



SUNRISE-Guidelines on “Shared Mobility”

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1. What is shared mobility?

“Sharing” is a pre-requisite for transport and mobility: without a “shared” responsibility, financing and use of paths or streets, there would be no mobility, as we need it for business and daily life (image 1). Shared mobility offers from services providers have always been essential for the mobility of people and all kinds of different mobility options have been developed throughout the history: from horse carriages (image 2) to trains, air traffic or the public transport of the cities today (images 3). Despite the importance, usually we do not think about this kind of “sharing.”

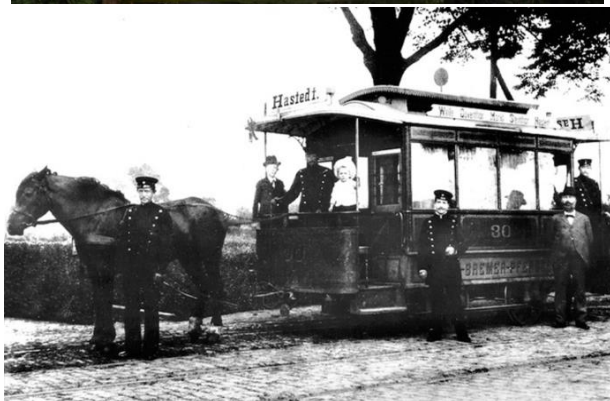


Image 1 (top left): A prerequisite for mobility: Sharing infrastructure – not usually considered as shared mobility; Image 2 and 3 (Bottom): “Conventional” shared mobility in earlier times and today: Horse drawn rail cars in Bremen, Late 19. Century (left) [Source: BSAG] right: Modern low floor bus in Bremen [Source: BSAG]

With ride sharing, taxi-sharing and early forms of car sharing, some precursors of **modern “shared mobility” modes** emerged already decades ago. However, it required smartcards, internet, and smartphones to exploit a wider potential for “shared mobility” as we understand it today. Those “modern” shared mobility options include, for example, free floating or station based car sharing, bike sharing or bus-on demand. The market of shared mobility in various forms is growing rapidly, driven by urbanization, increasing smartphone penetration, growth in internet of things (IoT), growing awareness about the environment and personal health etc. Innovative mobility options, like **e-mobility and mirco-mobility** (e.g. e-scooter/kick-boards) are also offered by sharing services and thus become easily accessible to people. They create new opportunities for flexible and efficient mobility in cities and within neighbourhoods.

The evolution of modern shared mobility has brought up the concept of **“mobility as a service” (MaaS)**. It describes the approach to provide access to various mobility services, such as public transport, car

sharing, cabs etc. in one integrated, digital mobility offering, which can cover all individual transport demands. People can be mobile with a mix of multi- and intermodal mobility options by using a single app for planning, booking and paying a journey. MaaS approaches are applied in a growing number of cities to fully exploit the full potential of shared mobility. The long-term effects are yet to be identified, such as: whether or not MaaS has adverse effects on public transport system or causes rebound effects, which could increase traffic and environmental impacts.

From the viewpoint of sustainable neighbourhood mobility plans – the key subject of SUNRISE – we have to look closely at the potential impacts of the various applications of shared mobility. Looking at a fair and more efficient use of limited street space, a key objective of shared mobility is to give an alternative to car ownership. As the private car is not only a tool for transport but has some deep emotional relationship, we have to consider also aspects of image, convenience and fun.

It is a challenge for cities and neighbourhoods to deal with the new mobility offers, to use the opportunities and to mitigate any adverse effects. The SUNRISE cities want to share their experiences on shared mobility and to contribute to a mutual learning on this topic.

These guidelines cover:

- an introduction of some of the main forms of shared mobility and the different effects they can have on mobility patterns, the environment and the use of street space
- insight about the effects COVID-19 had on shared mobility and possible strategies to reduce them
- recommendations for cities and neighbourhoods.

For additional information on city examples, please see the “Shared Mobility Rocks: A Planner’s Guide to the Shared Mobility Galaxy”, a comprehensive guide for municipalities being published by the SHARE-North project soon: <https://share-north.eu/resources/>.

2. Characterisation of shared mobility options

2.1 Ride sharing: Classical ride sharing, ride hailing, bus-on-demand (ride pooling)

Ride sharing is the traditional forms of shared mobility. A simple definition of ride sharing is “the sharing of car rides by persons to reduce costs and environmental impact” (SHARE-North project). Spontaneous rides become popular decades ago as “hitchhiking.” Later, car pooling agencies offered their (analogue) services to match private drivers with passengers for specific trips (e.g. from city to city). Taxi sharing has always been an option to share informally and/or spontaneously a ride with other people traveling in the same direction or to the same destination. With internet platforms and the use of smartphones, new options emerged that are typically geared at relatively short distances within a city. Today, there are many internet-based platforms to match drivers with potential passengers for the same routes.

Three main options of ride sharing are introduced below:

- **Classical ride sharing**
Rides are shared with people who know each other (neighbours, friends, colleagues) or the driver and passengers are matched through ride sharing software (e.g. Liftshare UK, Blablacar). Classical ride sharing is typically used as a regular commuter alternative or for occasional long-distance journeys (e.g. for leisure or business trips). This classical form of ride sharing has an impact on regional traffic volumes, demands for parking spaces at destination locations, emissions reductions by better use of vehicle capacity.
- **Ride Hailing, e.g. Uber, Lyft and DiDi (operating in Asia)**
The concept of ride hailing has been developed as an alternative to the taxi business, with app-based booking platforms. The locations of potential drivers are shown in real time on the smartphone. The original idea (originating in the USA) is that private drivers offer services in their private cars (normal cars with 4-5 seats). In Europe, the concept of working with private drivers are not allowed – the services have to be offered by professional drivers, car rental companies etc. - in many cases commercial and profit-oriented companies. Thus, the boundaries to classic taxi companies blur and become a great competition to them. However, in contrast to taxi companies, ride-hailing operators are not allowed to park and wait for customers on predefined locations in the cities – and therefore are less visible.
- **Bus-on-demand (or ride pooling), e.g. by MOIA, IOKI, Clevershuttle**
Bus-on-demand services work often with minibuses, to be able to transport several passengers at the same time, with different destinations (images 4 and 5). A dynamic pooling algorithm assigns them to an existing ride. The client is picked up and transported together with others on a completely dynamic route, which is often not the most direct one, due to the various specific pick-up and drop-off locations. However, it is more cost-efficient option compared to normal taxis, if more time-consuming rides can be tolerated.

Ride hailing and ride pooling (bus-on-demand) trips can be booked on a short notice via an app. Relevant booking information, such as the driver's position and arrival time, can be displayed in real

time. The system allows an “evaluation” of the driver and the user after completion of a ride. As the identity of all involved parties is part of the system, there is a relatively high level of safety. Furthermore, women are able to specifically select another female driver to share a trip with.

Ride sharing services can be well integrated into company-based mobility management - to reduce the demand for parking spaces and the number of kilometres driven by several company cars. In the US, such services are often complemented by guaranteed ride home programmes (e.g. by taxi) by the companies in case of unforeseen events such as overtime or when no other mobility options are available.



Image 4 (left): MOIA in Hamburg, ©MOIA;



Image 5 (right): Bus-on-demand generally works with spacious vehicles for more than one passenger ©IOKI

Table 1 summarises positive and negative impacts that can be associated with station-based car sharing.

Table 1: Potential impacts of ride hailing

Potential impacts	
Positive	Negative
<p>For cities/neighbourhoods</p> <ul style="list-style-type: none"> • Offers can complement public transport (e.g. within or to suburban areas) • Bus-on-demand: More efficient use of cars - reducing associated negative environmental impact, less congestion • Future perspective: Driverless vehicles can potentially improve the availability of services and reduce costs <p>For users</p> <ul style="list-style-type: none"> • Future perspective: Driverless vehicles can potentially improve the availability of services and reduce costs • Potentially cheaper than taxi (e.g. shared rides with bus-on-demand) • Flexible “bus” trips, to specific destinations 	<p>For cities/neighbourhoods</p> <ul style="list-style-type: none"> • Currently no financially viable business model; Can increase cost for public transport when, e.g. bus-on-demand is operated by a public transport company • Could reduce the usage of the already traditional taxi and public transport services • Mobility-on-demand: Benefits of shared mobility only become effective with sufficient users (currently: operators often transport only one person at a time) <p>For users</p> <ul style="list-style-type: none"> • Potential safety concerns (in comparison to traditional taxis which start their ride on well illuminated central taxis stands) • In case of bus-on-demand: Increased time needed due other passengers destinations and associated detours (often no direct trips)

2.2 Station-based car sharing (UK: “Car clubs”)

Station based car sharing (or “car clubs” in the UK) is the organised joint use of cars offered by a professional service provider. The car sharing vehicles are distributed within the city at different stations, in reserved parking spots. Users pick up the car at a station and return it after use to the same station. They often can select from different types of cars (also e-cars) which are assigned to the specific stations. The journey with station-based car sharing needs to be booked in advance and can be planned up to several weeks before a trip. This reliability makes it attractive for users who want to get rid of their own car and need a reliable access to a shared vehicle.

Car sharing stations are located either on private ground or on dedicated spots on public space, where the visibility for the offer generally is much higher (image 6-10). In Bremen, for example, car sharing stations are erected on public street space and are planned as mobility hubs (“mobil.punkt”). They host between 4 and 12 cars and offer access to additional mobility forms, like public transport, bike parking facilities, easy cycling and pedestrian access as well as taxi stands (image 6). The smaller hubs (“mobil.punktchen”, with 2 to 3 cars) are typically located at less central spots, within side streets directly in the neighbourhoods, to bring the service closer to the users (image 7). The approach in Bremen has proved to be successful: Today’s car sharing (390 cars) are used by nearly 20.000 users. A recent study shows, that 16 (and even up to 20 in some neighbourhoods) private cars are replaced by each car sharing vehicle offered.¹ Thus, more than 6.000 cars have been taken off Bremen’s roads so far. A similar effect would have costs more than 100 Mio € if Bremen would have invested in underground car parks².

In Germany, some providers of station-based car sharing have begun complementing their fleet with additional free-floating (non-station-based) vehicles. This has the potential to increase the attractiveness of their offer and attract additional costumers. A study has shown, that the effects on the reduction of private car ownership of those “combined” offers is comparable to pure station-based offers³.

The number of station-based car sharing operators with a viable business model is limited. Some offer local services (e.g. *STATAUTO*, *Munich*), others operate nationwide (e.g. *cambio*). The concept often is similar: The operator is responsible for the maintenance and repair of the vehicles. The use of the cars generally is linked to a membership. A wide variety of systems are used for getting access to the cars: from simple key boxes to app-based solutions with GPS positioning. The use of the vehicles is billed via a time or kilometre tariff that includes the fuel costs, or via mixed forms of such tariffs.

Table 2 summarises positive and negative impacts, that can be associated with station-based car sharing.

¹ Team Red (2018): Analyse der Auswirkungen des Car sharing in Bremen

² Senatspressestelle Bremen (2018): Car sharing entlastet Bremer Straßenraum um 5.000 PKW

³ Bundesverband Car sharing (bcs) (2018): Nutzer und Mobilitätsverhalten in verschiedenen Car sharing-Varianten



Images 6 and 7 (top): Station-based car sharing on public space in Bremen: “mobil.punkt” with up to 5 cars (Georg-Gröning-Straßestraße) and one of the smaller car sharing stations with 2 to 3 cars (“mobil.punktchen”), which are situated in side streets in neighbourhoods (Keplerstraße)

Image 8, 9 and 10 (bottom): “Switchh” mobility hubs in Hamburg, providing spaces for car sharing stations (and other mobility offers)

Table 2: Potential impacts of station based car sharing

Potential impacts	
Positive	Negative
<p>For cities/neighbourhoods</p> <ul style="list-style-type: none"> • Reduction of private car ownership and thus reduction of space used for car parking (in Bremen, Germany: 16 private cars are taken off the road -sold or not bought- for each car sharing car (Source: TeamRed, 2018.) • Reduction of car usage and thus less traffic congestion, less traffic induced pollution and noise (Trips with car sharing are more carefully planned, due to (transparent) costs) • Added value from car sharing stations on public space: the implementation of car sharing stations can be used as an opportunity to improve accessibility and walkability: by the building of protruding sidewalks/curbs with the purpose of supporting manoeuvrability for service vehicles and creating barrier free intersections • Station-based car sharing can be part of mobility concepts for housing developments: reduced need for parking space results as contribution to affordable housing and better urban environment • When cars with new drive types (Hydrogen, E-cars) are offered in the fleet, car sharing can help to increase their acceptance and market diffusion <p>For users</p> <ul style="list-style-type: none"> • Reliable and predictable availability, with good accessibility for the user. It can substitute a private car – if not required for daily trips (e.g. for work) • User has access to different car types • Reduces the need for looking for (free) parking spaces (fixed parking spot at the station) • Cost savings (compared to using own car), when user drives less than 10.000 km/year • Time savings (no need to organise maintenance and repair works) • Easy access to new types of drives (Hydrogen, e-cars) • Special parking rights for car sharing-cars – if legislation in places (Example: German legislation) • Combination with other mobility modes at mobility hubs – if station has been design accordingly (e.g. bike parking, bike sharing etc.) • Easy to use (online booking tools, apps, keycard-system etc.) 	<p>For cities/neighbourhoods</p> <ul style="list-style-type: none"> • Often not available in outskirts as operators need a high utilisation rate • Difficult business model – only few providers on the market are profitable • Reduced acceptance from residents (when not informed adequately with marketing campaign) when car sharing stations in public reduce available parking space <p>For users</p> <ul style="list-style-type: none"> • Small flexibility: the car has to be returned at a specific time and can only be prolonged, if not booked afterwards by another user; • Most users book well in advance - less spontaneous availability • Often not available in outskirts as operators need a high utilisation rate

2.3 Free-floating car sharing

Free-floating car sharing is a relatively new service - offering one-way usage of the car sharing vehicles. The cars are provided not at fixed stations, but can be picked up wherever the previous user parked them – which must be within a predefined operational area (images 11 and 12). The locations of available cars are shown in the related smartphone app.

The system does not allow reservations more than 30 minutes in advance. On the one hand, this offers maximum flexibility for the user to do spontaneous trips. On the other hand, a journey cannot be planned ahead, which makes the service unattractive for those who want to rely on the offer as an alternative to an own private car.

In Germany, the free-floating services are offered mainly by companies of the automotive industry. They concentrate their services in only 17 cities (mainly larger cities) – whereas station-based offers are available in more than 800 cities and towns⁴. There are more than 200 station-based providers on the German market as compared to seven free-floating providers. Since 2014, there are more free-floating subscribers in Germany than with station-based car sharing. A total of about 1.5 million free-floating customers (twice as many as station-based).

Compared to station based car sharing, free floating is a very expensive offer. For example, a weekly groceries purchase (2 hours, 10 km) costs about 24€ (station-based: 8,50€) (prices calculated for a compact car in standard tariff)⁵.

Free-floating car sharing is normally used for shorter urban trips (average about 30 minutes/10 km) – which are however longer than with bike- or scooter sharing. Station-based car sharing is used more frequently for longer trips (e.g. outside the city)⁵.

Free-floating alone shows very little effect on private car ownership: every second free-floating customer still has his or her own car – In the case of station-based car sharing, it is only about every 10th customer⁵. Some car sharing operators have started to offer a combination of reliable station-based and more flexible free-floating services. A study has proved that this approach also has strong impacts on private car ownership similar to those of station-based car sharing. In addition, the operator may attract new customers⁶.

Table 3 summarises positive and negative impacts, that can be associated with free-floating car sharing.

⁴ Bundesverband Car sharing (bcs) (2020): Zahlen & Daten

⁵ Bundesverband Car sharing (bcs) (2020): Car sharing in Deutschland 2020

⁶ STARS project (2020): Car sharing in Europe: a multidimensional classification and inventory



Image 11, 12: Free Floating car sharing in Hamburg, Share Now (formerly “DriveNOW”); in Bremen: smumo (by Cambio)

Table 3: Potential impacts of free-floating car sharing

Potential impacts	
Positive	Negative
<p>For cities/neighbourhoods</p> <ul style="list-style-type: none"> Attracts new users to car sharing concept (also to station-based car sharing) If offers are combined with station-based car sharing: reduction of private car ownership If electric vehicles are offered: May support market penetration of e-mobility <p>For users</p> <ul style="list-style-type: none"> Flexibility of use (short-term decisions, no planning needed) High accessibility throughout operating area Possibility to pick up and drop off the car anywhere in the operating area (without fixed stations) 	<p>For cities/neighbourhoods</p> <ul style="list-style-type: none"> Often substitutes public transport trips and thus increases car traffic No reduction of car ownership (as use cannot be planned ahead) Often leads to increased parking pressure in neighbourhoods; free-floating cars can add to existing parking pressure Payment schemes based on payment per minute can increase “wild”/ illegal parking in neighbourhoods Cars of “free-floating” offers are used for illegal street racing in inner city areas (often expensive cars are in the portfolio of free-floating companies) Negative impacts result in a bad reputation for car sharing in general (often press reports do not distinguish between different kinds of car sharing) <p>For users</p> <ul style="list-style-type: none"> No plannable trips, not suitable for substituting private car ownership Only available in larger cities (due to economic decisions of operators) App-based services exclude some user groups

2.4 Peer-to-peer car sharing

Peer-to-peer car sharing (P-2-P car sharing) involves the sharing of privately owned vehicles – traditionally being done among friends and neighbours. Private cars are generally not used efficiently. On average, they are not in use for about 23 hours a day⁷. Therefore, sharing private cars is a smart way to use the resources more efficiently and share costs between the owner and users.

P-2-P car sharing has found a wider exploitation with the introduction of internet and smartphones apps (images 13 and 14). Service platforms offer the framework to bring the parties – owners and users – together, managing bookings and dealing with payments. Sharing platforms also manage the insurance and the availability of roadside assistance for the users. Different to traditional sharing among friends, owners may not know the “borrower”. To offset this disadvantage, P-2-P platforms allow users and owners to give comments on the experiences with each other – and thus create a certain transparency. This may help to overcome the fears of bad treatment to your private car.

Instead of handing over car keys in person, P-2-P car sharing services can offer more convenient options, for example, by installing in-car hardware, which allow vehicle keys to be kept securely in the vehicle (company: getaround). The installation also allows the user to access the car through an app.

The P-2-P approach has an unbeatable advantage: it is not limited to some business area, but works in principle anywhere where car owners are willing to share their asset. Therefore, people can also might find suitable offers in areas without good mobility services (but high car ownership), e.g. in the countryside.

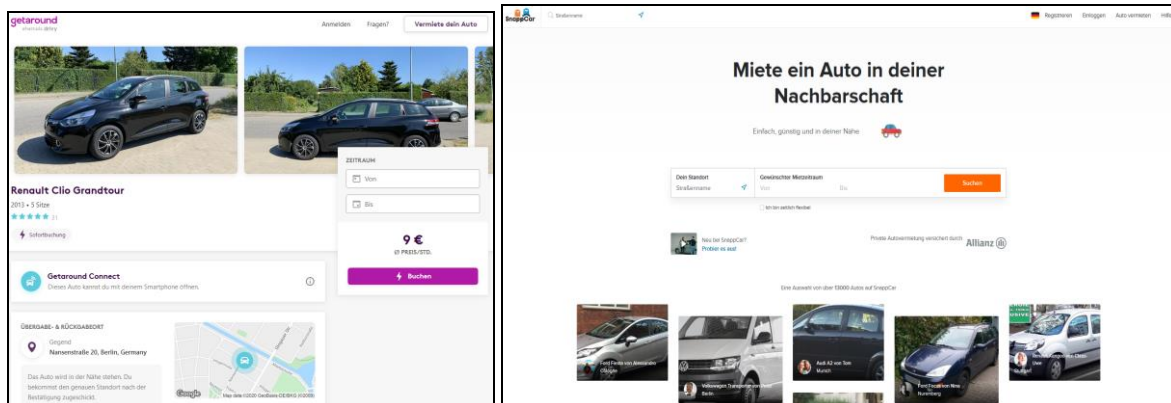


Image 13 (left): screenshot of the getaround-website <https://de.getaround.com/> @getaround;

Image 14 (right): screenshot of the Snappcar-website www.snappcar.de @snappcar

Table 4 summarises positive and negative impacts, that can be associated with P-2-P car sharing.

⁷ Mobilität in Deutschland (MiD) (2017): Ergebnisbericht

Table 4: Potential impacts of Peer-to-peer car sharing

Potential impacts	
Positive	Negative
<p>For cities/neighbourhoods</p> <ul style="list-style-type: none"> • Reduction of private cars (reduced parking pressure) • Sustainable mobility offers for residents in peripheral (or rural areas) which are poorly connected to public transport and/ or free floating car sharing is not available • No associated planning tasks for cities (e.g. providing space for stations) <p>For users</p> <ul style="list-style-type: none"> • Sustainable mobility offers for residents in peripheral (or rural areas) which are poorly connected to public transport and/ or free floating car sharing is not available • Access to a car without ownership (for the ‘borrower’) • Reduced costs for car-ownership (sharing of costs) • High flexibility for usage (short, long trips or regular trips, etc.) • App-based sharing services offer flexible, easy accessible and risk-reduced participation 	<p>For users</p> <ul style="list-style-type: none"> • Certain risks about the quality of the booked cars (need for repair) • Increased use of shared cars lead to increased maintenance and repair costs for the car owner and a reduced lifetime of the vehicle • Owners are involved in managing with results of traffic violations by the user • Reduce flexibility on the choice of cars for special needs (e.g. transporter)

2.5 Bike sharing

Bike sharing systems are well established in many cities worldwide. They provide a convenient and cost effective mode of transportation, particularly for short-distance trips. The experiences show that the bikes are rented by a wide range of users and for many occasions. Citizens use shared bikes to overcome the “last mile” from/to public transport stations (e.g. commuters), to substitute public transport or cars trips or as a flexible option if an own bike is not available.

Bike sharing offers can contribute to an increase of the share of active modes used in a city and, thus, have a positive effect on the environment and the physical health of the users. A citywide bike sharing system can represent the starting point for a wider transition towards bike-friendly cities – like in Paris (Vélib). It can help to have a bike available where the housing stock does not offer parking facilities for private bicycles. Bike sharing is also part of attracting tourists to actively explore the city. The low renting costs make bike sharing very attractive (standard tariff: 1 €/30 min).

Although various types of bikes are used in bike sharing, most of them are standard, gender-neutral framed and pedal-powered bikes. The integration of e-bikes (pedelecs) requires charging infrastructure, which makes the system more expensive. However, especially for hilly areas, electrically supported bikes make the system much more attractive. In addition, cargo bike sharing require more organisational and infrastructural considerations (see chapter 6 about cargo-bike sharing).

Bike sharing schemes can be distinguished between station-based (or “dock” based), free floating and hybrid forms. Station-based services involve a network of “docking” stations where users can pick up and drop off a bike (images 15 and 16). The docks work as automatic locking systems, controlled by the booking app, so that bikes can be rented independently and at any time of the day. Free-floating offers do not involve fixed stations. The bikes are freely available within the area of operation, wherever the last user has parked the bike. An app-controlled locking system is integrated within the bike. Some free-floating operators also offer “virtual” stations, i.e. pre-defined locations that are regularly supplied with bikes that are ready for use (images 17 and 18). Stations help to avoid random parking of shared bikes, which may block sidewalks or green spaces and reduce walkability and barrier free accessibility of the city.

The global bike sharing market has witnessed continuous growth in the past few years and is expected to grow even further. In some cities, the system is owned by the city itself funded by local authorities (e.g. Hamburg), to ensure a good access for all neighbourhoods, not only in inner-city areas. Bike sharing services are also offered by commercial operator alone or in cooperation with the city (e.g. Santander in London). Nextbike is the European leader in the bike sharing market. This company cooperates with local partners (e.g. in Bremen, with the local newspaper, “WK-Bike”). In Bremen, the largest housing company cooperates with the bike sharing operator, to the mutual benefit: all tenants have one 30 min trip /day for free and can be gained as users. Housing company integrates bike sharing into their mobility concepts.

A few years ago, many cities worldwide were flooded by operators with a large number of low-quality bikes, which blocked public areas, many of them ending up littering the environment. This has resulted in negative headlines and discredited a whole sector. Those operators were often not aiming at a sustainable mobility but rather on collecting user data. Cities reacted by implementing

regulations (e.g. Bremen) since they viewed the general public use of street space as overstretched. A clear requirement for an operating permit allows to limit the number of bikes, to define operating areas and ‘no-parking zones’ (e.g. in narrow historic areas, parks etc.). Other organisations have responded with accreditation systems for bike sharing providers (e.g. CoMoUK) or specific tendering procedures to ensure quality and reliable services.

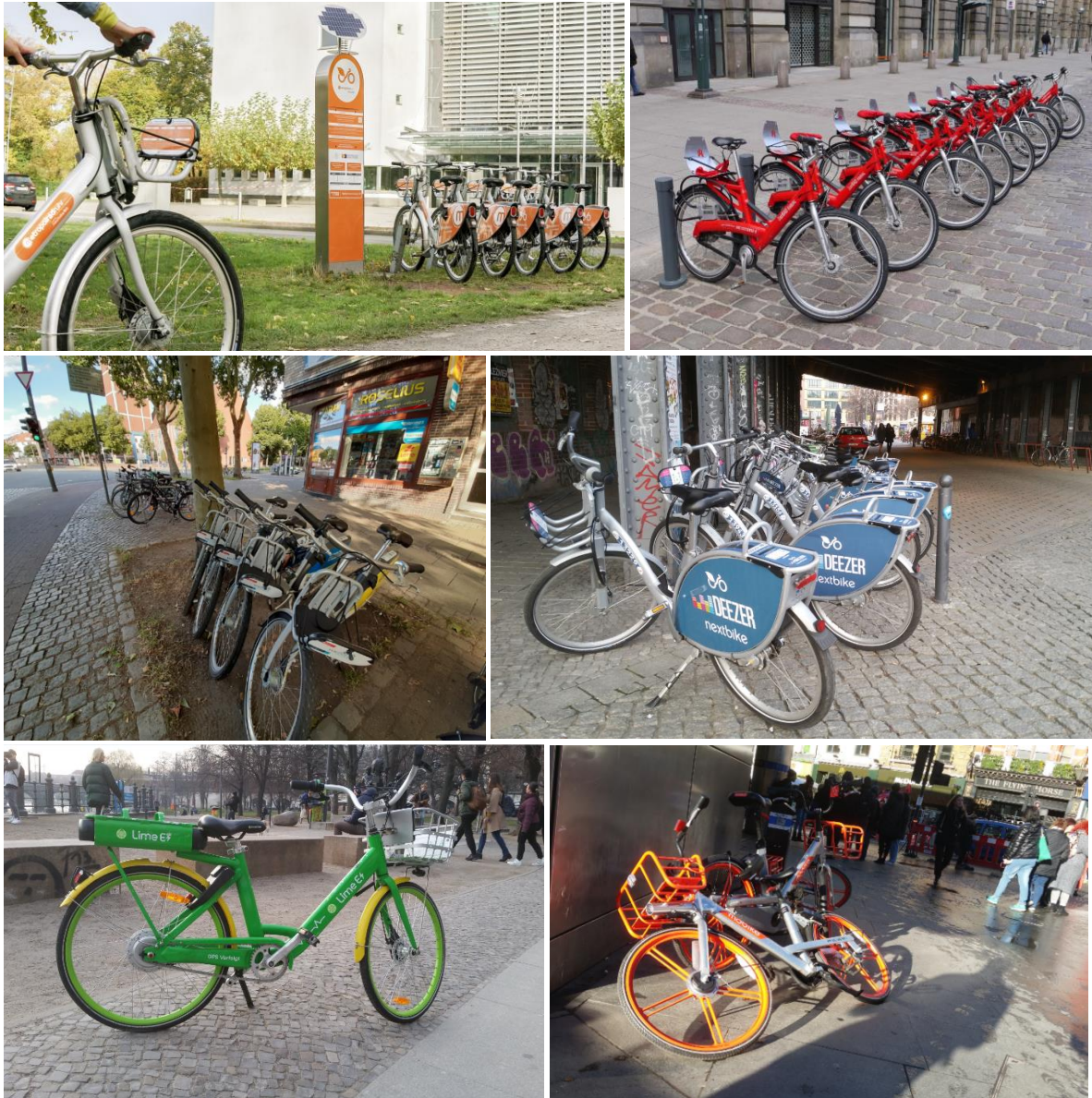


Image 15 (top left): A bike sharing station by Nextbike, with a high visibility, ©nextbike GmbH;

Image 16 (top right): A station of StadtRAD in Hamburg, with locked-in Bikes, ©StadtRAD Hamburg;

Image 17 and 18 (middle): “Virtual” stations by Nextbike(left: in Bremen; right: in Berlin);

Image 19 and 20 (bottom): Shared bikes blocking side walks (left: Lime-Bike in Berlin; right: “mobike” in London.)

Table 5: summarises positive and negative impacts, that can be associated with bike sharing.

Table 5: Potential impacts of bike sharing

Potential impacts	
Positive	Negative
<p>For cities/neighbourhoods</p> <ul style="list-style-type: none"> • Alternative to car use (Less air pollution, less congestions) • Complementation of public transport • Increased number of cyclists increases safety (“critical mass”) • Can be a starting point for a transition to become a bike-friendly city • Increased shared of sustainable mobility modes (decreased carbon footprint) <p>For users</p> <ul style="list-style-type: none"> • Easy and flexible access to bikes if no own bike is available (e.g. on the way home from train station) • Can substitute public transport trips • Low costs compared to other shared-mobility offers (E-scooter, car sharing) or taxis • Positive effects on health condition • Easy and fun way to explore a city (e.g. for tourists) • Increased number of cyclists increases safety (“critical mass”) 	<p>For cities/neighbourhoods</p> <ul style="list-style-type: none"> • Possible “flooding” of shared bikes in cities by operators not focussing on high quality bikes and services but on collecting user data • Possible wild parking on public space (often on sidewalks), blocks space and can represent barriers • Risk of users not following the traffic rules (illegal driving on pathways etc.) • With some service providers: short-lived, cheap products, that have a negative environmental impact <p>For users</p> <ul style="list-style-type: none"> • With some operators: Cheap bikes with low riding comfort • Often only available in defined operating zones (inner city areas)

2.6 Cargo bike sharing

Often, people consider using a car when it comes to transporting heavy or larger items. However, there is an alternative that bridges the gap between the bicycle and the car: cargo bike. They are specifically designed and constructed to transport anything from grocery shopping, bottle crates, toddlers or pets (images 21 to 24). Therefore, cargo bikes are enjoying increasing popularity, both in private use and in business.

There are different types of cargo bikes on the market: with electric support or without, the cargobox in the front or at the back. In case of electric support, the charging needs to be done at specially designed stations or by the “hosts”. To avoid theft of batteries, some special protection is recommended. “Tricycles” may also be offered, off-road bikes or vehicles suitable to transport children or even grown-ups.

Sharing services provide access to cargo bikes for private and commercial users in many cities – some free of charge or at low cost. The operators of some of these cargo bike sharing systems are NGOs, which have non-commercial offers, based on voluntary work and donations⁸. Nevertheless, there are also (specialised) bike sharing operators. In Germany, for example, each of the 72 cities that provide cargo bike sharing have their very own supplier⁸. In Switzerland, cargo bike sharing is offered by only one provider nationwide, the commercially run company “carvel2go”, which operates in 70 cities and municipalities.

Cargo bike sharing systems are typically designed as “station-based” offers, meaning that they have a fixed home location, where you need to pick them up and bring them back, often in specific local shops as “hosts” of the cargo bike. In such cases, access and return must happen during opening hours of these shops. The sharing procedure requires an online registration, where you have to book the bike in advance.

For business applications (delivering goods over the last mile), the cargo bike is proving to be an environmentally friendly, space-saving and congestion-free alternative to the delivery van. For distances of up to three kilometres, cargo bikes and delivery vans reach their destination in the same time. For longer distances (up to 8 kilometres), the bike is only between two and ten minutes slower than a delivery van⁹. Therefore, cargo- bikes are often part of the innovative delivery concept called “micro hub”: small, decentralised storage containers from which goods are distributed into the neighbourhoods.

Table 6 summarises positive and negative impacts, that can be associated with cargo bike sharing.

⁸ Cargobike.jetzt: Städteliste Cargobike Sharing

⁹ Deutsches Zentrum für Luft- und Raumfahrt (DLR) (2019): Travel Time Differences Between Cargo Cycles and Cars and Commercial Transport Operations



Image 21 (top left): Cargo-bike in Hamburg (“Klara”) www.klara.bike, © Volker Hämmerling;

Image 22 (top right): Shared cargo-bike system in Bremen (“Fietje”), ©Burkhard Cordes

Image 23 and 24 (bottom): Cargo bikes “Kasimir” in Cologne, ©KASIMIR;

Table 6: Potential impacts of cargo bike sharing

Potential impacts	
Positive	Negative
<p>For cities/neighbourhoods</p> <ul style="list-style-type: none"> Reduced car usage for private purposes- and associated effects: less traffic congestions, air pollution, noise Reduction of traffic by delivery vans Reduced car ownership and reduced space requirements for car parking <p>For users</p> <ul style="list-style-type: none"> Availability of alternative means of transport for bulky items (e.g. grocery shopping), kids etc. Health improvement by active mode 	<p>For cities/neighbourhoods</p> <ul style="list-style-type: none"> Overloading of the existing cycle infrastructure if not designed for bikes of such dimension Normal bike racks are often not suitable for cargo bikes, so they might block the road space or pavement <p>For users</p> <ul style="list-style-type: none"> Increased number of accidents due to lack of driving experience with a larger bike So far often relatively few numbers available – reduced access Small flexibility - pre-booking required

2.7 (E-) Motor scooter sharing

Moped or motor scooters are worldwide a frequently used mobility option – especially in congested cities (images 25 and 26). Whereas the traditional 2-stroker engines contribute heavily to bad air quality and noise problems, today’s electric scooters are more environmentally friendly. Scooters are easy to use, and allow people to travel on urban roads often faster and more efficiently than by car. As mopeds sometimes are also called “scooter”, it needs to be clarified: In this context, the focus is set on mopeds (Vespa style). Kickboard “scooters” (formerly used from kids but nowadays available as roadworthy e-vehicles) are subject of chapter 2.8.

Motor scooter sharing is a relatively new service that has evolved around 2012 and rapidly gained considerable market share since then. Some offers exist also in smaller towns and in rather rural areas¹⁰, where the shared motor scooters complement public transport and enable residents to be flexibly mobile. The costs vary with each provider. Generally, costs for a short trip are comparable to e-kickboards, renting for a whole day is cheaper than station-based car sharing (Example: “Emmy”, Berlin, 2020: 19 cents per minute, 24 euros per day).

Motor scooters are mostly free-floating offers. Similar to other sharing services, booking and payment is done via smartphone apps. The motor scooter can either be unlocked by the smartphone app or the ignition key can be found in the helmet box. Some provider offer two helmets in the box under the seat, so that an additional person can join the ride (free of charge).

Users must be at least 18 years of age and have a driving licence to drive a car, motorcycle or moped. In Germany, the maximum speed is 45 km/h and the maximum distance for a ride, depending on scooter model, is usually between 50 and 100 km. The batteries are recharged by the motor scooter providers. For this purpose they are collected regularly. The persons responsible for charging these vehicles are often called “juicers”.

It is not an easy business case to refinance costs such as maintenance, personnel costs or app development by renting a motor scooter. Some providers are already off the market. Even the motor scooter-sharing provider “Coup” (part of Bosch), has withdrawn from the market.



Image 25 (left): Motor scooter can easily be located and unlocked by an App, ©Emmy;

Image 26 (right): Shared motorcycle “Stella” from Stadwerke Stuttgart ©Stadtwerke Stuttgart

¹⁰ Example: start-up Share2Move offers electric scooters in Meppen and Lingen in Emsland.

Table 7 summarises positive and negative impacts, that can be associated with e-motor scooter sharing.

Table 7: Potential impacts of (e-) motor scooter sharing

Potential impacts	
Positive	Negative
<p><i>For cities/neighbourhoods</i></p> <ul style="list-style-type: none"> • Less parking space needed compared to cars • Complementation of public transport system for neighbourhoods that are only poorly connected • Can reduce the amount of short car-trips within the city <p><i>For users</i></p> <ul style="list-style-type: none"> • Potentially easy accessible in inner cities and neighbourhoods • Fast way to pass congestions • With some /many offers: 2nd persons can join (free of charge) • Fun factor 	<p><i>For cities/neighbourhoods</i></p> <ul style="list-style-type: none"> • Possible wild parking on public space, e.g. pathways, blocks space and represents barriers • Car-traffic by juicers, who replace the empty batteries in the e-motorbikes by charged ones <p><i>For users</i></p> <ul style="list-style-type: none"> • Risk of accidents for users with limited practice • Minimum age: 18 years

2.8 E-scooter sharing (kickboards)

With the electrification and further development of kickboards, the former “toys” have been transformed to a new mobility option suitable for public streets. E-Scooters/kickboards, which are considered as a form of “micro-mobility”, have entered the market only recently. However, sharing service operators have expanded their offers quickly throughout many cities worldwide (images 27 to 32).

E-scooter sharing systems are often designed as free-floating offers, meaning that they do not have a fixed home location. They can be parked and collected from the next user at random places within a pre-defined service area. Problems associated with random parking of scooters (which creates barriers for pedestrians and other vulnerable road users on pavements, in parks etc.) led to public discussions in many cities about the drawbacks of e-scooters and how undesired effects can be regulated. E-scooters, which have to be recharged regularly, are collected by the operators’ team (so-called juicers) who distribute the vehicles afterwards throughout the city.

The use of e-scooters can be particularly useful for short distances in urban areas. Commuters belong to the typical user group, to travel the “last mile” between home and the nearest public transport station¹¹. In many cities, e-scooters are also used by tourists as an alternative to public transport to explore the city.

With e-scooters in over 50 European cities, the US-companies Lime and Bird are two of the largest suppliers on the market. The largest European operator is the Swedish company Voi, founded in 2018. Besides these, also the German start-ups Tier, Wind and Circ offer their e-scooter fleet in numerous European cities.

The use of e-scooters usually requires the registration with the operator. Booking is done via apps, which display the location of e-scooters ready for further use. E-scooters can be unlocked at a basic rate. Throughout Europe, this unlock fee is about one Euro. On top of the basic rate, users pay a price per minute the e-scooter is used. The prices per minute are around 20 cents per minute. According to a study on shared mobility in Berlin, e-scooter sharing can be regarded as the most expensive option of shared mobility (in Berlin, even for short distances of less than three kilometres¹²).

A prerequisite for the use of e-scooters on streets is the passing of associated regulation, which defines the specific rules for their use. The rules for e-scooter usage and specifications for road approval vary widely across Europe as summarised by ELTIS¹³: A number of European countries (like Italy, Germany, Norway and Sweden) have defined 20 km/h as the maximum speed for e-scooters. Others (France, Belgium and Austria) even allow 25 km/h. The minimum age for driving is, for example, 12 years in France and 14 years in Germany. In the Netherlands, e-scooters are classified in the same category as mopeds, with 16 being the minimum age for driving. Also, the rules where e-scooters are allowed to be driven vary significantly. In Germany, they must use the road or cycling infrastructure and are banned from driving on sidewalks and in pedestrian zones. In France and Italy, it is also allowed to ride such an e-scooter in pedestrian zones with reduced speed. In Spain, riding on

¹¹ Auf der Maur et al. (2019): Shared Mobility – Collaborative Mobility Services in European Cities

¹² Business Insider (2019), after data analysis of Mydealz (2019): Preisvergleich zeigt: E-Scooter von Lime, Tier, Circ und Voi sind mitunter teurer als Car sharing

bicycle lanes that are not equipped with associated traffic signs, is not allowed¹³. Some European countries such as the United Kingdom have no associated regulations in place yet (April 2020). Some additional issues are currently discussed in Germany to further improve the national rules for e-scooters: a mandatory installation of turn signals and the automatic reduction of the maximum speed, for certain areas of the city, at specific times of the day or during city events – based on GPS data.

In Germany, the ‘Small Electric Vehicle Regulation’ (Elektrokleinstfahrzeugverordnung – eKFV) became effective in June 2019 – only since then were e-scooters allowed to be used in public road traffic. As one of the first cities in Germany, Bremen additionally issued an e-scooter regulation which defines specific rules for e-scooter sharing providers on the basis of the “special use regulation of public space” (“Sondernutzungsrecht”). This allows Bremen to steer and control the operation of e-scooter offers in the city. Service providers require a permission to operate in Bremen under strict conditions. For example, only a limited number of e-scooters are allowed and certain areas from operation and parking must be excluded (see also page 36).

Table 8 summarises positive and negative impacts, that can be associated with e-scooter sharing.

Table 8: Potential impacts of e-scooter sharing

Potential impacts	
Positive	Negative
<p>For cities/neighbourhoods</p> <ul style="list-style-type: none"> • Supplement to public transport system, especially in areas/times of low/no service • Potential reduction of the amount of short car-trips within inner city areas • Attractive offer for tourists <p>For users</p> <ul style="list-style-type: none"> • Potentially easily accessible (distribution within in inner city neighbourhoods) No need for a driver license • High fun factor • Fast way to pass congestions • Can be combined with public transport • Not private property (no risk of theft) 	<p>For cities/neighbourhoods</p> <ul style="list-style-type: none"> • Random/disorderly parking on public space: blocking of sidewalks and bike paths, • Parked vehicles are a particular problem for visually impaired people • Additional burden for bike lanes (which are not designed for additionally accommodating e-scooters) • Users not following the rules and provoke accidents (drunk drivers, illegal driving on pathways, more than one person on a vehicle) • Broken vehicles that are littering the environment • Short-lived, cheap products (of some operators) have a negative environmental impact • Car-traffic by “juicers”, who collect the scooters to recharge them • Mainly low-wage jobs involved (“juicers”) <p>For users</p> <ul style="list-style-type: none"> • Risk of accidents for users with limited practice • Risk of accidents in case of rain or on cobblestones • Not suitable in winter (snow) • Safety issues: as no option for indicating a turn • No protection gear available (helmet) • The pre-defined zones for usage/parking are limited to inner city areas • Only usable with smartphone and app

¹³ European Local Transport Information Service (ELTIS) (2019): E-scooter regulations in Germany and France



Image 27 (top left): E-Scooter parked in the middle of the sidewalk – being a potential barrier for pedestrians;
 Image 28 (top right): E-Scooter driving on cycle paths – as required; Image 29 (middle left): E-Scooter parked at a bus station;
 Image 30 (middle right): so-called “Juicer” collecting the e-scooter for recharging (Problem here: blocking the cycle path with vehicle);
 Image 31 (bottom left): Pre-designated parking areas for e-scooter at the main station in Frankfurt;
 Image 32 (bottom right): E-scooter are parked at a “mobil.punkt” in Bremen

3. Drivers and barriers for shared mobility

There are a wide range of drivers and barriers that can support or hinder a successful implementation shared mobility options. The following table (table 9) summarised the main issues, identified by the SUNRISE Consortium.

Table 9: Drivers and barriers for shared mobility

Drivers	Barriers
Mobility Related	
<ul style="list-style-type: none"> Offering “mobility hubs”, which combine different mobility offers (public transport, bike parking) with sharing services etc. No attractive public transport system available, e.g. no sufficient connections, overcrowded busses and trams in the city etc. High quality of sharing service: high number of stations (e.g. for station based car sharing), high number of vehicles, high quality of vehicles, good O&M Larger cities provide a high number of potential customers and make viable business models possible Large operating area, that also includes more remote areas High parking pressure in neighbourhoods: Difficulty of finding a parking place with a private car (increases the attractiveness of other mobility options) Integration of sharing services in housing development, to reduce the need to offer private car parking (can reduce building costs) 	<ul style="list-style-type: none"> Free parking for cars in neighbourhoods, at work (company premises) – makes private car ownership attractive Lack of safety measures for gender consideration: not suitable locations for stations Insufficient offers or service quality from operating companies (low quality vehicles, insufficient maintenance etc.) Risk of vandalism or theft for shared vehicles (high costs) Service is market based: operators finally decide on services offered Negative press about, e.g. car sharing in general – mixing up negative effects of free floating car sharing with station-based car sharing Increase of flexibility in the working world can generate more commuters (who daily need to use private cars) For bike sharing, cargo bike sharing: lack of good cycle infrastructure (bike-lanes, cycle-streets, low speed of car traffic...)
Political / Regulatory	
<ul style="list-style-type: none"> Political support in boroughs and on city level (based on understanding of benefits and chances) Insurance-related simplifications (car sharing insurance that also covers damages caused by the user of the vehicle) Regulations for shared mobility, for steering and controlling the development (which can reduce adverse effects), e.g. Car sharing legislation Shared mobility as part of strategic mobility plans (e.g. Sustainable Urban Mobility Planning SUMP, Actions plans for car sharing etc.) 	<ul style="list-style-type: none"> Regulations can prevent exploratory, innovative offers that are tested in living lab settings Policies are often slow to respond to potentials that the shared mobility market has to offer – public administration often lacks knowledge of market
Economical	
<ul style="list-style-type: none"> Increasing costs for general parking of private cars Higher fuel prices Using the chances of developing a viable business model (cooperation with local partners, using vehicles for placing advertisements etc.) 	<ul style="list-style-type: none"> Service is a difficult business model: often only few providers and making a profit is difficult for most providers Unclear mid- or long-term availability of offers in the city, as business models still often have to prove viability (i.e. often cross-financed, services only for image reasons) Risk of theft and vandalism (economical risks)

Social / Environmental	
<ul style="list-style-type: none"> • Trend towards “sharing” instead of “owning” • Digitalisation: availability of app-based booking tools etc. • Increased awareness for climate and environment protection • Electric vehicles for a sustainable image • Development of “trendy” mobility option with fun factor (e-scooters) • Increasing amount of people living in cities: more traffic, more mobility needs, more need to avoid congestion • Increased desire to re-connect with the community: shared vehicles increase social inclusion 	<ul style="list-style-type: none"> • Often depended on having a smartphone and apps to book a ride (excludes e.g. older people) • Fear of using new types of drives (Hydrogen, E-car) – when only those are offered • Private car ownership stays important for many people (due to status symbol, comfort, etc.) • Missing publicity/knowledge about the service • Cultural differences that make it difficult to share a vehicle with others at a time

4. Shared mobility in times of COVID-19

The evolution of the COVID-19 pandemic in early spring 2020 has severe impacts on the entire transport sector – including the various forms of shared mobility. With the lockdown regulations in many cities in Europe and even worldwide, many reasons for travelling vanished: closed factories, home office, restricted leisure options, very limited family meetings and cancelled vacation travels – all leading to empty streets, empty trains and closed airports. Side effects were reductions in congestion, in transport-related CO₂-emissions and other forms of air pollution and as well in road accidents.

With the gradual release of Covid-19-related restrictions, the number of trips increased again – still not reaching the level of “before”. At the same time, many cities recognise a modal shift away from collective traveling (esp. public transport) to individual modes (esp. private car and bicycle). Many cities saw an increase in walking and cycling, which provided a much-needed push for expanding or establishing cycling cultures in cities. In parallel, structural changes got a push – like the shift in shopping activities from stationary shopping to internet-based e-commerce and related deliveries – accelerating a process of changing downtown areas from shopping districts to more leisure, restaurant and edutainment areas. These parallel processes will lead of a new post-Corona ‘normal’, which will be different from the pre-Corona situation. In addition, changes in employment will have impacts on the transport (and as well housing) sector.

Depending on the type of shared modes, different impacts can be identified¹⁴:

Car sharing:

The reduction in travelling had severe impacts on the car sharing market. The Bremen based car sharing operator cambio had about 50% reduction in trips in comparison to the previous year (see image 33). When leisure activities, family meetings etc. became possible again with some defined limitations, the private use of car sharing increased to some extent – but to some reduced level of “normal”. The use of car sharing in the business sector is still at a very low level, due to the reduced number of business activities¹⁵. Even half a year after the Corona lockdown, physical business meetings (including training workshops, conferences etc.) are extremely limited.

As the business model of car sharing was extremely endangered, some operators that developed from the eco-NGO scene (like cambio in many German cities) asked their users for support. Many users donated money by taking over sponsorships for car sharing stations (paying the monthly fee) or by booking a “solidarity car” – paying for the use of a vehicle that did not physically exist. The high level of donations shows the importance of car sharing for many users: As they do not own a car, the existence of the car sharing service is crucial for their life. Without car sharing, they may need to purchase a car – creating much higher costs than the donations in the Corona crises. It also reflects the identification and connection with operators that arose from the NGO/local action group scene.

¹⁴ Berliner Zeitung (2020): Fahrzeug-Sharing in der Corona-Krise: Eine Chance für die Verkehrswende

¹⁵ Redaktionsnetzwerk Deutschland (RND) (2020): Car sharing: Daimler Mobility erreicht trotz Corona-Krise Vorjahresniveau

Some cities and states in Germany created programmes to support car sharing to ensure that car sharing can further grow to replace private cars. The State of Baden-Württemberg created a special “umbrella program” for stations that were at risk of being closed down due to Covid-19, and new users receive vouchers that are paid by the State¹⁶.

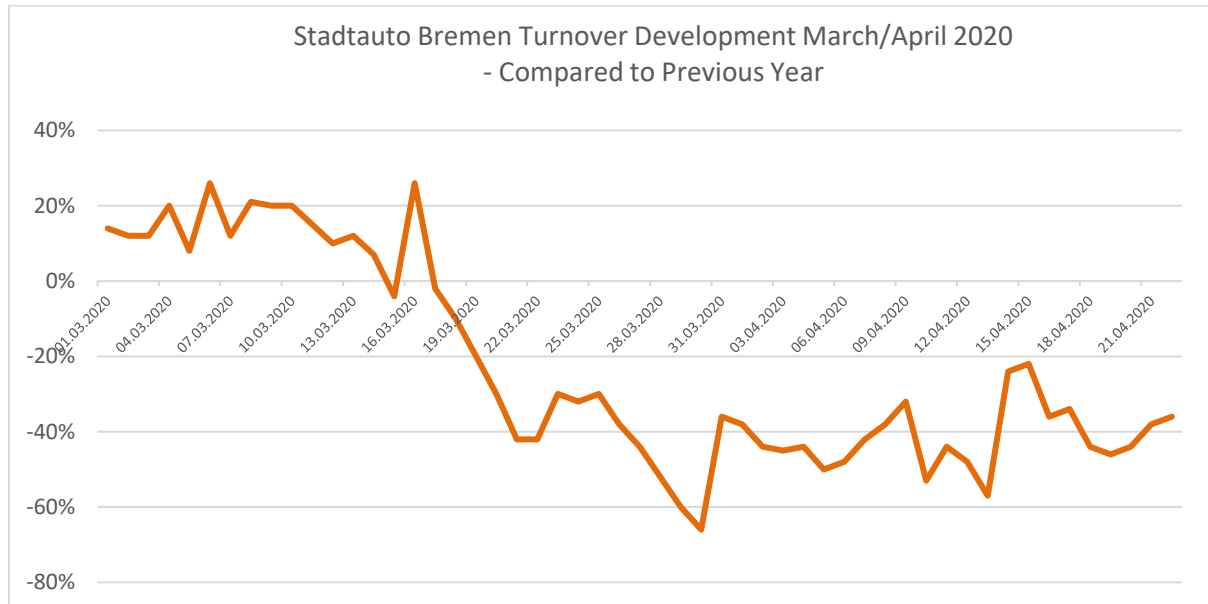


Image 33: Effects of Corona on car sharing in Bremen: Revenue development of the station based car sharing provider “Cambio” in March and April 2020 (Data from Cambio)

No similar activities are known for the big motor-industry-based car sharing operators. They also experience lapses in revenue as a result of the Corona-situation. WeShare (Volkswagen group) announced that they would postpone their extension to further cities to the year 2021- but at the same time reported that usage is back to higher use levels in July 2020 than before the Corona-crisis¹⁷.

To mitigate any infection risks and deal with public concerns, car sharing operators clean their vehicles more frequently and asked users to wipe the steering wheel and gear stick before and after use with disinfectant. Some users prefer using gloves to reduce physical contact to the vehicles.

E-scooter sharing

While some operators stopped all operation during the lockdown period, others offered their scooters for “system-relevant” service persons (e.g. doctors, nurses, emergency services employees). In general, e-scooter sharing providers were also affected by the reduction of travelling – here especially from limitations in leisure activities and tourism. In the period of lifted restrictions, the scooter operators were back also on the streets – claiming that scooter-use guarantees the required social distance on the streets.

¹⁶ Land Baden-Württemberg (2020): Stabilisierungshilfe für Car sharing-Anbieter

¹⁷ Stern (2020): Alles oder nichts: Corona wird zur härtesten Probe der Car sharing-Dienste

Bike sharing / cargo bike sharing

Similar to scooter and car sharing, bike sharing was also affected by the reduction of traveling – but recovered partly with lifted restrictions in summer 2020.

Cycling in general offers a comparatively Corona-safe way of travelling, many cities state that the reduction of transport did not occur at the same level with cycling as with public transport. The demand for bicycles grew with the spread of the Coronavirus pandemic¹⁸. In order to provide better cycle infrastructure, local authorities created pop-up bike lanes during the Corona crisis. As in the fuel price crisis of 2008, during the Coronavirus pandemic the mode of cycling proves to be a very resilient mode of transport.

For further mobility planning, it is obvious that cycling has a huge potential that must be exploited. Safe cycle infrastructure must not only include bike lanes but must also include parking facilities for bicycles. It all requires street space: the Corona situation may support policies of re-allocating street space from the car to the sustainable modes. Shared services for bicycles and cargo bikes will support such strategies – but may require support by local authorities (esp. in dedicating space for stations).

¹⁸ Radmarkt (2020): ECF und Corona: Daten bestätigen massives Radverkehrs-Wachstum

Public Transport

The reduction of trips and the fear of infection hit public transport sector extremely hard. The amount of passengers dropped in some cities by 90%¹⁹. Services were reduced in order to have enough operating staff available in case of infections. In Germany, like in some other countries/cities, passengers of public transport are required to wear a mask covering their mouths and noses.

Despite intensified cleaning and masks, numbers of public transport passengers (and related revenues) are still far below the previous ‘normal’. For Bremen, it is expected that the necessary public funding for the public transport operator will have to be increased by about 20 – 35 million €²⁰ to make up for losses as a result of reduced passenger numbers.

Ride-hailing/taxi

The wider taxi business still suffers under the reduction of travelling – especially the reduction in business trips.

Due the low level of demand, the ride-hailing operator MOIA stopped operating in Hamburg temporarily and revised its concept by reducing the number of passengers allowed in vehicles. Of course, such capacity reduction affects the business model severely.

Already before the Corona crisis, the vulnerability of the business concept became obvious when the operator Clevershuttle (using electric vans) stopped operation in Hamburg, Frankfurt and Stuttgart. With the Corona crisis, operation has also been abandoned in Berlin, Dresden and Munich due to “economic reasons”.²¹

“Berlkönig”, a publically co-financed operator in Berlin (in conjunction with public transport and ViaVan), offered their capacity during the lockdown period to “system-relevant” workers in the health sector. The four-year contract with the city of Berlin will terminate in 2022 and the future is currently unsecure despite taking the higher demand of public funds for regular public transport operation into account.

¹⁹ Mobilité (2020): Corona: Was jetzt zu tun ist, damit der ÖPNV wieder an Bedeutung gewinnt?

²⁰ Buten un binnen (2020): BSAG verkauft nur halb so viele Tickets

²¹ Auto Motor Sport (2020): Aus in Berlin, Dresden und München

5. Recommendations

How can cities and neighbourhoods exploit the benefits and mitigate the risks of new forms of shared mobility?

The following recommendations can be drawn from the experiences of the SUNRISE consortium and can be valuable for other cities and neighbourhoods:

1. Capacity building –
Increasing knowledge on shared mobility in administrations and with decision-makers
2. Strategic planning –
Integration of shared mobility as part of the city’s mobility strategy
3. Facts and images –
Measuring and evaluating shared mobility effects
4. Defining the rules –
Development of a regulatory framework for shared mobility
5. Informing the public –
Marketing and information campaigns
6. Involving the public–
Considering participating options
7. Understanding the impacts-
Monitoring how the “sharing” is working in practice – getting and giving feedback –adjusting rules and conditions if necessary
8. Risk mitigation –
Supporting operators of shared mobility in the times of COVID-19

The recommendations are explained in detail in the following pages.

1.

Capacity building**– Increasing knowledge on shared mobility in administrations and with decision-makers**

Shared mobility in various forms will increasingly change mobility of cities and within neighbourhoods. Therefore, building up knowledge about innovative concepts and new players, the options how to regulate and steer developments, how to reduce potential negative effects and how shared mobility can contribute to a more sustainable mobility in cities and neighbourhoods, is essential for members of administration and decision-makers. Targeted capacity building is therefore required.

A suitable way is to exchange experiences with other cities and to learn from best practices examples, e.g. by

- Site visits and excursions to other cities, with members of the administration, decision-makers or other stakeholders (images 34, 35, 37)
- Invitations of external experts to shared their experiences from their cities within discussion events or seminars (image 36)
- Participation in European projects on sustainable mobility and shared mobility, either as partners or as “associated partners” or “up-take” cities, where a direct exchange between cities and neighbourhoods is facilitated (image 38)
- Participation webinars offered by e.g. European projects on sustainable mobility and shared mobility (SHARE-North, Civitas Framework, ECOMM) (image 39)



Image 34 (top left): Onsite exchange on car sharing in Bremen, with colleagues from the Cologne Traffic Authority;

Image 35 (top right): Site visit to Cologne, organised with SUNRISE (Bremen); Image 36 (bottom left): Public discussion with external experts in Bremen; Image 37 (bottom right): SUNRISE Bremen and local stakeholders in Hamburg – to exchange on sustainable mobility

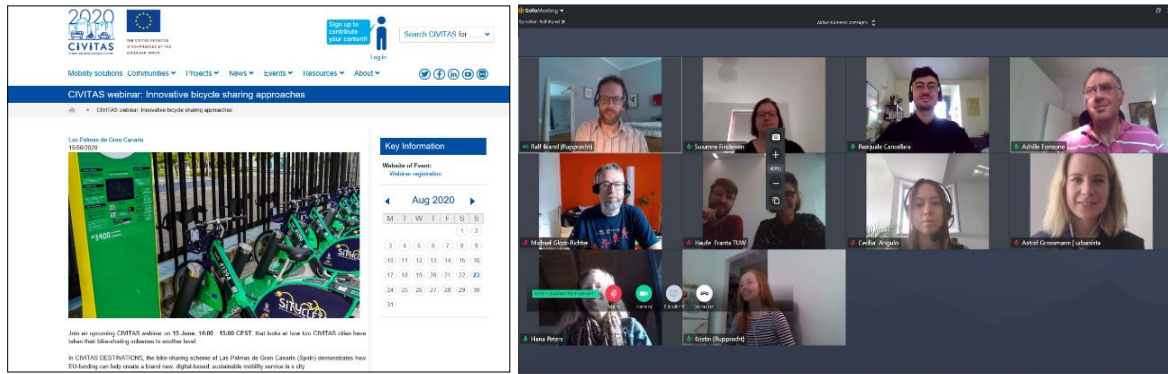


Image 38 (left): CIVITAS webinars on shared mobility – open for the public;

Image 39 (right): Online-Meeting within the SUNRISE Consortium, to exchange on sustainable mobility

2.

Strategic planning –

Integration of shared mobility as part of the City’s mobility strategy

Shared mobility should be a strategic element of a city’s sustainable urban mobility plan (SUMP) and ideally of its neighbourhood equivalent (SNMPs), as it can be a relevant element to reach set aims.

Strategic planning of shared mobility should consider the different effects the individual shared mobility modes can have:

- Shared mobility can **reduce the number of cars trips** (e.g. bike sharing) within a city and thus reduce pollution and congestion. This is also true for car sharing, as users generally plan trips more consciously (car use becomes a rational decision, not an automatic one).
- Some shared mobility modes, like bike or e-scooters sharing can **complement and thus increase the attractiveness of public transport**.
- Station-based car sharing (also in combination with free floating offers from the same provider), peer-to-peer car sharing and cargo bike sharing can **represent alternatives to private car ownership (see table 11)**: Those who do not need a car regularly (e.g. for commuting to work) might find those offers attractive alternatives to owning a car for occasional trips. **This effect is particularly valuable for neighbourhoods, as less private cars parked in the streets means more space for walking, cycling or playing.**

Strategic plans for shared mobility could contain the definition of, e.g.

- Dedicating space for stations
- Quantitative targets for specific shared mobility options
- Intermodal approaches by planning mobility hubs (decentralised or centralised)
- Coverage of city neighbourhoods
- A potential role of the city as a service provider (e.g. bike sharing offers together with public transport).

Table 11: Effects of shared mobility modes on private car ownership

High effects: can reduce private car ownership	Low effects on the reduction of private car ownership
<ul style="list-style-type: none"> • Station based car sharing • Combined station-based + free-floating car sharing • Peer-to-Peer car sharing • Cargo bike sharing 	<ul style="list-style-type: none"> • E-Scooter sharing • Free-floating car sharing • Bike sharing • Motor scooter sharing • Ride hailing/bus-on-demand

Examples:**Bremen's Car sharing Action Plan (2009):**

- 20.000 users by the year 2020
- 6.000 fewer private cars on the streets (getting rid of private cars due to car sharing)
- Improved visibility of car sharing stations (“mobil.punkte”, “mobil.punktchen”)
- Market access for all providers in order to achieve more competition and additional innovation

Bremen's SUMP (“Verkehrsentwicklungsplan 2025”) (2014)

(images 40 and 41)

– includes strategic plans and aims for car sharing to reach Bremen's aims to reduce car traffic and ownership:

- to extend station based car sharing offers at mobility hubs on public space (“mobil.punkte”, “mobil.punktchen”)
- to further include areas outside the inner city areas in the planning of car sharing stations
- to include e-mobility in car sharing
- to integrate car sharing in housing development projects



Image 40 and 41: SUMP Bremen (“Verkehrsentwicklungsplan 2025”), which integrates shared mobility as a strategic element

3.

Facts and images –

Measuring and evaluating shared mobility effects

It is recommended to regularly evaluate the effects of shared mobility and collect qualitative and quantitative data on each mobility form offered in the city. This is a basic requirement to identify the benefits and problems of the options, to understand user needs to be able to develop targeted offers and solutions, and identify and understand drivers and barriers. The findings are vital to set realistic targets and develop strategies. Furthermore, facts and images on shared mobility need to be communicated to the public and decision-makers to safeguard acceptance and support.

The effects of shared mobility should be analysed through user surveys that are carried out by the service providers themselves as well as through independent research institutes. A valuable example is the study “users and mobility patterns with different car sharing types”, by BCS Bundesverband Car sharing e.V., 2018: The study shows that station-based car sharing (also in combination with free-floating offers) has the effect that the number of private cars are reduced significantly; this effect cannot be observed with free-floating car sharing alone (images 44 and 45)

Information worth investigating is, among other things:

- Number of users, frequency of use
- Change of mobility patterns of users due to the shared mobility options (reduction of car trips, etc.)
- Reduction of car ownership by shared mobility options
- Factors which attract users (e.g. service quality, proximity to station/ vehicle)
- Comparison of effects of different shared mobility options
- Problems associated with the use
- Contributions to social equity and accessibility (needs of different user groups)

Example: “Study on the effects of car sharing in Bremen”, by teamred Deutschland 2018
(image 42 and 43)

- Each car sharing car replaces 16 privately owned cars in Bremen
- Main factors which make car sharing in Bremen attractive to users
 - Short distances to the next station
 - Availability of the vehicle at the desired time

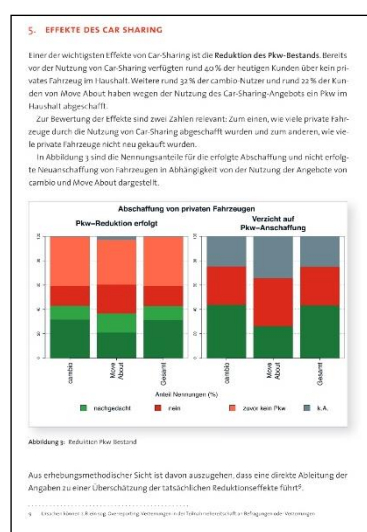
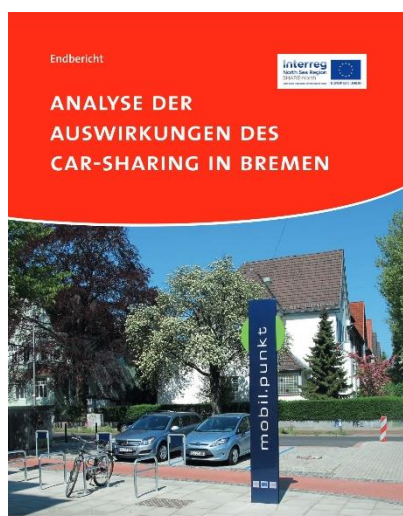


Image 42 and 43: Study on the effects of Car sharing in Bremen, by teamred Deutschland, 2018

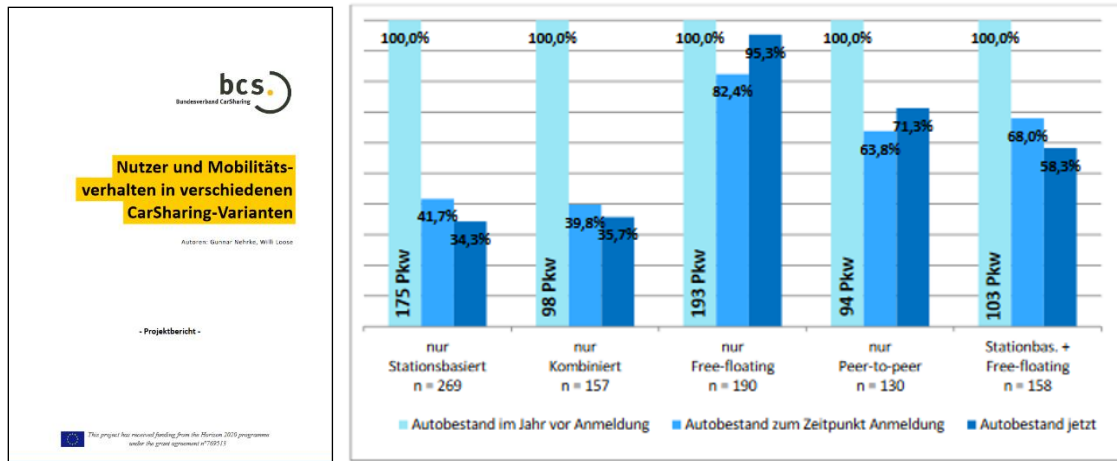


Image 44 and 45: Study “users and mobility patterns with different car sharing types”, by BCS Bundesverband Car sharing e. V., 2018 – the study shows that station based car sharing (also in combination with free floating offers) has the effect, that the number of private cars are reduced significantly; this effect cannot be observed with free floating car sharing alone.

4.

Defining the rules –

Development of a regulatory framework for shared mobility

Shared mobility is a great opportunity for cities and neighbourhoods to change mobility habits of citizens for the benefit of sustainable travel modes and to reduce the number of privately owned cars. However, the new mobility options must be regulated in order to reduce unwanted negative impacts and to steer the development. Therefore, it is recommended, to issue specific local regulations. They could encompass:

- the definition of areas of operation for free-floating offers
- the exclusion of specific areas, where driving and/or parking of vehicles is forbidden (e.g. e-scooters in parks, pedestrian zones) (image 46)
- the definition of rules parking rules in residential parking zones
- the definition of the maximum amount of vehicles allowed to be distributed in the city area by each private operator
- criteria for minimum operational service (e.g. to remove broken or wrongly parked vehicles within a given time)
- criteria for private service providers
- environmental and quality standards for vehicles provided



Image 46: Budapest – Various forms of (shared) mobility are forbidden in pedestrian zones

Also, criteria can be defined within the tendering of the operation shared mobility services, e.g. car sharing stations /mobility hubs on public ground. For example, the obligation can be defined, to combine offers on high profitable inner city areas with offers in more remote neighbourhoods in the city.

Example: Bremen’s e-scooter (kick-boards) rules (2019)

Bremen was the first German city to define specific rules for e-scooter sharing providers. Permissions for providers were granted on the basis of the “Special use regulation of public space” (“Sondernutzungsrecht”):

- a limit of 500 vehicles per provider
- a pre-defined area where drivers are allowed to drive and scooters can be parked
- defined zones, where parking is prohibited (e.g. parks)
- a local contact person, who can intervene in case of problems
- the permit for the suppliers is limited to only one year
- in cases of non-compliance, the operation permits can be withdrawn.
- at least the minimum wages have to be paid by the operator.

Example: Bremen’s car sharing regulation (2009)

- Car sharing providers must tailor their range of services so that they contribute to a reduction in the need for parking space in the neighbourhood (minimum replacement rate of 1:6).
- Within the limits of available capacity, car sharing providers grant an entitlement to participate on a non-discriminatory basis to every adult person with a valid and presented driving licence for the corresponding vehicle
- Setting quality standards for operators who want to provide car sharing at on-street stations
- Holders of season or discount tickets for public transport should be granted discounts
- Information on environmentally friendly and low-noise driving should be made available to customers by car sharing providers through their website or other suitable information material

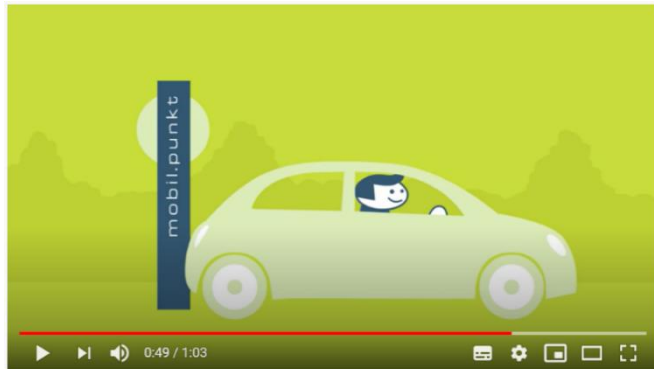
5.

Informing the public – Marketing and information campaigns

Today, in the light of environmental and climate protection movements, which is driven particularly from young people, the approach of “sharing instead of owning” is quite popular among some target groups. However, shared mobility is a new to many citizens and needs to be explained: People get access to new vehicle types they have not used before (e.g. e-scooter/kickboards), they have to become acquainted to new procedures and new rules to obey (where driving is allowed, how vehicles can be parked etc.). Furthermore, the public is confronted by additional mobility forms on the streets with which they must share the street space. Some notice initial negative impacts, e.g. shared bikes or scooters blocking sidewalks. The overall strategic benefits of shared mobility are often not known by the general public and have to be explained. Regular information also needs to be provided to frequent users: for example, updates about new services, new stations, costs, new regulations etc.

The implementation and operation of shared mobility or specific mobility services should be accompanied by marketing and information activities, which could include

- Marketing campaigns (e.g. corporate design, flyer, website, on-street advertisements, postcards, etc.) (images 47 to 49)
- Articles, Interviews in local newspapers
- Presentations at events, e.g. explaining shared mobility and the approach of the city
- New residents campaigns, to introduce shared mobility (images 50 and 51)
- Campaigns on shared mobility “testing” (e.g. summer fleet, Berlin) (image 52)
- “Test rides” events for e-bikes, cargo bikes etc., e.g. at local festivals
- Neighbourhood specific information (images 53 and 54)



Images 47, 48 and 49: UDO campaign Bremen (“Use it, don’t own it”) for Bremen’s car sharing approach “mobil.punkt”, “mobil.punktchen”: on-street advertisements, set of postcards, video, etc.

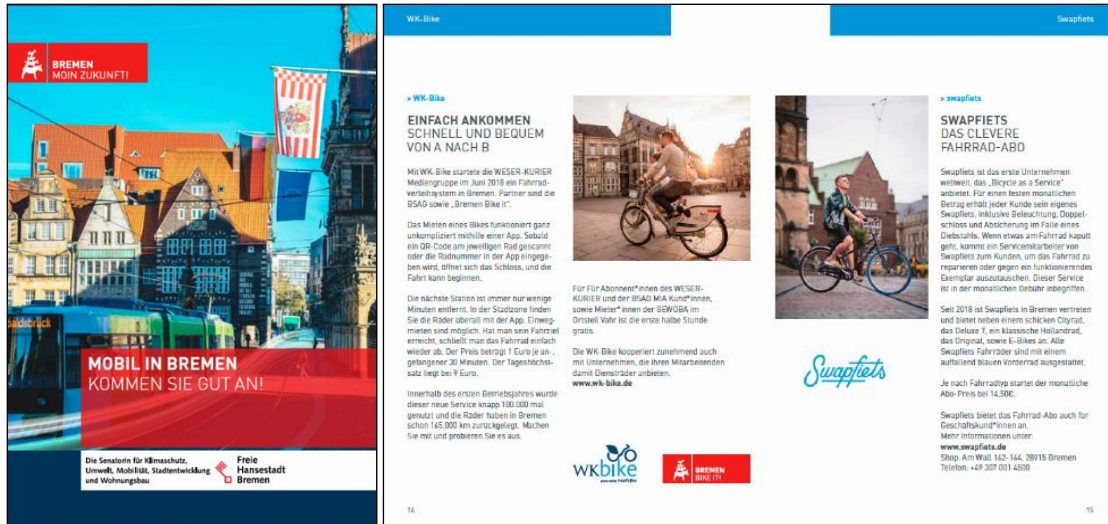


Image 50 and 51: Mobility campaign in Bremen (here: brochure) for new residents of Bremen, introducing public transport, shared mobility options etc. (Being new to a city or neighbourhood can be an opportunity to change mobility behaviours)



Image 52: Summer fleet campaign by BMW, Berlin (“Sommerflotte”): Interested persons can “test” shared mobility options for months in turn of handing out their car key. © Neue Mobilität Berlin; <http://neue-mobilitaet.berlin/summer-fleet-2019?lang=en/>



Images 53 and 54: Brochure for the SUNRISE neighbourhood, including information on specific on shared mobility services in the neighbourhood

6.

Involving the public– + Considering participating options

Involving the public in the planning and implementation of shared mobility can increase acceptance, can lead to a wider usage and even to additional offers.

The following options are possible:

- The joint selection of new locations for shared mobility stations (e.g. car sharing stations / mobility hubs on public space), together with residents and stakeholders of the neighbourhoods) (image 55)
- The joint suggestion of “virtual stations” in the neighbourhoods, where shared bikes or scooters are regularly provided to by the service operator (without offering a fixed lockage system)
- Non-commercial, low-threshold offers (e.g. cargo-bike offers) can be hosted by local shop owners, acting as “stations” for cargo-bikes, where the bikes are stored at night and can be collected from (image 56)
- Neighbourhood initiatives (small scale peer-to peer sharing networks) can be supported



Images 55: On-street participation activity in Bremen: visiting and finding new locations for car sharing stations;
Image 56: Local shop owners in Bremen act as stations for cargo bike “Fietje” (here: Oecotop)

7.

Understanding the impacts –**Monitoring how the ‘sharing’ is working in practice – getting and giving feedback –adjusting rules and conditions if necessary**

As it is not easy to forecast the impacts of new services of shared mobility, all involved players – including public authorities – need to be open for adjustments. The examples of bike sharing and e-scooter sharing show that adjustments of the regulatory framework was necessary to avoid unwelcome side effects. It requires some kind of monitoring what is going on in our streets, what is the feedback of citizens, stakeholders, neighbourhood committees etc.

It might be wise to rather carefully start and set some limitations in order to avoid that the new service got some negative connotation by citizens (as happened in some cities with bike sharing and as well with e-scooter sharing).

It is also helpful if operators and public authorities have some exchange about problems and ways to reduce such problems – and as well about exploiting a wider potential when impacts prove to be positive.

8.

Risk mitigation –**Supporting operators of shared mobility in the times of COVID-19**

The evolution of COVID-19 pandemic in early spring 2020, with the resulting lockdown regulations and safety approaches, had significant effects on the whole transport sector, the mobility of people and on shared mobility – as described in chapter 4. Especially in the first phase of the lockdown, the business models of shared mobility providers have been seriously endangered, e.g. from station based car sharing providers. It is still unclear how the pandemic develops, how long constraints need to last and how the “new normal” of mobility patterns will look like in the pre-COVID-19 phase.

Therefore, it is recommended for cities to consider the support of shared mobility operators, especially when they have a relevant role in the sustainable mobility strategy of the city, e.g. to replace private cars.

The following examples show how cities can support shared mobility in times of COVID-19:

- Reduction of fees normally to be paid from shared mobility providers to the city (e.g. for the use of public space for car sharing stations)
- Joint communication of the safety of shared mobility (on the basis of existing hygiene concepts for shared mobility providers)
- Specific financial assistance programmes to support sharing providers
- Programme of the city to pay for shared mobility vouchers, to gain new users(to keep users)

- Creation of pop-up bike lanes, in order to provide a better cycle infrastructure in the times of COVID-19, when individual mobility (e.g. cycling) increased, so that also local bike sharing operators can benefit.

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