Ref. Ares(2020)2009694 - 10/04/2020

STARS

HOW TO INTRODUCE CARSHARING IN YOUR CITY?

A toolbox for decision-makers

Why this toolbox?

Car sharing can promote a car-independent lifestyle that is less dependent on private cars and offer a supplement to public transport. Thus, it has the potential to ease congestion, reduce parking demand in cities and cut emissions.

Car sharing can also help to reclaim street space for active mobility, making cities quieter, cleaner and more liveable. However, it needs the right service of car sharing within a wider framework of sustainable mobility. This toolbox will show **how decision-makers and planners can support the development of car sharing.**

The idea of replacing a privately owned car by a shared car was at the heart of the concept when **car sharing emerged in the 1980s,** first in Switzerland and a bit later in Germany. Car sharing proponents figured that a shared use of cars would reduce the car dependency of most households and give room to other more sustainable means of transport without sacrificing appropriate access to cars.

With this toolbox, we will shed a light on the untapped treasures car sharing can offer. We want to unravel the sharing idea to municipalities, companies, fleet owners, housing companies and all multimodal enthusiasts and take you to the path to sustainable, future-proof mobility, getting rid of the muff of the ever-same dead-end road of the car-oriented city.

The recommendations included in this toolbox are based on the findings of **the STARS project (Shared mobility opporTunities And challenges foR European citieS).** Since October 2017, this H2020 project has been exploring the diffusion of car sharing in Europe, its connections with technological and social innovations, as well as its impacts on other transport modes (private car, bike, walk, taxi, public transport…) in a co-modality perspective. More specifically, STARS investigated the implications and impacts of different forms of car sharing, not only in terms of car ownership shifts but also in terms of usage of different travel means.

What is car sharing?

Car sharing is an innovative form of car rental with easy and decentralized access in the neighbourhoods and options for short use. **With car sharing, you don't own the car yourself** but use it and share it with others. The car owner is usually a car sharing provider with its own fleet. Customers have to present their driving licence and sign an agreement with the provider to register. When this is done, they can enjoy the advantages of using a car without the disadvantages of ownership. Car sharing is an umbrella term for several variants of sharing. It is distinct from ride sharing and ride hailing, where you will be driven rather than driving yourself.

A star was born

From the first experiments in the early 1980s in small communities that organised their privately shared car systems, the concept of car sharing as a mobility service evolved. From neighbourhood initiative to broader scale service, it took almost decades. The technology development of internet, smart card and phone apps improved intensely the quality service of car sharing.

The popularity of car sharing is a different story today with an estimated **15 million car sharing users and 150 000 cars in circulation in Europe in 2020** (Monitor Deloitte, 2017). In recent years, car sharing has witnessed double-digit growth, particularly in larger cities.

Today, high-density urban areas are the preferred business environment for car sharing (free floating models in particular). Nevertheless, smaller cities, towns and rural areas are also witnessing a growing number of car sharing services (usually station-based models). Besides the big players of the automotive industry and rather medium-sized commercial operators, you will find targeted offers in special environments also by non-commercial operators.

Societal benefits

Growing population and urbanisation are creating higher costs for car ownership in cities. Together with increasing transport problems, innovative mobility services support **a change of mobility patterns.** Car sharing can not only reduce the individual costs of owning a car, but also may reduce external costs such as congestion, energy consumption and air pollution.

Moreover, as the majority of cars sit idle for most of the day, car sharing can free up space by reducing the number of private cars. **The impacts depend on the model of car sharing and its integration into a wider sustainable mobility strategy.** Lastly, it has been demonstrated that **car sharing members use sustainable transport more often and cars less often than the average city or country population.**

Cooperation & technology as enablers

Competitive and innovative business models evolved. Some countries also developed **special legal frameworks** to enable municipalities to better integrate car sharing into mobility strategies. Cooperation with local governments often enable operators to operate with on-street stations, may have privileges for using parking space, integrate car sharing in new housing developments, and facilitate cooperation with local public transport.

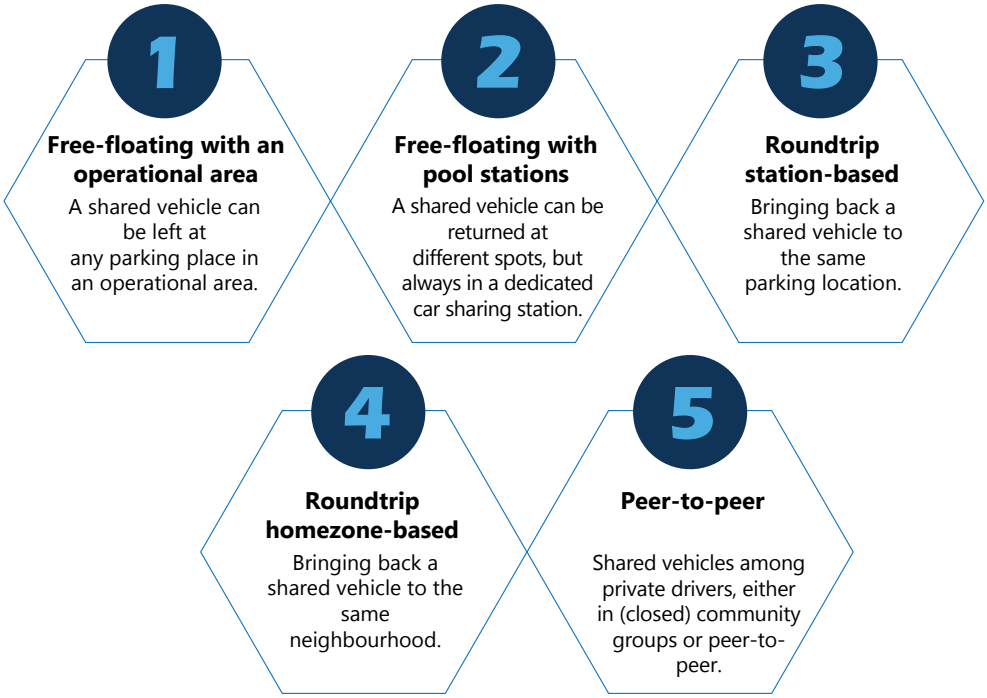
Technology and integrated digital platforms such as **keyless entry and real-time parking options on mobile apps** are tools which might be used by car sharing operators.

Customers require a convenient and reliable service if car sharing shall replace the private car. When car sharing shall serve as a stopgap, it needs a well-developed transport system where you can get around easily by walking, cycling and public transport (which is probably the most important prerequisite for a successful car sharing operation with meaningful impacts).

Further technological developments may disrupt the automobile world and change the way we use cars today to more **Mobility as a Service (MaaS) systems.** In addition, **electrification and autonomous driving** will deeply influence and may boost the car sharing market. The automotive industry is a key player in that field and may change from being just car manufacturers to mobility service providers. Also the digital industry is becoming a major player, not only with information services but as a major player influencing individual decisions in the chain of mobility decisions.

Car sharing models & their impacts

Car sharing services can be categorised into **five types that combine organisations' operational characteristics with different business models.** There is no business model better than others. The model that fits a rural area will not be the same as the one that fits a dense urban area. Likewise, the choice of consumers often depends upon personal preferences while for local authorities, choices depend upon the policy aims. Certain business models will work only on commercial basis in dense urban areas.



Different car sharing forms from different operators may well coexist in the same city, as STARS has shown. Additionally, one operator can organise **a combined offer** using part of the fleet for round-trip and the other part for free-floating services.

There are commercial car sharing companies, some being part of the automotive industry or of car hire companies, but also many medium-sized car sharing operators that developed from grass-roots organisations. Additionally you will find non-profit organisations providing services (mainly in specific small markets).

For car sharing operators, a key concern is **balancing capacity utilisation against the service level offered to users, while financing both investment and running costs** of the fleet. There is a wide range of membership and user fees options to meet varied market requirements.

Car sharing primarily impacts car ownership

There are differences in the impacts of free-floating and of roundtrip station-based car sharing, addressing different target groups and mobility needs. Most free floating operators (especially of the automotive industry) concentrate on larger cities (more than 500 000 inhabitants), whereas station-based car sharing is found also in smaller cities, towns and sometimes even in rural areas. Free floating services usually attract a number of subscribers in a given area of one order of magnitude larger than station-based ones.

STARS carried out a comparative study about car ownership impacts of car sharing. Key results are:

★ Free-floating car sharing alone has little effect on car ownership, mainly either in postponing the purchase of an additional car or in replacing an existing one that was abolished

★ Station-based car sharing: each shared car replaces up to 16 private cars in the German case study

★ Combined car sharing services have positive effects on car ownership

The studies show that combined car sharing offers the reliability of station-based car sharing services on the one hand, and the flexibility of freefloating offers on the other.

1. **High visibility and accessibility** of the service
2. **Reliable service** with option to make prior reservation (ensure that cars are available when needed)
3. **Stations close to demand:** dense station network (no "isolated applications", no non-public systems)
3. **Additionally to (smaller) stations in the neighbourhoods** also large stations with a wide range of vehicles (at public transport hubs, for instance)

How to provide station-based car sharing to replace most effectively private car?

Car sharing impacts mobility habits

Car sharing users are keen public transport users as they own more season tickets and they use public transport more frequently. In addition, car sharing users walk and cycle more frequently and use less a private car. This is especially true for roundtrip users, which perceive car sharing as substitution means of their private cars when other alternatives are not available.

Seamless intermodal travel and multimodal lifestyle requires cooperation between all transport modes with good usability, accessibility and comfort.

Car sharing can reduce emissions

Car sharing fleets are more energy efficient and less polluting than private vehicle fleets and they use more electric vehicles. Substituting private car trips with car sharing trips has therefore an impact also beyond car ownership.

The STARS project built **simulation scenarios for the cities of Turin and Milan:** here car sharing could serve up to 10% of all trips, inducing a reduction of particulate matter (PM2.5) emissions between 2% and 3%. In case of a fully electric fleet, the social costs of the whole transport system due to pollutants and greenhouse gases emissions could decrease between 3% and 4% in these scenarios.

How can the positive effects of car sharing be maximised?

In general, the number of people using shared cars is still quite small. **Free-floating car sharing services** attract many customers but with limited impacts on individual travel behaviours and on the reduction of the number of cars owned.

Roundtrip station-based car sharing attract fewer customers, but with strong positive impacts on individual travel behaviour and on the reduction of the number of cars owned.

Free-floating car sharing can therefore be considered as a possible entry point to the car sharing world, with a function of "market enlarger". Then, free-floating users should be seduced to broaden their view and start using station-based services after that they become familiar with the concept. Gradually this should impact their mobility habits in a positive way.

The best of both worlds might therefore be reached with combined services or the existence of offers of different services with different operators. The STARS project verified that **different forms of car sharing serve different mobility segments** and that they are quite complementary. Benefits of different forms are therefore expected to add up.

	Define your goals	Take up stakeholder views	Define priorities
City politicians	★ Reduction of parking pressure ★ Number of cars per 1000 citizens ★ Reduction of congestion Increase share of "clean" cars	★ Set up structured dialogue between politicians & citizens ★ Structured dialogue with car sharing operators ★ Ensure fair public procurement	★ Integration into SUMP ★ Develop car sharing action plan ★ Learn from best practises
National authorities	★ Reduction of air pollutants ★ Reduction of CO2 emissions ★ National sustainable development goals	★ Set up structured dialogue between politicians & citizens ★ Identify gaps in public transport provisions ★ Structured dialog with car sharing operators	★ Understanding the impacts of car sharing on national clean air and climate goals ★ Understanding car sharing impacts on economy and employability
Public transport operators	★ Additional service to customers	★ Define gaps in service Identify customer needs	★ Plan the offer together with public authorities, car sharing provider and bike sharing provider
Corporate fleet managers	★ Increase use of corporate fleet ★ Design mobility solutions for employees ★ Create a business case including parking ★ Decrease cost per km travelled/cost of ownership	★ Mobility survey on employee demand ★ Integration of corporate fleet use and neighbourhoods mobility demands	★ Reduce cost of mobility and fleet operation ★ Utilization rate of cars
Housing developers	★ Create value by offering attractive neighbourhoods ★ Save money on parking lots Image improvement for car-free lifestyle	★ Clear communication of cost of parking ★ Clear communication to new tenants ★ Talk to authorities, building and housing associations	★ Cost reduction for developers & residents ★ Car free vision in housing projects ★ Define your business model ★ Introduce a network to increase use/offer own fleet

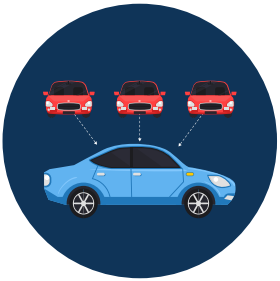
Set the frame	Implement	Review
★ Address car parking and enforcement ★ Set incentives for switching to car sharing instead of own car ★ Make car sharing part of public transport	★ Implement MaaS within the city ★ Engage with media to show benefits for car sharing ★ Make car sharing part or supplement of public transport	★ Measure impacts of car sharing on private car ownership ★ Establish periodic review of mobility services ★ Changes in technology and business models
★ Update legislative framework ★ Explore regular government funding for sustainable solutions	★ Develop a survey on mobility behaviour	★ Establish periodic review of mobility services
★ Tariff integration of new car sharing service	★ Provide public transport pass or package including car sharing ★ Engage with media to show benefits of new model	★ Measure impacts of car sharing operations on utilization of public transport services
★ Set a price for the service ★ Find cooperation with insurance company of car sharing operator ★ Which business model fits best ★ Define role of car sharing ★ Identify conflicts between internal & external use ★ Who manages the car sharing platform	★ Find incentive schemes for sharing cars ★ Educate employees on new services and incentives ★ Ensure access to apps and vehicles	★ Measure impacts of car sharing on utilization of cars and parking ★ Satisfaction level of residents with neighbourhoods
★ Set a price for the service ★ Mobility management becomes part of every development ★ Set requirements like reserved parking space	★ Test with pilot ★ Educate your tenants ★ Advertise your plans Include it into the contract	★ Measure use rate of cars ★ Measure satisfaction rate by survey ★ Measure household motorisation rate ★ Environmental quality of development

What is car sharing used for?

The simple answer from viewpoint of users is "it depends on":

★ free-floating car sharing: mainly for short distance inner urban trips (within operational area). Availability is checked spontaneously.

★ roundtrip car sharing: rather regional trips or planned trips when public transport and bicycle are not sufficient (at night, transport, bulk shopping, going to countryside…).



Reasons to foster car sharing

Core interest of cities is to replace the private car:

★ **municipalities:** reduce the consumption of street space for car parking, reduce congestion and pollution, solve parking problems in neighbourhoods, and supplement the regional general mobility framework.

★ **fleet managers:** reduce costs, increase utilisation rate and mobility solutions for employees.

★ **housing developers:** additional service to tenants, reduction of building costs

★ **public transport operators:** gaining new (season-ticket) customers, addition to public transport service, multimodal service approach for Mobility as a Service (MaaS), and a better image.

Travel behaviour & mobility related choices

In order to offer a serious alternative to owning a car, **daily trips must be possible without a car.** Therefore, a good cycle network and decent public transport should be the backbone of mobility. Such high-quality network of sustainable mobility needs to cover not only a city centre but the larger urban and suburban metropolitan region.

In addition, people (and drivers) are not all equal, and strategies to drive them out of their cars should therefore be targeted to specific groups. The STARS project identified **three main groups of car sharing users and two groups of non users.** They are differing on factors such as their environmental awareness, or the perceived usefulness of cars.

As a consequence, stressing on the environmental benefits of car sharing might entice its use only for a group of people, while pointing to the advantages of using a car without owning it works better for others.

Surveys among users have shown that **two key factors to foster car sharing** are trust, given by the reliability of the service, which in turn is mainly the availability of cars, and the service capability to meet individual travel needs.

Municipalities set a framework for successful car sharing as part of the urban mobility system. They also benefit from the positive effects:

★ **invest in performant public transport** and safe walking and cycling infrastructure

★ **anchor station-based car sharing** as a sustainable solution in your Sustainable Urban Mobility Plan (SUMP)

★ **aim for a suitable mix of car sharing schemes**

★ **invest in on- and offline MaaS**

★ **make citizens and stakeholders aware** of the benefits of car sharing

★ **integrate car sharing in your parking management plan**

★ **include car sharing in more policy areas**

★ **rethink fiscal systems** to better citizens' lives

★ **practice what you preach:** be a car sharing user too!

How to integrate car sharing into your Sustainable Mobility Plan (SUMP)?

★ **Close collaboration between the administration and car sharing service providers is essential.** Therefore, early cooperation should be developed.

★ **Promote car sharing.**

★ **Integrate car sharing stations,** cooperation with public transport, integration in new housing developments as part of SUMPs Sustainable Urban Mobility Plans (SUMPs) or Transport Development Plans (TDPs).

★ **Utilise car sharing as a supplementary measure** in thematic plans such as climate protection and adaptation plans, air quality plans.

★ **Adopt a municipal car sharing action plan** with concrete targets (how many cars do you want to get replaced?, how many on street stations?...).

★ Define quality standards.

Best practise examples

1

Car sharing in old residential districts

Residents enjoy a network of small on-street stations in walking distance to their home for roundtrip purposes. The aim is to reduce the number of cars parked in the street. You can reorganise car parks and reclaim street space for pedestrians and cyclists.

Example: tight network of on-street car sharing stations called 'mobil.punkt' to reduce parking pressure and illegal parking in inner cities (equipped with extended kerbs, bicycle racks and a very recognisable pillar).

2

Car sharing integration into parking management

Car sharing should be integrated into the Sustainable Urban Mobility Plan (SUMP) of cities and considered as a full component of parking regulations. Depending on the impact of different shared mobility solutions, cities can reserve parking spaces or grant parking permits for shared cars. Doing so, cities make the benefits of car sharing very visible for their citizens.

Example: the tight network of small stations to reduce parking pressure and illegal parking in inner cities: Bremen (**mobil.punkt** is a blueprint for integrating car sharing into parking management (example), mobilpunkt Bergen/ Norway (mobilpunkt)).

3

Car sharing integration into housing developments

Residents benefit from lower mobility costs and developers from less need for parking spaces thus considerably reduces construction costs, especially for expensive underground garages.

Example: Mobility Management integral part of residential construction in Munich.

4

Car sharing with corporate fleet

In corporate car sharing, the vehicles belong to the fleet of the respective company. To manage the vehicles, the company uses the software and booking platform of the respective provider. The resulting increase in efficiency leads - depending on the company's usage profile - to a reduction in fleet vehicles by 20 to 30%. Existing pool vehicles can also be retrofitted with car sharing technology. The company then remains the owner of these vehicles and decides for itself which functions and services it outsources to the car sharing provider in order to use its own vehicle pool more efficiently.

5

Local governments share own fleet with citizens and companies

A lot of cities and municipalities own a fleet of cars that are not extensively used. By sharing these cars, local authorities can save money and also offer an extra mobility solution to their citizens and companies. In the long term, a fleet owned by the local government can often also be replaced by the use of vehicles from car sharing organisations.

Example: more than 30 local governments in the Flanders region in Belgium open up their cars after business hours and during the weekend or use shared cars for their business trips. Car owned by the municipality of Brasschaat (Belgium, 38 000 inhabitants) and shared with citizens, using the platform of car sharing operator **Partago.**

6

Cooperation between car sharing providers & taxis

Since car sharing members are more keen on using taxis than non-car sharing users (see Bergstad, C. et al., 2018), synergies between car sharing providers and taxi companies can be interesting for both partners.

Example: GreenMobility, a Danish free-floating car sharing provider, works together with DTM, a taxi company in Antwerp, to deploy their electric shared cars in the Belgian city.

7

Sharing neighbourhoods

The idea behind the Sharing Neighbourhoods project in Belgium is to engage citizens to put their own car aside for one month and to make use of sustainable (shared) mobility alternatives instead. By giving them the necessary guidance and information, the goal is to make participants think about their trips and their car ownership.

Example: neighbourhoods in the cities of **Antwerp, Ghent and Mechelen** joined this challenge.

9 Partners

AUTODELEN.NET CARSHARE BELGIUM

bcs Bundesverband CarSharing

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

Freie Hansestadt Bremen

GM

ICLEI Local Governments for Sustainability

LGi sustainable innovation

POLITECNICO DI TORINO

UNIVERSITY OF GOTHENBURG

If sources are not named directly, this toolbox is based upon the work of the partners within the STARS project. Further information on the outcomes of the project: **www.stars-h2020.eu**

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This STARS project received funding from the Horizon 2020 programme under grant agreement n°769513. The content of this toolbox reflects only the author's view. The European Commission is not responsible for any use that may be made of the information it contains.