

*Faced with this new wave of urbanization, the Chinese government is more willing to seek a compromise as neither a spending binge on local public transit nor a massive cut on car usage proves to be feasible solutions. In the post-private car era, car ownership, shared mobility, and public transport will coexist for a long time.*

# The Future of Shared Mobility in China

BY / Marco Hecker, Quan Zhou, Zoe Wu

**T**his is what the future may hold: city dwellers can plan and organize their trips using a mobile application. Which mode of transport they choose is no longer an issue: the key is how to get from point A to point B in the most cost-efficient way and spare people from the hassles of congestion, parking and so on.

In order to evolve towards that future, we desperately need a fundamental change in urban mobility system. We have to reallocate road space in order to better balance the various travel needs and to make the environment pedestrian and bicycle-friendly. In such spaces, driving will be less stressful, air is cleaner and there will be fewer accidents and less noise.

In this report we will examine the impact of emerging mobility platforms, especially the mobility revolution led by ride-sharing firms, on China's urban transport as a whole. We will further explore what forces will lead the development of China's mobility ecosystem, and in what direction.



### Urban Transport Problems in China

The existing road infrastructure in China is far from meeting the surging demand for motorized transport. Private vehicles have occupied the bulk of road space in an almost zero-cost way as car users are barely charged with any external costs incurred by congestion, air pollution, traffic accident and noises. Currently, China's megacities face with several common transport problems: (1) Inadequate road infrastructure has led to a mismatch between limited supply and growing demand; (2) Low-density roads featuring wider and larger lanes in return made cities more congested. 3) Economic costs of traffic congestions are increasing rapidly.

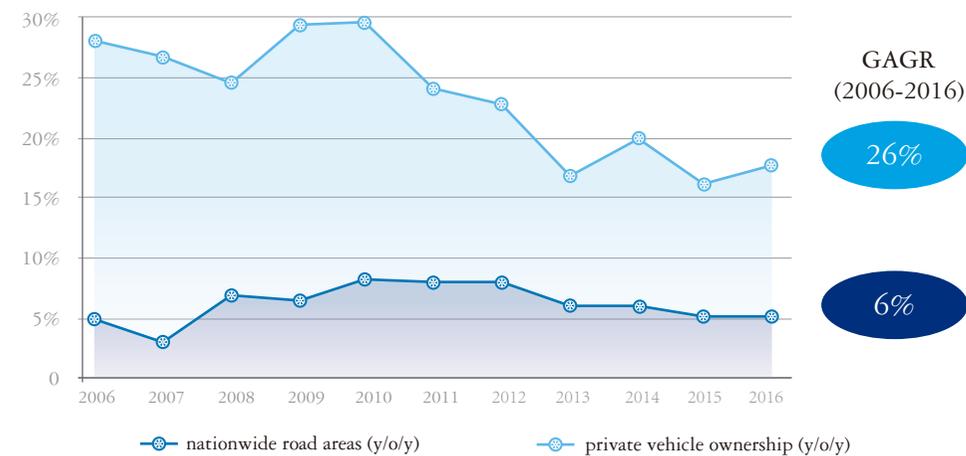
#### Mismatch Between Limited Supply and Growing Demand for Motorized Transport

The hectic pace of China's urbanization has not only led to regional economic development but also a huge demand for motorized transport. However, the supply of road space, due to land scarcity and Chinese government's efforts to prevent further urban sprawl, can not be expanded in an unlimited way. In the past ten years, China's vehicle fleets have increased to 170 million units, at a pace four times faster than the country built its roads (see figure 1).

A long-standing belief among Chinese urban planners is that increasing road capacity can help reduce traffic congestions. For a long time, making way for car use has been the predominant concern in China's urban transportation planning.

Cities at all levels have tried to solve the issue by building more and wider roads as well as broadening existing ones. But they soon found that increasing road supply only provided a temporary fix, for it also had the effect of boosting demand as more urban residents travel by cars. Traffic congestion had actually returned to previous levels, and commuting hours had not decreased.

Figure 1 Road infrastructure grows slower than car ownership



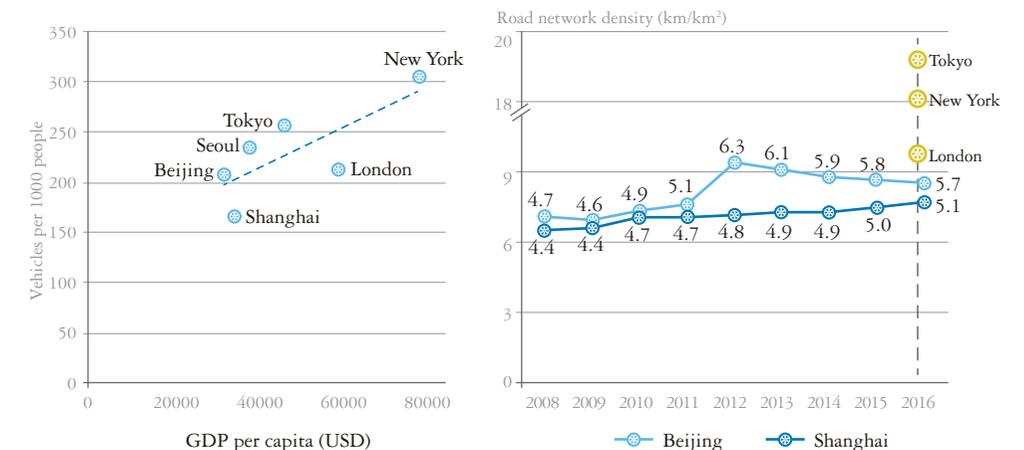
Source: Wind, National Bureau of Statistics.

### Wider Lanes Cause More Congestions Not Less

There're more effective ways of dealing with congestion. Blaming a shortage of road space alone won't fix the problem. Improper urban planning is one of the reasons for Chinese cities congestion. Chinese urban planners believe building freeways and main arterial roads can relieve traffic congestions. Thus, in China's major cities there're disproportionate shares of arterial roads which have undertaken a lot of traffic pressure, whereas the traffic volume on corrector streets are largely subdued. In fact, traffic speed will slow down when arterial roads reach their practical capacities.

The problem of improper road planning remains particularly acute in Beijing and Shanghai where the number of cars per thousand people is close to that of Tokyo and Seoul, but the density of road networks in central urban areas is less than one third of their Asian counterparts (see Figure 2). Density of road network in Tokyo and New York have reached 18.7 and 17 km / km<sup>2</sup> respectively, more than three times that of Beijing and Shanghai.

Figure 2 Density of road network versus vehicle fleet growth



Source: Wind, National Bureau of Statistics.

### Increasing Costs Due to Traffic Congestions

Another transportation problem is low efficiency and knock-on effect of congestions. Economic costs incurred by congestion including delays, low working efficiency, additional fuel consumption, polluted air and noise have been on the rise in the past few years.

According to the 2016 traffic report of China's major cities by Amap, about one-third of the country's road users are plagued by traffic jams, and among the 100 cities sampled, 32 cities see their Peak Hour Congestion Delay Index exceed 1.8, which means a 30-minute commute would be extended by 24 minutes due to congestion. Residents working in Beijing spend an average of three hours a day stuck in traffic jams, equivalent to more than 30 days a year, which is longer than their annual vacation time.

Faced with nationwide gridlock, worsening air pollution, and the increase in fuel consumption, the Chinese government has no choice but to seek and put into place viable solutions. Given the land use pattern, urban planning, rural-to-urban migration, there is no doubt that the development of a high-capacity rail transit system is an essential part of the next stage of investment and construction of transport infrastructure.

However, we believe increasing the accessibility of public transport is insufficient. Under the premise of ensuring the most basic travel needs, urban mobility market should also meet the demand for diversified, high-quality travel. Future mobility will therefore be about a comprehensive system that integrates all modes of transport and provides seamless travel service. Shared mobility, as a new way of travel, will become an integral part of this mobility ecosystem.

**China's Current Shared Mobility Market**

Five years ago, “Kuaidi Dache”, an online taxi-hailing app based on mobile Internet and GPS positioning technology made its debut, initiating a sea change in China’s personal mobility market. A large number of start-ups focusing on new forms of mobility service have been set up and sought after by investors. The shared mobility market in a broad sense can be divided into five models: (1) bike-sharing, which aims at solve the “last mile” problem whereby urban dwellers need to travel from their homes and offices to subway or bus station; (2)ride-hailing, which targets at addressing short-to-long distance trips; (3) ride-sharing, targets at urban travel as well (4) car-sharing-essentially car rental by hour- which focuses on middle-to-long distance travel; and (5) traditional car rental, which is all about long-distance and cross-city travel.

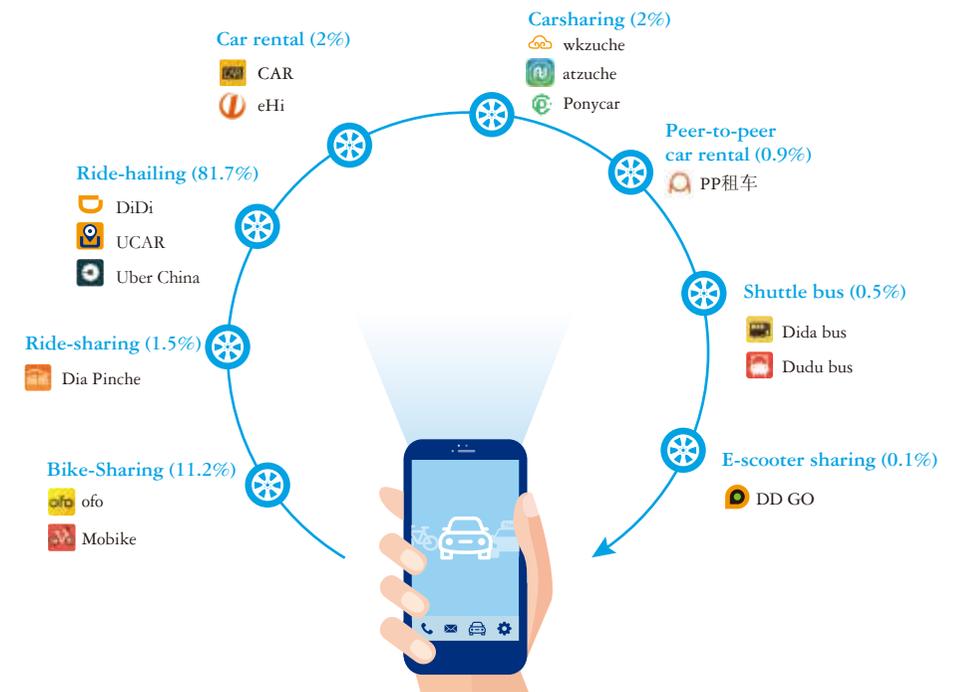
Over the past five years, shared mobility market has attracted a total of 168.9 billion yuan (see Figure 3) across 225 deals. More than 80% of the amount of capital flooded into ride-hailing platforms. But the tide is turning since 2017.

Investors are fueling a drive to a bike-sharing future, betting on startups such as Mobike and ofo which are hailed as the next big idea in the sharing economy trend. The category has attracted more than 19 billion yuan. At the same time, carsharing business seemed to have made a comeback and once again become hotspot for investment. Peer-to-peer car sharing, chased after by investors a few years ago, are scaling down and pivoting their business model.



Figure 3 Investment in China's shared mobility market, 2013-2017

Shared mobility market has attracted more than 160 billion yuan investment.



Source: Itjuzi, Zero2IPO.

**Ride-hailing**

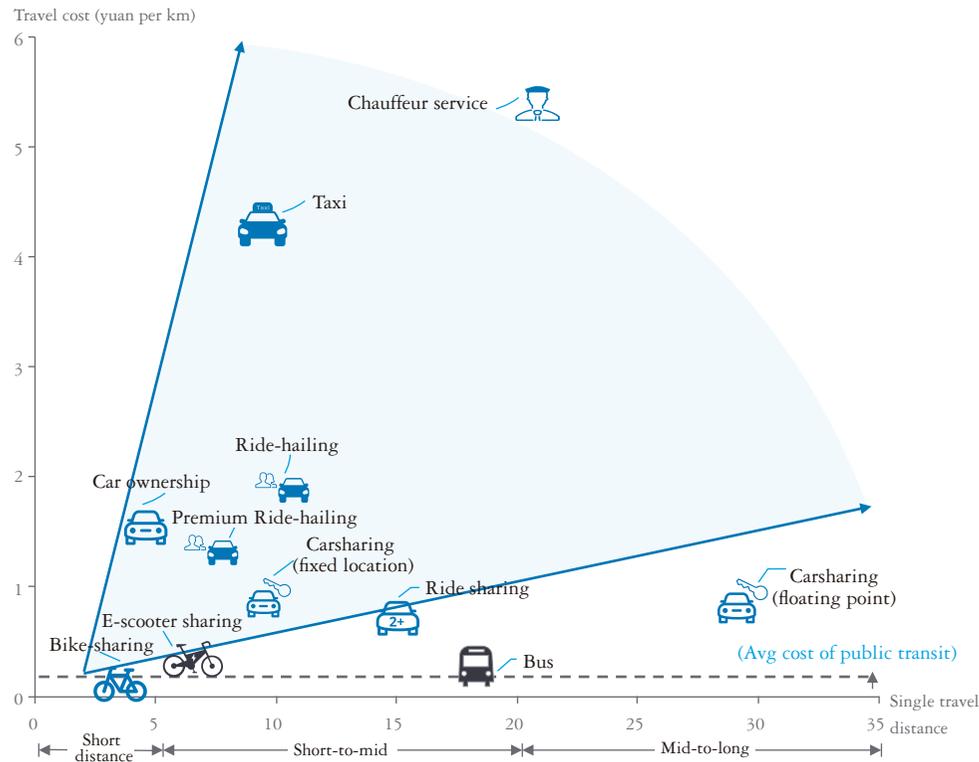
A series of mergers and acquisitions in the car-hailing industry has led to a greater consolidation. Didi holds a monopoly position, with total number of users reaching 100 million and providing 20 million rides every day. Uber’s China division (already acquired by DiDi), Youche, Ucar fall behind and have seen the number of active users decline significantly in the past year. Ride-hailing companies have concentrated most of their business in tier-1 and tier-2 cities. As those markets mature, DiDi, since the beginning of 2017, has waged the ride-hailing war into lower-tier cities as well as surrounding counties that have strong connections with mega cities. As new and innovative mobility service providers flourish, ride-hailing business, after years of fast development, has seen its growth curv flattened. The future growth will now depend on improvements in efficiency and service refinement.

**Ride-sharing**

Ride-sharing market, despite five years’ development since its debut in China, is still in its infancy, with small market size and relatively low penetration rate. DiDi with its carpooling service has the monopoly here and its number of users has exceeded 30 million. DiDa pinche is in second place with monthly active users (MAU) increased nearly 20% over the past year. As an alternative to ride-hailing and taxi-calling service, ride-sharing offers competitive transport

fares but at the same time lacks flexibility. For instance, most rides that DiDa pinche provides are pre-ordered trips often with fixed routes. As a result, ride-sharing, despite its low-cost, is only appealing to those who have higher flexibility on travel time and are willing to plan their journey in advance.

Figure 4 Ecosystem of urban mobility in China



Source: Open Source, Deloitte Research.

### Carsharing

Carsharing is essentially short-term car rental service and the main difference between the two is that one can use carsharing service as little as half an hour. It appeared in the Chinese market earlier than ride-hailing service, but because of its heavy dependence on capital, carsharing has hardly taken off.

In 2017, many Chinese cities called for the use of carsharing platform as an important means to promote electric vehicles. With relevant policies and incentives rolled out, carsharing business has demonstrated robust growth. The number of companies has grown to more than 100 with a total fleet size amounting to over 50,000 vehicles.

Companies backed by OEMs have taken up majority of the market shares, and those with traditional car rental background and start-ups have about 5% and 20% of the market share respectively.

### Bike-sharing

Unlike the bike-sharing schemes led by local governments, the new wave of dockless bike companies enables users to check out a bike by simply scanning a code via a smartphone and left the bikes wherever they are done. Since 2016, bike-sharing programs have become the most attractive investment option for venture capital.

At its peak, more than 16 million vehicles were deployed across China with more than 130 million registered users. But in just one year, bike-sharing went from exponential growth to overloaded deployment, with surplus appearing in most major cities. The industry has come to a turning point at which many small and medium-sized dockless bike companies went out of business due to cash squeeze. Today, the first bike-sharing companies in the field, Mobike and OfO, together account for nearly 90% of the market.

The impact of large-scale deployment of shared bicycles on urban traffic is complex and diverse. Internationally, in densely populated urban centers, city dwellers have tended to ride bicycles rather than take public transport to meet their short-distance travel needs; on the outskirts of cities with low population densities however, shared bicycles have increased the use of public transits. Domestically too we have seen that shared bicycles under most circumstances fulfill the task of short distance travel, especially serve as an effective solution to the “last mile” problem. According to statistics, more than 60% of bike-sharing users have a single riding distance of no more than 3 km, who use the service as a connection to public transit node during commuting time<sup>1</sup>. Meanwhile, the rise of bike-sharing has gradually eaten into the market share of short distance travel within 5 km of ride-hailing business, and has played a certain role in reducing the number of short trips in cars.



### The Impact of Shared Mobility on Urban Transport in China

- In general, the proportion of shared mobility in China is still low. Even DiDi who owns the biggest market share has only penetrated 1% of the total mobility market in China. According to Morgan Stanley, the percentage of mileage generated by shared mobility is expected to increase from 4% in 2015 to 26% in 2030.
- The emergence of shared mobility undoubtedly increases the complexity of China's personal transport market, but it also provides convenience and flexibility for urban travellers. First of all, as a low-cost alternative, this new model of mobility alleviates the problems of supply shortage and low operating efficiency of the city's taxi service; second, it can offer a trip from point A to point B at a cheaper price (the cost advantage of ride-hailing relative to traditional taxi service is weakened after the withdrawal of subsidies); third, it can meet on-demand use, diversified, multi-point and high-quality travel demands of consumers; the entire shared mobility has played a significant role in helping to plug the gap of the 'last mile' of public transport.
- That shared mobility would emerge and spread at such a rate unanticipated by the government, the society and the public. It has however generated quite a lot of controversy, especially the debate about whether ride-hailing and carsharing, which are both essentially traveling by cars, lead to extra travel and exacerbate traffic congestion to some extent. It is worth pointing out that the companies that provide shared mobility services are not charged with any costs incurred by the negative externalities of their services.
- The original idea of shared mobility was to reduce the use and miles of private cars, so that eventually they would sell their vehicles or join a sharing scheme. At the same time, it can deter potential car buyers in the next few years so that they would instead choose an integrated shared mobility platform that combines various models of transportation. Still, the biggest challenge facing the future development of shared mobility market comes from regulation, and the Chinese government is expected to introduce differentiated policies to guide, encourage or regulate these new types of travel service.

### Factors Determining the Future of Shared Mobility

The structure and texture of urban transport in China depends upon factors such as urban planning, population migration and industrial policy. Amongst these, urbanization is the dominant factor affecting the travel market. According to the World Bank, China's urbanization rate is expected to reach 70% by 2030, when the urban population will exceed 1 billion.

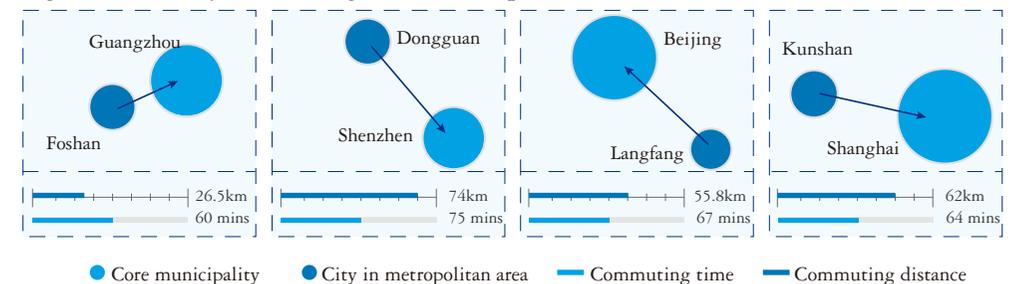
The Chinese government's goal is clear: to develop sustainable urban transportation and to upgrade and expand the capacity of large, commuter intensive public transportation system.

However, due to the constraints of local government's financing, construction time and other factors, it is difficult to meet a new round of urban travel demand. Therefore, the development of multi-model hybrid travel is expected to become the 'new normal' of urban transport, and shared mobility will play an important role in it.

### Future Metropolitan Transport in Urban China

China's Urbanization has entered the 'greater metropolitan area' stage, whose most typical sign is the emergence of new towns around the big city, forming a new populous and industrial agglomeration, as well as commuters' traveling across administrative divisions (see Figure 5). For example, hundreds of thousands of residents living in Yanjiao, Kunshan and Foshan will go to work in Beijing, Shanghai and Guangzhou respectively every day.

Figure 5 Intercity commuting in the metropolitan area



Source: Wind, Baidu Map .

In recent years, the trend of integrated transport and intercity travel has become very clear. The busiest intercity trips are concentrated in the Pearl River Delta and Yangtze River Delta regions, such as Guangzhou-Foshan, Shenzhen-Dongguan, Shanghai-Suzhou-Kunshan, and Hangzhou-Fuyang-Shaoxing<sup>3</sup>.

From international experience, building suburb railway is one of the solutions to intercity transport. In Tokyo metropolitan, for instance, operation mileage of its rail transit system is 3,500 kilometers, of which 2,300 kilometers is in suburban area<sup>4</sup>.

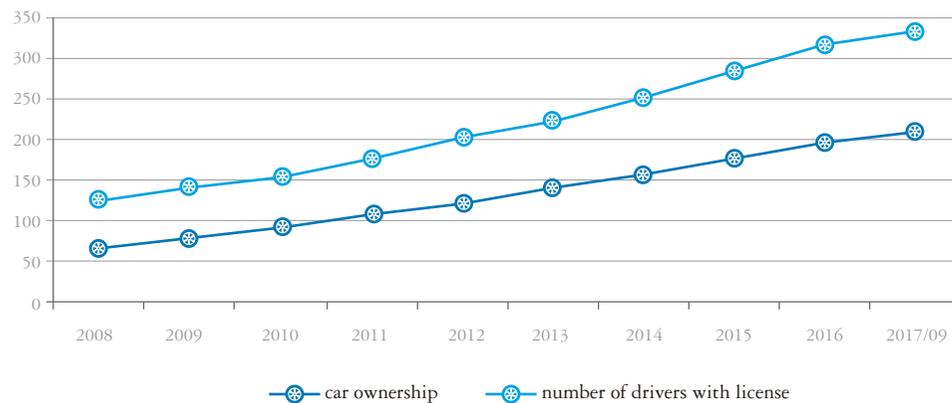
China's first-tier cities have proposed in the "13th Five-Year Plan" to ramp up the construction of suburban railway network reaching out to surrounding counties and adjacent cities in the metropolitan area. But a sheer imitation of Tokyo model is not realistic as China's metropolitans are not only faced with administrative hurdles but also constrained by fiscal squeeze on local government. Therefore, the Chinese government is more willing to seek a compromise: increase the accessibility of public transit to the public, but at the same time promote shared mobility as an effective solution to on-demand and diversified travel needs.

### Evolving Consumption Habits and Preferences

One of the most significant changes in China's personal mobility market in recent years is

that young consumers choose on-demand mobility service over car ownership. They no longer regard car ownership as a symbol of identity, instead their purchase decisions become more pragmatic. Evidence lies in the fact that the gap between car ownership and the number of people who have a driver's license is widening year by year (see Figure 6).

Figure 6 Comparison of Car Ownership and Number of Drivers with License



Based on previous research<sup>5</sup>, convenience, punctuality and cost have become the most important factors affecting urban Chinese travelers' decision for a particular transport mode. Young consumers born in the 90s are more willing to plan their travel in the most convenient way: they use public transit in their daily commute while choose ride-hailing service during rush hours or bad weather. The research also found that 69% of young Chinese consumers use smart phones to plan their trips, and they are no longer satisfied with the single point-to-point travel, but instead having higher and higher demands for personalized, multi-modal and high-quality mobility service.

**Direction of Policies and Regulations**

At this stage, policies and regulations that will have a profound impact on the travel market center around two things: (1) restrictive measures to control traffic congestion and air pollution (2) continue promotin Chinese government' ambitious new energy vehicle program.

In terms of dealing with congestion, some scholars have said that the Chinese government should learn from European countries by implementing economic instruments such as car license tax, fuel tax, road toll, congestion fees and parking charges. Any of the above instruments would have a profound impact on the use of vehicles.

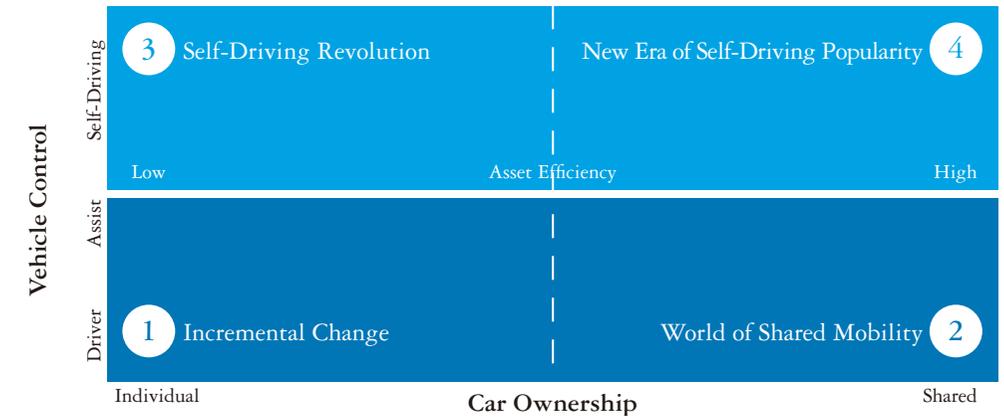
China's large metropolitan areas aim to build cities with low emissions and low energy consumption, which means that the electrification of all public and personal transportation will become the top priority. Over the past year, both domestic and foreign OEMs have accelerated their electrification initiative and at the same time, rushed to launch car-sharing programs to promote electric vehicles.

**The Future of China's Mobility Market**

**Deloitte Global Future Mobility Analysis Framework**

According to global analysis, there are four possible scenarios for personal transport in the future, However, given the fact that different groups of people in the world will need different modes of transportation, in the future, any combination of the following four scenarios may exist at the same time.

Figure 7 Four potential future scenarios



**Future Scenario 1: Incremental Change**

Those who hold the most conservative views on the future believe that we should make great efforts to invest in the assets that are closely related to the current system. These people believe that car ownership will remain the norm as consumers tend to enjoy the privacy, flexibility, security and convenience brought about by car ownership.

**Future Scenario 2: World of Shared Mobility**

The second scenario predicts that shared mobility will continue to grow, as families with multiple vehicles starting to reduce their frequency of use and as the proportion of shared mobility increases; others may consider giving up ownership of vehicles, thus reducing demand for cars.

**Future Scenario 3: Self-Driving Revolution**

In the third scenario, self-driving technology is proved to be feasible, safe, convenient and economical, but private car purchase still prevails. Regulators, car companies and Internet companies are working with each other to advance the future of the transport system in the direction of this scenario.

**Future Scenario 4: New Era of Self-Driving Popularity**

The trends of self-driving and car sharing will converge with each other. Urban commuters will be the earliest adopters of the model. As infrastructure becomes more intelligent, self-driving and shared car fleets may expand from the city center to densely populated suburbs and more remote areas.

### The Evolution of China's Mobility Market

Based on the above factors, we believe that the proportion of shared mobility will continue to rise, and such a model will play an important role in the development of a sustainable urban transportation system in China. Taking into account the regional and cascade development characteristics of China's economy, shared mobility plays different roles in various urban areas of China.



- **Metropolis or mega-cities with tens of millions of people.** These areas are extremely densely populated with highly developed public transport networks and coverage. Mismatch between supply and demand of travel is particularly acute. The growth and use of vehicles is strictly limited. Public transport is still the keystone of urban transport, but shared mobility will be gradually integrated into the urban transport system. The two represent a relationship of substitution and complementarity. On the one hand, shared mobility can meet travel needs in suburban areas with insufficient capacity and low coverage of public transport. On the other hand, it can help provide a convenient connection and solve the last-mile problem of public transits.
- **Surrounding cities in metropolitan area.** These are characterized by their proximity to the core municipality, long cross-city commutes, and travel needs that are not met by the existing public transport due to inadequate coverage or capacity shortage or low service quality. Shared mobility (carpooling, car-sharing, etc.) is expected to replace a part of public transport and become the main means for cross-city transportation.
- **Tier-2 and tier-3 cities with rapid urbanization progress.** These areas are characterized by a relatively low density of public transport network and small number of business districts / shopping areas that can be reached by rail transit. The share of private car travel is relatively higher. However, due to the fact that expansion of urban infrastructure can not keep up with urban population growth, congestion has become severe. As more mobility service provider expand in lower tier cities, the penetration of shared mobility in these areas will continue to increase.

- **Counties and urban-rural areas.** Car ownership is low and there is still much room for growth in these areas. With the increase of disposable income of urban-rural residents and the improvement of transportation infrastructure, private car purchases will still prevail, and cars will continue acting as the main transport choice of the residents there. The influence of shared mobility in these regions is a lot less profound.

So far, private cars have met almost all the additional travel needs brought about by China's urbanization. But this has led to serious pollution and congestion problems. The Chinese government hopes to redress these problems through the development of urban transportation networks. Increasing the supply of public transport without taking into account the return of investment and substantially reduced use of cars, however, is impractical. Therefore, car ownership and use, shared travel, and public transport will coexist for a long time. But new modes of travel will enhance the efficiency and competitiveness of traditional transport modes, and help build a sustainable urban transportation network.

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#### Note

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