Policy Analysis on Car-Sharing Industry Based on China’s New Energy Vehicle

Li-zhang ZHANG*, Qiang-guo ZHENG and Bing XU
North China University of Technology, Beijing, China
*Corresponding author

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Abstract. Based on the development of China's Car-sharing industry, this paper analyses the characteristics of current policies from the national and regional levels. It finds there are still problems in resolving the pain points about parking, charging piles, credit system, operational safety and operating costs, which are embodied in the lack of policy content at the demand level, inadequate policy rules at the supply level, and slow policy construction at the environmental level. In order to promote the development of China's Car-sharing industry, this paper puts forward that coordinate the application and implementation of policy tools from the supply, environmental and demand levels. Then support and link up relevant policies to improve the formulation of the policy and promote the healthy development of the industry.

Introduction

In 2017, the booming of bike-sharing industry has promoted the government's understanding of China's sharing economy. We can confirmed that sharing mobility will be the most potential industry in 2018. As an important part of sharing mobility, the development of Car-sharing is remarkable. The latest data showed that by June 2018, there are more than 400 enterprises registered in the Car-sharing industry in China. It is estimated that by December 2018, the industry market will reach 3.648 billion yuan and 6.639 billion yuan in 2019[1]. With China's Car-sharing industry entering a period of growth and transformation[2], the current policies can’t match the industry development. The formulation of new policies is lagging behind, improving the existing policies and introducing new policies are very important to promote the healthy development of the industry.

The Current Policy and Typical Mode of China's Car-Sharing Industry

As a new mode of mobility, Car-sharing has changed traditional concept of cars ownership[3], played a positive role in protecting environment and reducing the total number of traditional cars[4,5,6]. Car-sharing is regarded as one of the most promising mobility way in the future[7,8]. However, there are many difficulties in the developing. After reviewing 137 papers on Car-sharing, Ferrero et al. found that parking policy, operation technology, types of operating vehicles, vehicle power sources and vehicle insurance are the key issues in the industry[9]. Susan et al. considered that vehicle insurance, operation technology, vehicle maintenance and credit system are important obstacles to the industry[10]. Lindloff et al. believe that environmental motivation is only one of the influencing factors, the improvement of infrastructure such as parking is more important[11,12]. In addition, electric cars occupy 95% in China's Car-sharing market, so the construction of charging pile is another factor in development of the industry[13].

In view of the difficulties in charging piles, parking, convenient access and high operating costs, different regions in China have made some different attempts and developments at the supply, environmental and demand levels.
The National Policy

On August 8, 2017, the Ministry of Transport and Ministry of housing and urban rural development in China release “Guidance on promoting sound development of mini bus rents”[14], to encourage the development of Car-sharing new formats. The Guidance put forward that Car-sharing enterprises should take into account the actual situation of the city and establish a car delivery mechanism suitable for public travel demand, urban road resources, parking resources and so on. Car-sharing operators should enhance online and offline service capabilities, strengthen the intelligent organization of cars, and ensure cars safety through daily patrol. Operators should adopt safe and compliant payment services to ensure the security of users' deposits, and encourage the use of credit model instead of deposit management. The Guidance also puts forward some supporting policies, such as encouraging public parking in densely populated areas can facilitate for shared cars or exploring the parking on city roads. At the same time, relevant policies have been issued in Beijing, Shanghai and Liuzhou to promote the development of car-sharing industry.

The Regional Policy

“The Beijing electric cars promotion plan”[15] put forward the construction of electric car-sharing network, which will form a part of the city's multi-level transportation system. Beijing pays subsidy for new energy vehicles, and the subsidy standard for new energy vehicles is based on 1:1 ratio between country and city. By 2020, it plans to reach 435,000 charging piles and 600,000 vehicles. The field of private is basically “one car, one pile”. The service radius of urban core area, Tongzhou, Yizhuang and Yanqing winter Olympics area are less than 0.9 km.

The Shanghai government issued a guideline on promoting the development of Car-sharing industry of new energy vehicles[16], clearly pointing out that by the end of 2020, there will be over 6,000 car-sharing outlets, over 20,000 pure electric vehicles and over 30,000 charging piles. In terms of operating vehicle quota, the annual quota should be no less than 4000 vehicles. Financial subsidies will be given to public service fees such as public network leasing in municipal platforms, 50% of the operation subsidies will be given in 2016, and 30% will be given in 2017-2018, with the annual subsidy less than 3 million yuan.

The policies issued by Shenzhen mainly focus on the subsidy of charging equipment, and provides subsidies according to 30% of the investment in centralized charging equipment (stations, piles and devices), then plans to promote more than 120,000 new energy vehicles by 2020[17].

Chengdu transportation committee issued the guidance on encouraging and regulating the development of Car-sharing industry in October 2017[18]. It is expected that a Car-sharing service network will be basically formed in Chengdu by the end of 2018, with 2,500 service outlets and 10,000 charging piles. By the end of 2020, form an extensive service network, with 5,000 service outlets and 20,000 charging piles. The opinion also points out we should speed up the construction of charging piles and encourage establishing parking networks in enterprises, institutions and government. The shared-car is not allowed to have other ads except for the brand logo; Operating enterprises need to buy insurance for the cars; Users are responsible for traffic violations and so on.

The Liuzhou Model under the “Three-Level Linkage” Policy System

The development model of “three-level linkage” in Liuzhou, Guangxi deserves reference. The Liuzhou government actively encourages the development of the Car-sharing industry at both policy and regulation levels. At the same time, the government put forward the policy support “sharing bus lanes, free parking, sharing charging”[19], which effectively promoted the industry development.

First, for the supply aspect, the Liuzhou government supports technological development, increases support for new energy vehicle projects. Encouraging various service industries and build a service supporting system which can promote the new energy vehicle industry. The Opinions pointed out that under the unified intelligent charging infrastructure platform, we can implement the self-service Car-sharing. We will accelerate the cultivation of institutions including related industrial design,
financial bonds, energy management, after-sales service, professional testing and maintenance, then comprehensively improve the new energy vehicles industry chain.

Second, for the environmental aspect, the government actively implements subsidies and establishes the supporting strategy. It is mainly reflected in the following three aspects: Provide various financial support to enterprises, effectively solve the operating cost problems of enterprises in development. For example, it helps manufacturers actively strive for car-purchase subsidies by the nation and autonomous regions, set up special subsidies for the promotion and application of new energy vehicles during demonstration period, subsidize infrastructure construction such as charging piles, and subsidize charging fees of public operating enterprises. Give enterprises tax concessions. By the end of 2017, Liuzhou government will exempt the purchase tax of pure electric, plug-in hybrid and fuel cell vehicles, which are licensed for domestic sales and meet the requirements. Based on the strategic measures formulated to assist the development of the new energy industry, such as planning, rewarding innovation, encouraging mergers or alliances, public information and counselling, Liuzhou government not only supports enterprises to declare their products in the National Catalogue of Recommended Vehicle Types for New Energy Vehicle Promotion and Application Project, but also helps enterprises to increase sales and encourage the use of new energy vehicles. It also gives rewards to new energy products. In the Opinions, a one-time award of 500,000 yuan will be given to manufacturers with independent legal persons in Liuzhou which have obtained the announcement of automobile products issued by the Ministry of Industry and Information Technology. This measure can greatly promote manufacturers to focus on production and R & D of new energy vehicles.

Finally, for the demand aspect, Liuzhou government actively seized the new energy vehicle charging and parking infrastructure construction. By 2017, Liuzhou has planned to build 3,500 parking, with 3,600 parking actually completed. A large number of parking are still under planning, and more than 10,000 parking are expected to be built in one year. Electric cars can park in roadside for free, and park in commercial spaces for two hours free. As for charging piles, the Opinions pointed out 15,000 charging piles and 38 charging stations will be built in the city by 2020, then construct charging infrastructure fit with existing bus stations, transportation hubs and taxi stations.

The Pain Points of China's Car-Sharing Industry

As a non-intensive Car-sharing, it has obvious advantages over private cars in occupying public resources. According to Drive Now’s survey in Munich, 95% of the private cars are idle, and a shared-car parking may save 1500 common parking. It is clear that the existence of shared-car will greatly improve the utilization of resources, this is obviously effective for solving the transport problems in the first and second-tier cities, and also an effective way to build a smart city.

We know the government has responded rapidly to the Car-sharing industry, has issued beneficial corresponding policies. However, there are still shortcomings in the supply, environmental and demand policies, which are manifested in the fact that these policies can’t effectively solve the pain points of Car-sharing in China.

First, the parking problem, how to satisfy the customers to use cars without random parking problems; Second, charging problem, each enterprise build their own charging pile system, which have not been fully shared. Third, the credit problem, how to establish a unified credit system and conduct evaluation to users when they use shared-cars; Fourth, the operation problem, how to ease the tension of parking and using the cars for the tide of the citizens; Fifth, the cost problem, the Car-sharing enterprises are too small to realize benefits. High labor fees, parking fees, charging fees and car washing fees in enterprise operation are important factors that restrict enterprises to achieve profits. The specific information is shown in Table 1. In general, how to solve the problems from the policy level is a challenge to our government's ability to manage the new economic format.
Table 1. Analysis of pain points in Car-sharing industry.

<table>
<thead>
<tr>
<th>Pain points</th>
<th>Existing policies</th>
<th>Blind spot</th>
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<tbody>
<tr>
<td>Parking</td>
<td>The government has considered the construction of parking. For example, Chengdu Municipal Transportation Commission promotes parking constructed in government lots.</td>
<td>It is doubtful whether parking can only be stored in one or shared by others. Whether parking are properly chosen remains to be investigated.</td>
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<tr>
<td>Charging</td>
<td>Governments have clearly stated the installation of charging piles, but there are no feasible measures.</td>
<td>There is no uniform standard for charging piles, and didn’t realize the sharing of charging piles.</td>
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<tr>
<td>Credit</td>
<td>The Ministry of transport clearly encourages the use of credit mode instead of deposit supervision.</td>
<td>Our country has not formed a unified and effective credit system. The user credit evaluation rules are not clear.</td>
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<td>Operation</td>
<td>We lack the policy of operation, and the tide of travel is still a problem.</td>
<td>Car-sharing enterprises are mainly responsible for cars delivery. The cost pressure is huge, and it is difficult to form a large-scale, and alleviate travel congestion.</td>
</tr>
<tr>
<td>Cost</td>
<td>The government has introduced different subsidies for new energy vehicles, which help to reduce the cost.</td>
<td>At present, we didn’t find a reasonable profit model.</td>
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In view of relevant policies, we are gradually increasing the construction of shared-cars and charging piles, which provides certain guarantee for the development of Car-sharing industry. In the future, governments need to strengthen communication, strengthen the linkage between the government and enterprises, in order to realize the complementary advantages, to solve the pain points as soon as possible, especially put forward policies for the large-scale development.

Analysis the Development Policy of China's Car-Sharing Industry

Policy changes from idea to reality must rely on tools, policy tools are the means to achieve policy objectives[23]. According to different levels of policy tools on economic development, it can be divided into three categories: supply, environmental and demand[24]. According to different Car-sharing development policies, this paper simplifies its policy system from the perspective of tools and measures, and divides it into supply, environmental and demand policies in table 2.

Table 2. Analysis of China's Car-sharing policy tools.

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<tr>
<th>Category</th>
<th>Policy tools</th>
<th>Content</th>
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<tbody>
<tr>
<td>Supply</td>
<td>Public enterprises</td>
<td>Measures related to the establishment and management of Car-sharing enterprises, like sharing mobility technology innovation and new technologies (Chengdu, Shanghai, Liuzhou, Beijing)</td>
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<td></td>
<td>Science and technology development</td>
<td>The government encourages the development of new energy vehicle technology and sharing mobility, as follows: supporting funds for development projects (Liuzhou)</td>
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<td></td>
<td>Education and training</td>
<td>Policies for the education and training system of the new energy vehicle industry, such as discipline construction, vocational education, related operation testing, service, maintenance and cultivation (Liuzhou)</td>
</tr>
<tr>
<td></td>
<td>Information service</td>
<td>Encourage the circulation of technology and information, such as develop consulting services, databases, information networks and sharing service platforms (Chengdu, Liuzhou, Shanghai)</td>
</tr>
<tr>
<td>Environmental</td>
<td>Finance</td>
<td>Give support to manufacturers and Car-sharing enterprises, such as rewarding manufacturers for producing a new energy vehicle (Liuzhou), the loans or subsidies for purchasing cars(Chengdu, Shanghai, Liuzhou, Beijing), and encouraging financial institutions to use green credit, financial leasing, pledge and other financing methods. Promoting companies adopt energy management (EPC), public-private partnership</td>
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</table>
Although the existing policies have played a guiding role in the development of Car-sharing in China, more detailed implementation steps, specific measures and requirements need to be added to facilitate the connection of Car-sharing operators, automotive factories and dealers, charging operators, parking, third-party travel platform, vehicle networking technology R&D institutions, cloud computing service providers, etc. We will construct the Car-sharing industry ecological chain, so as to effectively solve the pain points, then provide more convenient and better experience for consumers, and promote the development of innovative economy.

On the whole, the strong support of environmental policy in finance has the most important contribution to promote the development of Car-sharing industry in China, such as “tax preference”, which has played a positive role. In the future, the policy will improve by focus on the supply, environmental and demand aspects.

(1) Complete supply policy rules

For the Car-sharing industry, the nation can actively promote the construction and implementation of the supply policy, establish various research societies and professional associations, promote the circulation of technologies and information, encourage the innovation of vehicle network technology, new energy vehicles technology and other network technologies. Establish various forms of technological innovation alliances to advocate collaborative innovation among government, enterprises, universities and R&D institutions, improve new energy vehicle production technology and reduce costs. We will launch an alliance support policy for manufacturers and shared-car companies, increase the market volume of shared-car production, and expand the scale of vehicles for Car-sharing companies so as to achieve large-scale operations. The research shows that the Car-sharing vehicle has the cost competitive advantage when it travels more than 10,000 kilometers per year\[^{25}\]. Increasing the supply policy has great significance for improving the innovation ability of new energy vehicles (especially electric vehicles) and reducing the production cost.

(2) Improve demand policy contents

We will further improve public service systems and infrastructure that are conducive to sharing mobility. There are restrictions on driving mileage and charging durability in Car-sharing vehicles\[^{26}\]. Establishing and improving service measures such as access services, charging piles and public parking construction will help to start market forces and stimulate consumers to adopt the consumption mode of sharing mobility.

We can give full play to the advantages of “public service” in demand level. The government plays an important role in formulating the policy, it takes the initiative to guide and carry out scientific planning, rational layout and free construction of charging piles and parking spaces in the community\[^{27}\]. We can improve training on “sharing-trips” for the public, publicize the concept of environmental, guide the consumption habits on green trips, provide subsidies to customers who use

<table>
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<th>Tax incentives</th>
<th>Measures for Car-sharing enterprises, such as exempting vehicle purchase tax (Liuzhou), reducing indirect tax.</th>
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<tr>
<td>Regulation and control</td>
<td>Measures to regulate the market order of Car-sharing, and to supervise the cars, citizen and operation market (Chengdu, Liuzhou)</td>
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<tr>
<td>Policy strategy</td>
<td>Based on the strategic measures for Car-sharing development, we encourage the business models innovation of Car-sharing and new energy vehicle enterprises, encourage cooperating with charging service enterprises and manufacturers, support establishing Car-sharing alliances, set up a unified Car-sharing service platform for real-time service.</td>
</tr>
<tr>
<td>Demand</td>
<td>Government purchase regulations, such as government procurement, public sector procurement and contract studies.</td>
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<tr>
<td>Public service</td>
<td>Measures to solve the problems of shared-car access, charging and parking, such as the construction of charging facilities, parking space planning and access sharing mechanism (Chengdu, Liuzhou, Shanghai, Beijing).</td>
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Car-sharing, implement parking preferences in public parking lots, thus promoting the development of Car-sharing industry.

(3) Accelerate environmental policies establishment

We can pay more attention to the perfection of environmental policies, encourage the combination or alliance among enterprises to form large-scale operation and reduce operating costs. Intensify the implementation of the “financial” policy, in such aspects as credit loans, charter, subsidies, to give companies a variety of financial support. Encouraging financial institutions use green credit, financial leasing, pledge and other financing methods. Promoting companies adopt energy management (EPC), public-private partnership (PPP), financial leasing, operational leasing or buyer's credit, to alleviate the pressure on purchase new energy vehicles at one time. For example, in credit system, credit mode can be used instead of deposit supervision. We will advocate enterprises to innovate their business models or build alliance through cooperation with manufacturers, charging service enterprises. In alliance, enterprises can collaborate in a unified Car-sharing service platform, and provide online services in real time. Other policies like optimize the proportion of private cars and shared-cars by increasing the distribution of licence plates to shared-cars; Give tax relief or tax deduction to Car-sharing enterprises. The research shows that providing license concessions or subsidies for electric vehicle is as important as increasing the ability for longer driving mileage, and the preferential tax policy has been proved to be an effective measure to promote development of the industry. We will improve laws to regulate market order, and improve measures such as patents, production access, and intellectual property rights. To build strategic measures to assist the development of the industry, including the unified planning of Car-sharing network, reasonable layout, and assistance of public information.

Conclusion

In the future, with the cooperation of Car-sharing companies, the promotion of technology and self-driving cars in China, we believe smart travel will become the normal state. Car-sharing will have great potential in many fields. The industry development needs relevant policy support and cohesion in supply, environmental and demand levels, especially in environmental level. To encourage Car-sharing industry development, establish wisdom city, improve people's feeling and happiness, realize the development strategic target of China, we need to plan and execute policies as soon as possible.

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