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In-depth case study: Shared bicycles

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Bicycle-sharing has become an important part of China's effort to improve local air quality and reduce carbon emissions. There are currently around 25 million shared bicycles in more than 200 Chinese cities, with 400 million registered bike-sharing users and up to 70 million daily riders, according to Liu Xiaoming, vice minister of the Ministry of Transport[1].

In 2017, shared bicycles reduced emissions by 4.22 million tons of carbon dioxide in China, while emissions of particulate matter PM2.5 were reduced by 3.22 million tons, according to the report *Shared bicycles and the development of cities*[2] which compares the current situation with a theoretical business-as-usual scenario. Furthermore, 1.41 million tons of gasoline was saved, corresponding to a cost of 12.4 billion yuan, and 400 thousand hours of congestion was avoided, which China Academy of Information and Communications Technology (CAICT) has translated into a labor cost saving of 16.1 billion yuan. The revenue of the industry is estimated at above 220 billion yuan, with almost 400 000 jobs, according to CAICT.

In addition, several Chinese shared-bike companies, including Mobike and Ofo, launched overseas in 2017 and 2018, including Berlin, Tokyo and Washington D.C. In some of these locations, the Chinese companies are the first to bring such a service to the inhabitants, though in most, they compete with existing services[3].

The history of shared bicycles in China

The evolution of shared bicycles in China can be divided into three stages, according *to China's Shared Bicycle Market Research Report*[4]:

1. **Docked public**, which started in 2007, when the concept of bicycle sharing was imported to China. Hangzhou city started providing shared bicycles for free in 2008[5], and was listed as one the eight cities with best public bicycle service by the BBC travel channel.
2. **Docked private**, which started in 2010, when Yong'an Bike began to provide a management service for public shared bicycles.
3. **Dockless private,** or floating systems, which started in 2014, when the bicycle sharing company Ofo was founded to provide bicycle-sharing services on campuses, with the first 2,000 bikes at Beijing university in September, 2015.

The shared bicycles industry did not get much public attention until the second half of 2016, when venture capital poured in, and Ofo and Mobike were valued at more than 10 billion yuan

[1] People's Daily Online, 2018-02-08
[2] China Academy of Information and Communications Technology, 2018
[3] Where not otherwise indicated, the information in this chapter was retrieved from the annual Transportation Research Board (TRB) conference, as described at http://2030-sekretariatet.se/lanecyklar-kina/ (in Swedish)
[4] Bigdata Research, 2017
[5] Urbanchina.org, 2013-10-24

each. In 2017, the industry grew rapidly, with more than 20 million bicycles from several different brands in Chinese cities, almost 10 times as many as in 2016, according to *China's Shared Bicycle Market Development Report*[6].

Driving forces of the industry

Demand

In Chinese cities, the nearest bus or metro station can often be hundreds or thousands of meters away, and the so-called last-mileage problem can be solved by bicycles. At the same time, congestion in large cities often makes riding a bike a faster and more convenient choice than going by car or bus. At universities with large campuses, a slightly different logic applies; the private car may not be an option, but the flexibility of the bike is highly valued. An added factor is that many private bicycles are stolen, which makes shared bikes a low-risk alternative.

Technology

Our analysis is that the popularity of shared bicycles depends on two key features:

- *They are dockless* and thus can be picked up and left anywhere where parking a bike is legal. This is ensured by mobile solutions, where the bike has a code that is scanned and linked to an account for registration, location and payment.
- *They are maintenance-free*. Such technologies as a chainless shaft transmission, non-puncture airless tires, a lightweight aluminum anti-rust frame, and enhanced and durable disk-brakes are adopted for most of the shared-bicycle systems[7], to minimize the need for maintenance, which is costly for the operator and inconvenient for the user.

Venture capital

Even though the individual bikes used in sharing systems are typically low-cost, launching a system typically means putting thousands of bikes on the roads, establishing a charging system and heavily marketing the product before any income is generated. For this reason, venture capital has been central to establishing bike-sharing systems, with more than 20 billion yuan invested in less than two years, according to The Deathlist of Shared Bikes[8]. Mobike and Ofo have been the largest destination for investment, but more than 40 companies have been established, with a very real risk of a market overcrowding.

[6] Mobike, 2018
[7] See e.g. Business Insider, 2017-12-05
[8] Wang, 2017

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Challenges

Parking

The availability of dockless bicycles is a double-edged sword. On the one hand, it brings convenience to users, who do not have to go to dedicated bike stands to find the bikes. Instead, they can pick up and leave them anywhere it is legal to park them. On the other hand, it has - as often reported by media - led to a situation where "Regulators are frowning upon the free-to-park two wheels as they clog city sidewalks, give rise to traffic accidents and lead to a flood of consumer complaints."[9] Part of the reason is that bicycle-sharing companies compete to have the greatest number of bicycles on the streets.

Among the measures that are being taken to improve the situation, the authorities in Nanjing and Shanghai demand that every bike is to be registered with license plates, which will make it easier to track them.

Usage

The shared bikes are mainly used to get to and from work as well as to ride home for lunch. The average user is around 30 years old and earns slightly less than the average income. Almost half of the users have access to a car, while fewer have their own bicycle. An average trip is just under half an hour, which in many of the Chinese cities with loan bikes is the limit for free rides, all of this according to reasearch by Mengwei Chen at Zhejiang University[10].

Other research concludes that the poor air quality is a major hindrance for use of the bikes. When the air is particularly bad, people prefer to take the car or bus, which becomes a self-reinforcing negative spiral. This is especially true for women, the elderly and for those with higher incomes. Thus, for shared bikes to become more widely used, and for the potential air-quality benefits to fully materialize, air quality must be improved. Furthermore, the effects of climate change itself may make cycling less attractive. The use of the shared-bike systems declines when temperatures exceed 30 degrees centigrade, when it is windy or raining[11].

Profitability

"No one makes money on shared bikes for the first three years", claim the experts behind Bikesharingmap.com[12]. That certainly seems true for China, where the bike-sharing business is currently not profitable, since the initial investment has outweighed the initial income. The cost of a single bike is around 2,000 yuan, with added costs for repairs, shipping, marketing, labor

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[9] Forbes, 2018-01-26

[10] As presented on the annual TRB conference, described at http://2030-sekretariatet.se/lanecyklar-kina/ (in Swedish)

[11] Based on the annual TRB conference, as described at http://2030-sekretariatet.se/lanecyklar-kina/ (in Swedish)

[12] Ibid.

and replacement after theft - which is still a major concern, even though many of the companies have put RFID-chips on all valuable parts of the bikes.

The hourly rate for a bike is around 1 yuan - often lower due to the intense competition for market share. With an average usage of three hours per day per bike, it will take more than two years to cover the cost of the bicycle, at least double that with all costs factored in. With an expected lifespan of around four years for a bike, at current income levels it seems hard to make bike-sharing profitable in the short term.

The future of shared bikes in China

Our analysis is that the future of the shared bike systems can be seen as being dependent on several key factors:

a) The appetite to invest of future venture capital; further economic injections will likely be needed for the companies to survive.
b) With more than 70 bicycle-sharing companies in China, consolidation would probably be in the interest of both the business and the consumer.
c) The price per use will most likely have to increase to allow for costs to be better covered, and good consumer behavior may be incentivized by the charging model.
d) Local-government acceptance. More than 10 cities have imposed restrictions on shared bicycles, including Beijing, Shanghai, Guangzhou and Shenzhen. This may both be a challenge for the business, and an opportunity to address the key concerns of consumers.
e) How relevant bike sharing is seen by the central government when it comes to reducing climate impact, improving local air quality and decreasing congestion will be central to how the sector can expect to be treated in the future.

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Reference list

2030-sekretariatet. *Lånecyklar: Nu kommer Kina.* Available at: http://2030-sekretariatet.se/lanecyklar-kina/

Bigdata Research, 2017. *China's shared bicycle market research report.*

Business Insider, 2017-12-05. *Mobike Receives 2017 Champions of the Earth Award from United Nations for Contribution to Low Carbon Transport*. Available at: http://markets.businessinsider.com/news/stocks/mobike-receives-2017-champions-of-the-earth-award-from-united-nations-for-contribution-to-low-carbon-transport-1010372437

China Academy of Information and Communications Technology, 2018. *Shared bicycles and the development of cities.*

Forbes, 2018-01-26. *After Bike Sharing Explodes In China, Local Authorities Now Move To Clamp Down*. Available at: https://www.forbes.com/sites/ywang/2018/01/26/after-bike-sharing-explodes-in-china-local-authorities-now-move-to-clamp-down/#7781c12712e3

Mobike, 2018. *China's Shared Bicycle Market Development Report.*

People's Daily Online, 2018-02-08. *Daily bike-sharing users in China peaks at 70 million: report.* Available at: http://en.people.cn/n3/2018/0208/c90000-9425354.html

Urbanchina.org, 2013-10-24. News article. Available at: http://www.urbanchina.org/n/2013/1024/c369544-23313556.html

Wang, Y., 2017. *The deathlist of shared bikes.* Available at: http://www.iheima.com/zixun/2017/1208/166341.shtml