followed by Venice, Turin and Rome, that represent also the oldest CS organizations in Italy. A recent survey¹¹ (IPR, 2009) analyzed also the characteristics of CS users in ten cities where the service was active at the time. The study confirms Italian users to fit the common characteristics found in the literature, where the majority of users are well educated male (58% of respondents) living in small households with one or zero car, using public transport every day (41% of CS users have a public transport season ticket and 19% of them has purchased a season ticket simultaneously or after joining the CS service) while the car is daily used by 35% of CS members (IPR, 2009). The main reason for joining CS is the absence of a car in the household, followed by the cost effectiveness of the service; the number of CS trips is quite low (less than 3 trips per months for the majority of the users) while the average mileage per month is just around 50 km. Finally CS is mainly used for leisure reasons or for shopping, while work related use is minor. Fig. 2 represents the trends for the cities listed in Tab. 2:

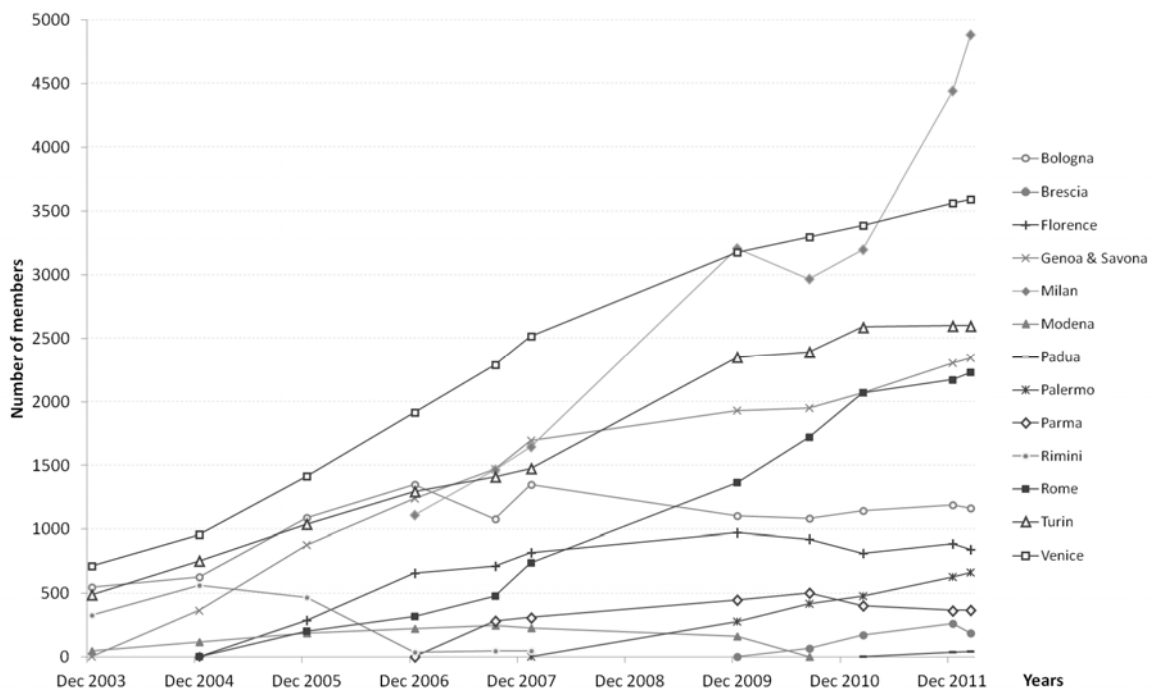


Fig. 2 - Members' trend for the ICS cities (Source: our elaboration on Mastretta and Burlando 2007a, Mastretta and Burlando 2007b, Mastretta 2008b, Mastretta 2010b, Debandi 2010, ICS website data accessed on February 2011, December 2011 and May 2012)

Whereas CS service is older and the population is higher (Turin, Rome, Milan, Genoa), there has been a constant growth in the number of members while in smaller cities with a relatively new service, the growth has been much lower (Brescia, Palermo, Parma). Florence and Bologna differ from Venice in terms of members' trend even if they have a similar population and a relatively old CS service. In Bologna, membership increased from 550 users in 2003 to 1 191 members in 2011, while in Florence the value grew from 288 in 2005 to 890 in 2011. On the other hand, Venice experienced a faster growth in the number of users from the initial 714 to 3 564 members in 2011. The reasons for these differences probably lie in the

¹¹ Financed by the Ministry of Environment and based on both CATI and CAWI technology.

context characteristics¹² of Venice, that has a peculiar urban structure that limits car use and does not encourage car ownership (in Tab. 2 Venice has the lowest level of private car ownership among the ICS cities).

3.3. INCENTIVES TO PROMOTE CARSHARING INITIATIVES

In order to promote the use of CS, ICS suggests some tools that municipalities can introduce to increase membership. Free access to Limited Traffic Zones (LTZs), use of public transport reserved lanes, free parking in city centres and discounts (30-50%) on the annual fee for the CS service if users have a public transport season ticket.

CITY	WEBSITE OF THE CS ORGANIZATION	FREE ACCESS TO LTZ	USE OF PT RESERVED LINES	FREE PARKING IN BLUE AREAS	DISCOUNT ON THE ANNUAL FEE
Bologna	www.atc.bo.it	x	x	x	x
Brescia	www.carsharingbrescia.it	x		x	x
Florence	www.carsharingfirenze.it	x	x	x	
Genoa and Savona*	www.genovacarsharing.it	x	x	x	
Milan	www.guidami.net	x	x	x	x
Padova	www.carsharingpadova.it	x	x	x	
Palermo	www.carsharingpalermo.it		x	x	
Parma	www.parmacarsharing.pr.it	x	x	x	
Rome	www.atac-carsharing.it	x	x	x	x
Turin	www.carcityclub.it	x	x	x	
Venice	www.asmvenezia.it	x	x	x	

Tab. 3 - Incentives applied in the ICS cities to boost carsharing initiatives (Source: websites of CS operators)

Another initiative introduced by ICS, and financed by the Ministry of the Environment, to promote CS concerns the introduction of incentives for scrapping polluting vehicles in exchange of a subscription to CS (one year free subscription to CS service and a 50% discount on the second year subscription plus a bonus of € 600 for the use of CS service). Concerning the success of CS initiatives, the above mentioned survey (IPR, 2009), also evidenced a limit for the diffusion of the service related to the scarce propensity of drivers to share their own car: only one third of the respondents state that they would share their car without problems, while for the majority of the drivers the emotional bond with their cars seems very strong, meaning that car is not seen just as a means of transport and a status symbol, but also as a sort of extension of the space of their "intimacy"(IPR, 2009). This cultural aspect clearly contributes to the final result of CS initiatives, evidencing the importance of a cultural change.

4 CASE STUDY: MILAN

4.1 MILAN'S CONTEXT

Milan presents a central business district (offices, business activities, services, etc), somehow coincident with the historical centre, entailing great mobility in the urban area, and a big and much more dispersed

¹² Venice is built on an archipelago in a lagoon formed by 177 canals in the old centre (nearly 90 000 inhabitants), transport is possible only on water or on foot, so the car use is limited to the part of the city on the mainland (nearly 180 000 inhabitants).

productive area right outside the city. According to AMMA¹³ data (AMMA, 2006), there are 841 000 non residents daily entering in the city, among them nearly 510 000 use private car (410 000 vehicles with an average of 1.2 people on board and 21 000 motorcycles), while 311 000 use public transport (176 000 by train, 71 000 by underground and 64 000 by buses or trams). Considering the whole mobility in Milan's area, 53% of the trips are made within the city (31% of which by public transport), while the rest are cordon trips (to enter or exit from the urban area, 47% by public transport) that in part start (or end) from municipalities included in the first belt around Milan.

4.2 CAR SHARING INITIATIVES IN MILAN

Milan has been a pioneer in Italy for CS since it had formerly two organizations providing the service. The first one, *Carsharing Italia*, was created in 2001 (in 2006 it joined the ICS network) by the environmental association "Legambiente". The second one, *GuidaMi*, born in 2004, was supported by the municipality of Milan and by the Ministry of the Environment. In 2007, the Local Public Transport company *ATM Group* (owned by Milan's municipality) took control of *GuidaMi*, followed in 2010 by the acquisition and merger of the other CS operator in Milan, *Carsharing Italia*. *GuidaMi* offers an interoperable service within the ICS network (i.e. *GuidaMi* users can access CS services in other ICS cities without subscribing a new membership); in December 2010, a new pilot project of electric CS has been launched in Milan known as *E-vai*, run by FNM Group (the main transport and mobility group in Lombardy, owned by the Regional Government), which is not part of the ICS circuit.

GuidaMi is a two ways service (i.e. car should be returned to the initial location) where users reserve the car by the internet or call-centre, choosing the time and the pick-up location; to unlock the car members use their smart card, then pick the keys in the car and start their trip. *GuidaMi* has adopted all the incentives described in paragraph 3.3. Concerning the costs, members pay an annual fee (120 €, that can be reduced by 50% if the member has a season ticket to public transport) while the usage cost depends on the category of vehicle and considers both time and kilometres travelled.

VEHICLE CATEGORY	MODEL	HOURLY RATES [€/h]		MILEAGE RATES [€/km]
		7:00 – 24:00	00:00 – 7:00	
ECONOMY	Smart, Panda	2.2	1	0.45
CITY	500, Y, Grande Punto	2.4	1	0.55
FLEXY	Doblò Persone, Doblò Combi	2.6	1	0.65
PREMIUM	Prius*, MiTo, Giulietta, Touran	2.8	1.5	0.75
CARGO	Doblò Cargo, Ducato	3.00	1.5	0.80

Tab. 4 - GuidaMi usage costs (hourly and distance costs) (source: GuidaMi website accessed March 28, 2012)

As shown in Tab. 2, to date Milan represents one of the most successful CS experiences in Italy in terms of members.

¹³ Mobility Agency of Milan.

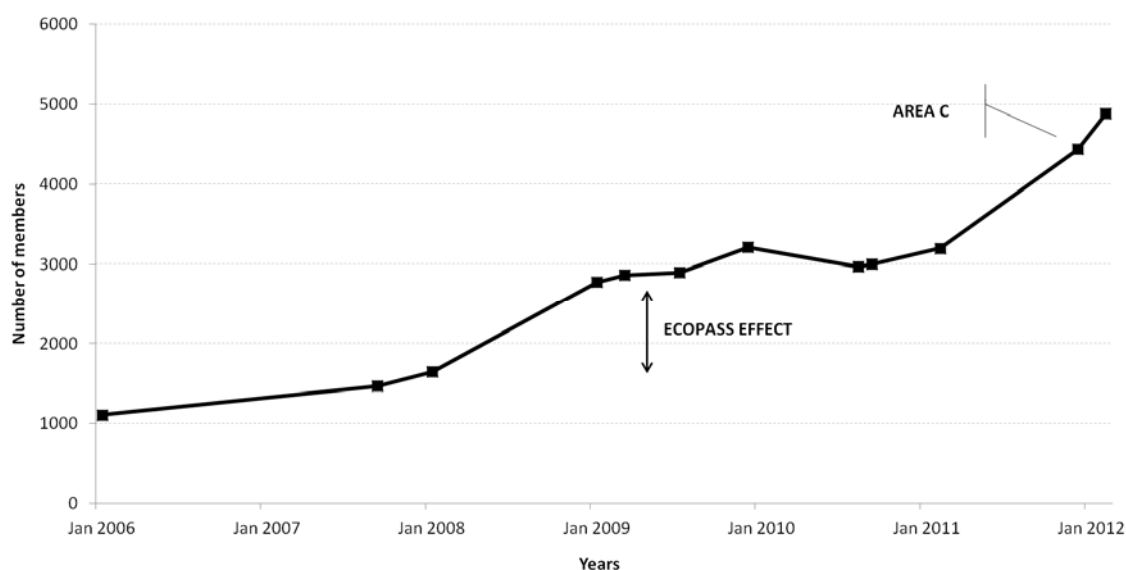


Fig. 3 - GuidaMi members' trend in Milan (Source: our elaboration on Mastretta and Burando 2007a, Mastretta and Burando 2007b, Mastretta 2008b, Salucci 2010, Mastretta 2010a, Debandi 2010, Leverano 2010, ICS website (accessed on February 2011, December 2011 and May 2012))

The increase in the number of members between January 2008 and January 2009, derives in part from the introduction on January 2008 of a charging scheme, known as *Ecopass*, applied at the most polluting vehicles entering the city centre. The major effect has been a shift towards cleaner, and thus toll-exempt, vehicles and an increase in the use of public transport (Rotaris et al., 2010, AMAT, 2011), but Fig. 3 also suggests that some drivers probably gave up to their old and polluting cars, relying on public transport and CS for their mobility needs. On January 2012, following a public consultation, the *Ecopass* scheme has been substituted by a new charging scheme, known as *Area C*, focused on congestion rather than pollution: every vehicle entering the central area now has to pay a 5 euro toll.¹⁴ This new scheme and the shift in the parking policy for CS cars from garages, where they were barely visible, to the "on street parking" (entailing greater visibility) can in part explain the increase in membership between December 2011 and February 2012. Further data are needed to evaluate the impact of *Area C* on CS usage, however we see a sharp increase in GuidaMi users in 2012.

GuidaMi cars are chosen mainly for economic reason and they are used during free time and for shopping related occasions in Milan (Salucci, 2010). The following Figure considers three indices that evidence a decrease both in the average distance per run¹⁵ and in the average duration of a run in time together with an increase in total runs which might suggest an use of CS for short trips (around 40 km).

¹⁴ From Monday to Friday, from 7h30 to 19h30.

¹⁵ With respect to the values of the base year 2006 (64km/run and 10.6h/run).

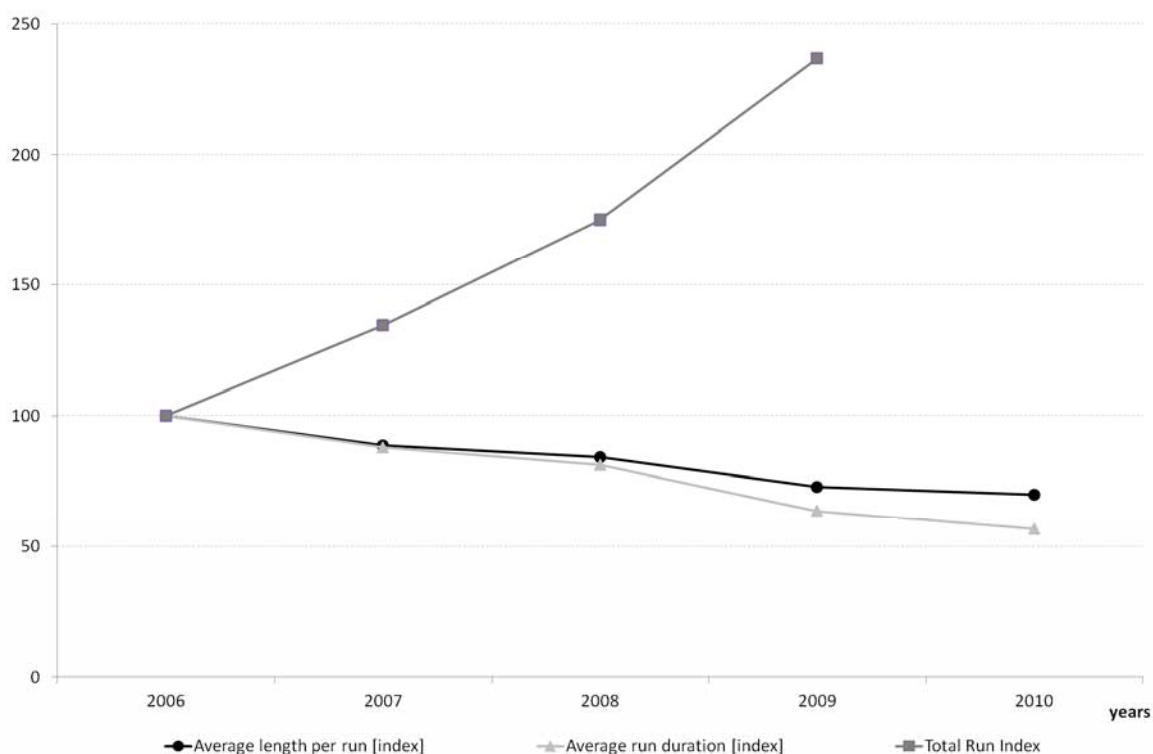


Fig. 4 - GuidaMi performance indices (Source: our elaborations on Mastretta and Burlando 2007a, Leverano 2010, Salucci 2010)

Milan has implemented all the incentives suggested by ICS (see Tab. 3) and the impacts on its CS service have been somehow relevant if compared with other Italian experiences. New parking policies based on a more complex pricing structure¹⁶ and on the strict sanction of incorrect behaviour, together with the improvement of public transport, might increase the importance of CS.¹⁷ Moreover CS service can still be improved increasing its capillarity or integrating its service with those of other operators in the transport sector (car rental companies, railways operators, etc.). The impact of CS in Milan could be evident only if the problems here briefly summarized will be faced within a broader urban transport strategy.

5 FINAL CONSIDERATIONS

This paper, after a general literature review, tried to present the current situation of CS in Italy, analyzing the role and characteristics of the national coordination structure created to boost CS initiatives. We discussed the peculiarities of ICS based on the concepts of standardization of the service and interoperability among different operators. We saw how CS in Italy has great potentiality that now is limited in part due to a scarce integration of the service within broader transport policies and in part due to cultural reasons, as many Italian drivers still seem to consider their car as a “good” rather than as a “service”. As pointed out by Burlando (2012), CS seems to have the necessary characteristics to overcome the existing gap between mobility offer and demand that could contribute to satisfy the modern transport needs so, a greater role seems possible for it. In the second part we deepened the case of Milan’s car sharing that, to date,

¹⁶ For example, introducing higher rates and shorter pricing periods at more convenient parking spaces (like on street spaces and parking near building entrances) during peak hours in order to increase turnover and foster higher-priority uses.

¹⁷ According to some newspapers (*Corriere della Sera* 15/01/2010), an estimate made by the Automobile Club Italia, fixes the number of cars double parked every day in Milan around 60 000 and 100 000.

represents the most successful initiative in Italy. Context characteristics and the introduction of toll schemes (Ecopass, and then Area C) helped the diffusion of the service and in general the available data suggest great potentiality for the service in the future. Concluding, the result of CS initiatives will depend largely on mobility policies that both the national government and municipalities will introduce in the future. A legislation concerning CS is needed in order to promote the involvement of private initiatives; bearing in mind the costs for municipalities entitled by CS services, mobility policies should evidence the advantages, both in economical and practical terms, offered by CS with respect to private car also considering the social role that CS might have for low-income households (and students) that could have access to a car on a pay as you use principle.

REFERENCES

- Agenzia Milanese Mobilità Ambiente – AMMA (2006), *Strategia per la mobilità sostenibile al fine della tutela della salute e dell'ambiente Milano 2006-2011*, November, Milan 2006.
- Agenzia Mobilità Ambiente e Territorio – AMAT (2011), *Valutazione nuovi scenari di Regolamentazione degli accessi alla ZTL Cerchia dei Bastioni*, November, Milan 2011.
- Andrew, J., Douma, F. (2006), *Developing a model for carsharing potential in Twin Cities neighbourhoods*, Compendium of Papers for the 85th Annual Meeting of the Transportation Research Board, Washington D.C., January 22 - 26.
- Barth, M., Shaheen, S. (2002), *Shared-use vehicles systems: framework for classifying carsharing, station cars and combined approaches*, Transportation Research Record (1791): 105-112.
- Burlando, C. (2012), *A comparison of car sharing organizational models: an analysis of feasible efficiency increase through a centralized model*, in Review of Economics & Finance, Better Advances Press, 2012, No.2
- Cervero, R., Tsai, Y. (2003), *City CarShare in San Francisco: Second-Year Travel Demand and Car Ownership Impacts*, Transportation Research Record (1887): 117-127.
- Cervero, R. Golub, A. Nee, B. (2007), *City CarShare: Longer-Term Travel Demand and Car Ownership Impacts*, Transportation Research Record: Journal of the Transportation Research Board, no. 1992: 70–80.
- Costain, C., Ardron, C., Habib, K.N. (2012), *Synopsis of users' behaviour of a carsharing program: A case study in Toronto*, Transportation Research Part A 46 (2012) 421–434.
- Debandi, P. (2010). *Il car sharing in Italia, l'esperienza di ICS*. October 27, 2010. (available at <http://www.civitas.eu/docs/426.pdf>)
- Duncan, M. (2010), *The Cost Saving Potential of Carsharing in a US context*, Transportation (38), no. 2: pp. 363-382.
- Haefeli, U., Matti, D. (2006), *Evaluation Car-Sharing*. Bundesamt für Energie BFE. (available at http://www.bfe.admin.ch/themen/00526/00541/index.html?lang=de&dossier_id=00888)
- Harmer, C., Cairns, S. (2011), *Carplus annual survey of car clubs 2010/11*, Transport Research Laboratory, Published Project Report PPR567, Final Draft.
- Huwer, U. (2004), *Public transport and car-sharing—benefits and effects*, Transport Policy, Volume 11, Issue 1, pp. 77 – 87.
- ICS - Iniziativa Carsharing (2003), *ICS Project – The state of the art*, Bucarest 30 June. (available at http://www.icscarsharing.it/main/doc/car/ICS_BUCAREST_30_giugno_03.pdf)
- IPR Marketing (2009), *Servizio Carsharing del circuito nazionale indagine di customer satisfaction presso gli utenti, privati ed aziende e di notorietà e di interesse presso il target potenziale*, Research Report, Research financed by the Ministry of Environment.
- Koch, H. (2001), *User needs report. MOSES (Mobility Services for Urban Sustainability) Project – Workpackage 2.2*, European Commission, DG TREN. University of Bremen 2001: 22-24.
- Lane, C. (2005), *PhillyCarShare: First-Year Social and Mobility Impacts of Carsharing in Philadelphia*, Transportation Research Record: Journal of the Transportation Research Board, no. 1927: 158-166.
- Leverano, A. (2010), *Il carsharing come parte integrante del servizio di Trasporto Pubblico Locale*, Presentation at the workshop “Il ruolo del carsharing per un'offerta integrata di servizi di tpl”, October 12, Rome.
- Loose, W. (2010), *The State of European Car-Sharing*, Project Momo Final Report D 2.4 Work Package 2.
- Martin, E., Shaheen, S., Lidicker, J. (2010a), *Impact of Carsharing on Household Vehicle Holdings*, Transportation Research Record, no. 2143: 150-158.
- Martin, E., Shaheen, S. (2010b), *Greenhouse Gas Emission Impacts of Carsharing in North America*, Mineta Transportation Institute Report 09 - 11, San Jose, California, US.
- Mastretta, M., Torriani, L. (2005), *Monitoraggio del programma nazionale car sharing – Rapporto di valutazione*.
- Mastretta, M., Burlando, C. (2007a), *Il carsharing: un'analisi economica ed organizzativa del settore*, Milan: FrancoAngeli, Studi e Ricerche.
- Mastretta, M., Burlando, C. (2007b). *Il carsharing: un'analisi a livello internazionale*, Presentation at the workshop “CarSharing - La scelta sostenibile”, November 21, Rome.
- Mastretta, M. (2009b), *Il carsharing per l'utente: interesse, immagine e gradimento*, Presentation at the workshop “Il Car Sharing per l'utente: interesse, immagine e gradimento”, April 2007, Rome.
- Mastretta, M. (2010a), *Il carsharing in Italia*, Presentation at the workshop “La diffusione del Carsharing negli enti locali: prospettive di sviluppo”, February 4, Genoa.

- Mastretta, M. (2010b), *I benefici dell'integrazione tra carsharing e tpl*, Presentation at the workshop "Il ruolo del carsharing per un'offerta integrata di servizi di tpl", October 12, Rome.
- Muhr, E. (2009), *Report Customer Survey Car-Sharing Brussels*, Project MOMO Grant agreement no IEE/07/696/SI2.499387.
- Muhr, E. (2010), *Report survey on satisfaction of Cambio clients in Wallonia*, Project MOMO Grant agreement no. IEE/07/696/SI2.499387.
- Rotaris, L., Danielis, R., Marcucci, E., Massiani, J. (2010), *The urban road pricing scheme to curb pollution in Milan, Italy: Description, impacts and preliminary cost-benefit analysis assessment*, Transportation Research Part A: Policy and Practice, Volume 44, Issue 5, June 2010, Pages 359–375.
- Salucci, F. (2010), *Il progetto milanese di integrazione tra carsharing e Tpl* (available at <http://www.icscarsharing.it/main/doc/card/Perrone.pdf>)
- Shaheen, S. (2001), *Carsharing in the United States: Examining Market Potential*, 8th ITS World Congress, Sydney, Australia, October 2001, pp. 12, ITS-Davis PUB #RP-01-10.
- Shaheen, S., Martin, E. (2006), *Assessing Early Market Potential for Carsharing in China: A Case Study of Beijing*, Institute of Transportation Studies, University of California, Davis, Research Report UCD-ITS-RR-06-21.
- Shaheen, S., Cohen, A. P. (2007a), *Growth in Worldwide Carsharing: An International comparison*, Transportation Research Record, no. 1992: 81 – 89.
- Shaheen, S., Cohen, A. P., Chung, M. (2008), *North American Carsharing: A Ten-Year Retrospective*, Institute of Transportation Studies, University of California, Davis, Research Report UCD-ITS-RR-08-38.
- Synovate (2007), *Attitudes towards Car Clubs*, Research prepared for Transport for London.
- Sullivan, E., Magid, L. (2007), *Bringing Carsharing to Your Community – Long Guide*, San Francisco City CarShare.
- Transit Cooperative Research Program - TCRP (2004), *Carsharing – Where and How it succeeds*, TCRP Report 108 published by the Transportation Research Board Washington DC, USA.
- TfL - Transport for London (2008), *Car Club Strategy*, TfL Group Publishing.
- Victoria Transport Policy Institute – VTPI (2010), *Carsharing. Vehicle Rental Services That Substitute for Private Vehicle Ownership*, TDM Encyclopedia. <http://www.vtpi.org/tm/tm7.htm> (Accessed May 15, 2011).

IMAGES SOURCES

Front page Figure: <http://www.viaggi-lowcost.info/come-muoversi/car-sharing-piu-lo-usi-meno-lo-paghi/attachment/carshareonly/>

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