Photo: Jung

Fewer cars, more mobility

Can carsharing work in China?

Mass motorization, urban traffic, air pollution, parking management

In response to China's rapidly increasing vehicle population, the first carsharing operators are entering the Chinese market to complement the range of alternatives to car ownership. From the emergence of such services in 2009 until today, more than 330,000 people signed up for a carsharing membership in China – equivalent to almost one third of the total number of carsharing members in Germany, one of the world's largest carsharing markets. Considering that carsharing in China is still in an embryonic stage, its dynamic development indicates potential for further growth. Nevertheless, public and political awareness of carsharing is low, and uncertainties related to the feasibility of large-scale applications remain.

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Although China became the world's largest automobile market in 2009, its level of motorization is still comparatively low. With about 69 private passenger cars per 1,000 citizens, there is a significant disparity in car ownership between China and developed countries such as Germany (588 cars per 1,000 citizens) and the USA (786 cars per 1,000 citizens) [1]. Rising car ownership in China is very much an urban phenomenon, concentrated mostly in Chinese megacities and metropolitan regions. While here, the expansion of the automotive market has been a major driving force for the economy, serious climate and environmental concerns have cast a shadow on this development. Severe air pollution, inefficient land use, tremendous congestion levels, increasing parking demand and road accidents are among the negative effects of the unprecedented growth over recent decades.

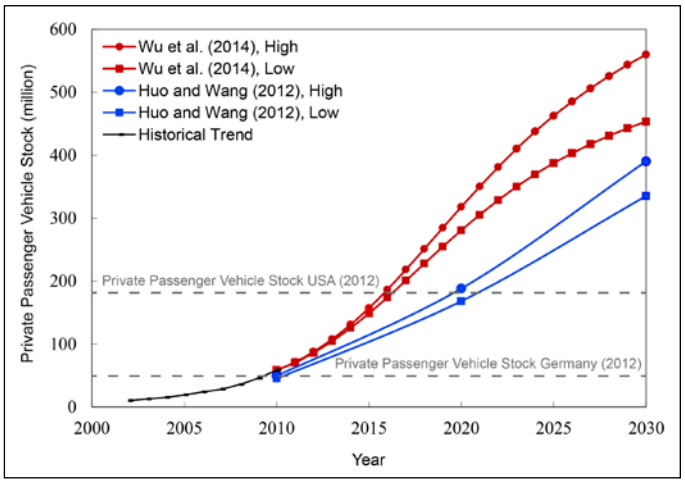

Figure 1: Private passenger vehicles in China: Historic data and projection until 2030
Source: Wu et al, 2014

Mass motorization in China: no end in sight

China's level of urbanization is expected to rise from the current 53.7 % to 60 % in 2020 [2]. Paired with continued economic growth

and increasing per-capita income, urban mass motorization is unlikely to halt anytime soon. Recent projections of the School of Environmental Studies at Tsinghua University, one of China's leading academic institutions, forecast a four- to six-fold increase in the number of private passenger vehicles by 2030 (*figure 1*). This would add between 250 and 450 million cars to the already clogged streets in Chinese cities.

The expected effects of continued mass motorization are daunting and exacerbate the pressure on Chinese city planners and political decision makers to provide livable urban environments. Consequently, various Chinese megacities have already introduced restrictions on private car ownership, such as driving ban days and license plate limitations. Nevertheless, additional demand-based strategies are necessary to persuade urban residents to adopt more sustainable transport modes, and to slow down or ideally prevent a further rise in private car ownership in the mid- and long-term.

Carsharing – booming throughout Europe and North America, but largely unknown in China – could tie in with China's already existing urban transport policies and complement a broader strategy aimed at mitigating the rapidly increasing motorization in cities. The integration of carsharing in urban transport can help reduce private car ownership, while meeting the demand for individual mobility. Moreover, carsharing users tend to shift their mobility behavior towards public and non-motorized transport modes, which contributes to a reduction of vehicle kilometers traveled (VKT). Experience in Europe suggests that each carsharing vehicle will replace four to ten private vehicles, and carsharing users usually reduce their VKT by 28 % to 45 % [3].

China's carsharing market in numbers: absolutely impressive, relatively small scale

While carsharing is gaining more and more international attention, the availability of carsharing in China is still limited and its impact on urban transport is barely quantifiable. Among a total of eight station-based carsharing companies in 2015, Yi Dian Zuche is currently the largest Chinese carsharing service. In 2009, the company pioneered carsharing in China with ten shared cars and five stations in Beijing. Since then, Yi Dian Zuche has expanded its service to nine other Chinese cities, offering a total of 1,000 vehicles to almost 280,000 registered members. As of April 2015, the overall size of the Chinese carsharing market is about 336,000 members, who share 4,915 vehicles at 1,018 stations in 13 cities (table 1). Compared to the size of the European or North American carsharing market, these are certainly impressive numbers, but in relation to the populous Chinese cities, the services are still operating on a small scale. Nevertheless, the momentum of Chinese carsharing activities in recent years does not only spark the interest of domestic companies. Besides two corporate carsharing pilot projects initiated by Daimler and Volkswagen,

Service	Operator	Founding year	Business model	Vehicles	Stations	Members	Cities	Website
Yi Dian Zuche (EduoAuto)	EduoAuto (Beijing) Technology Co., Ltd	2009	Station-based carsharing	1000	769	278419	Beijing Changsha Chengdu Chongqing Hangzhou Nanjing Shenzhen Shijiazhuang Suzhou Wuhan	www.yidianzc.com
China Car Clubs	Hangzhou Cherry Intelligence Co. Ltd.	2010	Station-based carsharing	200 (incl. 50 EV)	78	38000	Hangzhou (Membership cooperation with Green Go in Beijing)	www.ccclubs.com
car2share	Daimler Greater China Ltd.	2013	Station-based corporate carsharing	90	3	Membership limited to pilot partners during initial phase.	Guangzhou Shenzhen	www.car2share.daihing.com
VRent	Volkswagen New Mobility Services Investment Co., Ltd	2013	Station-based corporate carsharing	25	5	Membership limited to pilot partners during initial phase.	Beijing	www.vrent.cn
Wei Gong Jiao	Zhejiang Kandi Electric Vehicles Co., Ltd. (Joint Venture of Zhejiang Geely Holding Group and Kandi Technologies Group)	2013	Station-based carsharing	~2500 (estimated, EV only)	34	n.d.	Hangzhou	No website available. Booking only via WeChat.
EVCARD	New Energy Vehicles Operating Services Co., Ltd.	2013	Station-based carsharing	300 (EV only)	53	3000	Shanghai	www.evcardchina.com
Green Go	Beijing Heng Yu New Energy Car Rental Co. Ltd. (Joint Venture between BAIC New Energy Co., Ltd. and Foxconn Technology Group)	2014	Station-based carsharing	700 (EV only)	26	15000	Beijing (Membership cooperation with China Car Clubs in Hangzhou)	www.green-go.cn
GX Zuche	Car-sharing Rental Co., Ltd.	2014	Station-based carsharing	100 (incl. 10 EV)	50	2000	Yantai	www.gx-zuche.com

Table 1: Overview of carsharing services in China

Source: Data collected from carsharing operators, April 2015

the German mobility provider moovel announced early this year to bring its free-floating carsharing service car2go to China. Moovel and the Chongqing Municipal Government agreed on launching car2go in the central Chinese megacity by the end of 2015. Chongqing will be the first Chinese city and the first city in Asia to include free-floating carsharing in its urban transport system.

Since carsharing is still not a common mobility service in China, numerous questions arise, especially related to the necessity of adapting the service to specific Chinese market requirements. In this respect, the current public and academic discussion often revolves around cultural barriers or competing transport modes, for instance inexpensive taxis, as market barriers for carsharing in China. However, those questions concern more the growth potential of the mobility service than its actual feasibility. From the perspective of Chinese operators, more pragmatic concerns regarding the implementation of the service are relevant. "At present, we are facing parking as a major challenge for further expansion. Taking Beijing as an example, parking accounts for a large proportion of our operating costs. In addition, parking demand is high and the availability of parking in key locations is limited," says Liu Wenjie, CEO of Yi Dian Zuche. "For this reason, we are hoping to receive support from the government in terms of exclusive parking lots for carsharing in public areas."

Parking is a key challenge for carsharing operators around the world. In China, unclear parking responsibilities as well as poor parking management can hamper the development of the mobility service. While parking has often been neglected in China, the first cities, for instance Beijing and Shenzhen, are currently introducing on-street parking management strategies, which might contribute to the feasibility of carsharing. The introduction of comprehensive pricing schemes could shift demand towards off-street parking and open up highly valuable public on-street parking spaces for carsharing. Moreover, free-floating carsharing in particular could tremendously benefit from the consolidation of parking authorities, as the operators depend on finding an agreement with cities on how to pay for the usage of public parking spaces.

Figure 2: While the electric cars resemble a popular German two-seater, Wei Gong Jiao has revolutionized the design of carsharing stations. Photo: Jung

The Hangzhou-based carsharing company Wei Gong Jiao benefits from the tense parking situation by turning the related problems into a smart business opportunity. Against the common practice of Chinese carsharing operators to set up stations on private parking spaces in underground car parks, Wei Gong Jiao makes its fleet available in fully-automated parking towers (*figure 2*). Distributed across the whole city area, these innovative carsharing stations strongly contribute to the service's convenience and visibility. But Wei Gong Jiao does not only see an opportunity for carsharing in the high parking demand. The operator's carsharing fleet consists exclusively of electric vehicles (EV), leveraging another promising driver for carsharing in China: electro-mobility.

Carsharing does not need electric vehicles, but electric vehicles might need carsharing

China's continuously growing traffic volume does not only cause environmental concerns, but also increases the pressure to address China's strong dependence on oil imports. Against this background, electro-mobility has been singled out as a key technology to achieve sustainable mobility. Purchase subsidies of up to 120,000 CNY (~17,000 EUR), privileged license plate availability and exception from driving bans are exemplary governmental incentives to meet the ambitious target of five million electric vehicles in China by 2020. However, as private EV ownership comes with technical limitations in terms of range and charging, as well as with a certain price tag even after subsidies, there is still a large gap between the announced and the actual number of EVs. Tony Lai, General Manager of the Hangzhou-based carsharing service China Car Clubs, sees great potential for carsharing in the slow development of the EV market. "For our carsharing service China Car Clubs, increasing the awareness of carsharing among local authorities is part of our overall development strategy. We are highly confident that especially our future plan to integrate more electric vehicles in our carsharing fleet will help to generate a higher level of awareness and support from the government."

The integration of electric vehicles could prove to be a valuable opportunity for carsharing operators to receive policy support beyond existing EV promotion in exchange for their contribution to major governmental objectives. On the one hand e-carsharing can encourage the diffusion of electro-mobility by facilitating low-cost access to electric vehicles and eliminating the mobility limitations private EV owners have to face. On the other hand, electro-mobility alone will not solve transport-related issues, such as congestion and space consumption, caused by high private car ownership. Yet e-carsharing can help to reduce demand for private vehicles and – depending on the energy source – provide access to low-carbon mobility at the same time.

Access beats ownership: carsharing can complement sustainable urban transport

Recognizing the challenge of rapid motorization, China is committed to limiting the climate and environmental impact of transport not only by promoting electro-mobility, but also by implementing other low-carbon transport policies. In addition to extensive investments in public transport infrastructure, various Chinese cities have adopted transport demand management strategies to discourage the use of private cars and to promote walking, cycling and public transport. Combined with an increasing number of cities with restrictions and strict regulations on car use and ownership, the range of pressing problems in the urban transport sector might be another essential market driver for carsharing. Especially in cities such as Beijing, where cars are partially restricted, but bikesharing, taxis, buses and subway – all accessible with one ticket – provide seamless multi- and intermodal mobility, the integration and promotion of large-scale carsharing services would be the next step towards a sustainable urban transport system. "As a new transport mode, carsharing plays a prominent role in relieving urban traffic congestion, reducing energy consumption and environmental pollution, as well as effectively enhancing the attractiveness of public transport. China is in an important phase of rapid urbanization, and carsharing can provide a comple-

REQUESTED IN BRIEF

Three questions to Michael Glotz-Richter, Head of Sustainable Mobility of the City of Bremen

Michael Glotz-Richter is one of the carsharing pioneers in Germany and regularly invited by the Sino-German Cooperation Project on Electro-Mobility and Climate Protection[1] to advise Chinese ministries and cities on carsharing as a contribution to sustainable urban transport in China.

Mr. Glotz-Richter, you have been focusing on carsharing for more than 20 years. How do you assess the current situation of carsharing in China?

"Since my first invitation to China in 2008, many things have changed. By now, the first privately owned companies are offering carsharing services. They have recognized the huge potential of this market. The interest in Chinese cities is enormous, as the pressure to act is high. Cities are running out of space for driving and parking cars alike. Intelligent solutions are needed to mitigate these problems. Those who are familiar with parking demand and air quality in Beijing, know that carsharing can have a bright future in China."

Do you think the Chinese government will promote carsharing?

"I think it is a very positive signal that the Ministry of Transport (MoT) has recently and for the first time ever put carsharing on the agenda of a three-day transport training with 250 decision makers from all over China. MoT invited me to speak about carsharing and sustainable mobility. Back in 2013, GIZ organized a study tour on carsharing concepts in Germany and the Netherlands with representatives from MoT. This indicates the increasing importance of sustainable urban transport concepts for MoT, including carsharing systems."

Photo: Jung

Is it possible to compare the momentum of Germany's pioneer phase 20 years ago with the current situation in China?

"A comparison is only possible to a limited extent. The opportunities in China are much better nowadays. When we started the concept in Germany, people used to smile at carsharing, mistaking it for a social experiment. Today, Germany alone counts more than 1,000,000 carsharing users. Back then, technologies such as the internet and smartphones, which make carsharing so convenient nowadays, did not yet exist. Nor did we have the market experience that we have today. If a city wants to introduce carsharing now, it can simply use a proven set of tools and start right away. Carsharing is a question of political will. And it requires a good private provider."

[1] The Sino-German Cooperation Project on Electro-Mobility and Climate Protection is funded through the International Climate Initiative of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in China.

mentary tool for solving the urban traffic problem," says Wang Hao, Deputy Director of the Road Transport Department at the Research Institute of Highways, a think tank under the Chinese Ministry of Transport. "Governmental efforts to promote carsharing and carsharing-related benefits can shift the mobility behavior of urban residents towards carsharing and public transport. The Government should endorse low-carbon travel and make people understand and use carsharing."

But even if private car ownership retains its current high status in China, it will become increasingly difficult and inconvenient to own and use a private vehicle in densely populated urban areas. Restrictive policies, parking demand and traffic congestion as major downsides of hyper-motorization are counteracting the benefits of owning a car. Facing the projected increase in private car ownership until 2030, it does not seem irrational to imagine a scenario that will take the already existing restrictions and regulations on private car ownership in major Chinese cities one step further. City centers with environmental zones open only to shared vehicles, electric vehicles, taxis as well as public and non-motorized transport might be one of the mid- to long-term consequences of continuous growth. This would be a major game-changer in the discussion about the feasibility of carsharing in China and a good reason to stop talking about culture-related obstacles to sharing cars. ■

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