

Review of Shared Bicycles as a Smart Mobility Solution for Sustainable Travel in China



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Abstract

China shared bicycles or Mobike's have collected a huge number of copyrights and patents in China with the growing demand in the market. This analysis investigates the strengths, weaknesses, opportunities, and threats of Mobike in the rapidly evolving bike-sharing market, particularly focusing on the integration of electric bikes (e-bikes) into urban mobility solutions. Mobike's strengths include robust bike capabilities, significant intellectual property through patents, and solid supplier relationships, which provide a competitive edge in the market. The company also benefits from strong government support for e-bikes in China and the environmental advantages of shared electric bikes, which contribute to reduced emissions and traffic congestion. However, challenges such as improper parking practices, inconsistent municipal policies, and safety concerns negatively impact public sentiment and hinder the growth of bike-sharing systems. Opportunities for Mobike include optimizing integration with public transport systems, using big data for credit ratings, and capitalizing on international markets. Additionally, advancements in ICT and artificial intelligence can enhance service efficiency and customer satisfaction. Nevertheless, the company faces threats from increasing environmental costs, and rising buyer bargaining power. Furthermore, the increasing competition in the international market, coupled with the need for tailored local strategies, poses significant challenges to Mobike's market position and profitability.

Keywords: Share bicycle or Mobike; Internet; Review; SWOT analysis; Sustainability; Urban mobility; Ecological issues; Social environment

Abbreviations: Dbsss: Dockless Bike-Sharing Frameworks; FBS: Free-Floating Bike Share; Sebs: Shared Electric Bikes; BIPTS: Bike-Sharing for Integrated Public Transport Systems; EBS: Electric Bike-Sharing

Introduction

Substantial fresh studies on shared electric bikes (SEBs) and bike-sharing systems reveal their significant impact on urban mobility and sustainability. SEBs in Changsha reduce carbon emissions by 3.3% [1], while bike-sharing decreases traffic congestion in Beijing, Shanghai, and Wuhan [2]. Public interest in shared bikes has risen since 2018, driven by discounts but hindered by parking issues [3]. In Kunming, e-bikes have more dispersed networks than shared bikes [4]. A BIPTS framework in Beijing improves demand identification by 48.6% [5] and built environment factors affect dockless bike-sharing and metro integration [6]. In Yancheng, e-bike share negatively impacts transit and for-hire vehicle ridership [7], while private e-bike trips in Wuhan are influenced by trip frequency and POI density [8].

A fresh study finds that cities with high tertiary industry ratios, high employment density, and complex terrain see higher usage of shared e-bikes, especially where public transport is lacking. E-bike sharing can improve mobility in less-developed areas and support sustainable transportation development [9].

In 2017, both OFO's bicycle trip off the grounds and Mobike's bicycle venture off Beijing for the New Year finished in Wuhan. The roads were blocked with yellow and orange bikes for some time. The market for shared bikes is separated into three classes: government-run shared bikes, legally binding bikes, and web portion of bikes, which incorporates the primary players, the OFO, and different players like Xiao Ming, cycling, and hi bicycle. The term "bicycle sharing" refers to the practice of sharing bicycles

through the Internet. According to data, China would opt for the “final kilometer” of riding with a population of around 85 million people, resulting in a potential market size of about 8.5 million automobiles based on 10 persons sharing 1 car. According to this assessment, there is still a lot of room for growth in the bicycle market.

Bikes that can be rented via the Internet have a significant effect in both the lower and upper parts of the globe. Overcapacity has mostly been addressed by upstream producers, with a shared bike CEO telling the media that shared bikes now account for 80 percent of the country’s bike production lines. The shared bikes have solved the last kilometer journey problems for downstream users. According to traffic data, vehicles were faster in 80 percent of Beijing journeys and 60 percent of Shanghai travels. As of now, the offer bicycle market has more than 30 dynamic members, with OFO share bicycles, Mobike bicycles, Coolidge, Yongan, minimal blue bicycles, harrow, small bicycle, and Uber bicycles having the most portion overall industry and application downloads. Consider Shenzhen, which invited seven bicycle-sharing firms in October 2017, with a sum of over 520,000 bikes. From a goal stance, the offer bicycle market is yet the Blue Sea market, with a low number of enlisted clients and a city of shared bicycles that is scarcely a large portion of the size of every single Chinese city. The greatness of the market for shared bicycles is yet worth expecting.

The residents’ expectations for everyday comforts have considerably improved as China’s economy has quickly evolved, and the quantity of private vehicles has quickly extended. The traffic bottlenecks and ecological issues that follow are turning out to be progressively intense. The public authority has proposed various measures to resolve the issue, and the improvement of bicycle partaking in 2017 offers the chance of a drawn-out answer to these issues. The development of versatile Internet clients and the prevalence of cell phones are the establishments for the advancement of bikes. Cycling super-advanced and sentiments in Mobike bicycle model, Mobike bicycle CEO Wang Xiaofeng said: First, it’s a unique task in China that separates Mobike bicycle’s new company and other almost 100% of its organizations. Second, it is a social property identified with individuals’ work; if you go to a city administration with thousands of clients, this isn’t something similar, so this is to separate us from the other almost 100% of the business. Third, the advantages of equipment and programming permit it to extend past China, basically later, and to turn into an overall partnership.

The monetary model for Internet-sharing bicycles is projected to expand later, with promoting and huge information income added to the rents and stores. Enormous information is an upper hand for Internet organizations like Mobike, which is overwhelmed by innovation and information and offers some benefit-added administrations to countless purchasers. As far as possible, the spell is who the client is tremendous, sitting on a monstrous number of client assets, the stage between the conclusive battle

is truly beginning, conveying esteem added administrations for clients is likewise the way to share the organization’s last benefit. Modified bikes, enormous information administrations, model results, and other worth-added administrations for the public authority are the most well-known worth-added administrations in the common bicycle space. There are no deficiencies in capital establishments, like Tencent, Alibaba, and Xiaomi, and even protection firms, for example, protection firms, rustic credit associations, investors, complex investors, and capital, just as shared records, all through the sharing area.

Literature Review

E-bikes and motorcycles have had a distinct growth trend and a shift in political attitudes from human-powered bicycles. Because of ideal government approaches and expanded interest from purchasers for an adaptable type of transportation to support short-center distance and last-mile trips, the fate of human-controlled bike transportation in China appears to be splendid. Because municipal policies fluctuate and safety concerns remain unresolved, the future of e-bikes is uncertain [10]. Free-floating bike share (FBS) is a new breed of bike share scheme that offers mobility options that affect people’s everyday commutes. Understanding the variables that impact FBS utilization can assist with directing the improvement of bicycle share programs and policymaking. The use of ICT has a considerable impact on both participation in and use of FBS; however, the social environment, age, and annual individual income have nonlinear impacts on FBS utilization [11].

Since their beginning in 2016, application-based, dockless bike-sharing frameworks (DBSSs) have developed across urban areas in China, managed by significant Internet specialist organizations and with focal government help with a work to advance non-mechanized transportation. Even though it has a more extensive territory and more summed up use, DBSS has a ton of variety in nearby use rates, proposing that controlling explicit neighborhood ecological elements could assist with encouraging more expansive bike use [12]. As dockless shared bikes (DSB) have become more common, cluttered stopping has started public shock and infringe on urban communities’ public spaces. The main component affecting DSB stopping is the absence of a typical meaning of “systematic stopping.” It affirms that accepted practices, correspondence, correspondence obligation, and institutional climate play a significant impact in controlling and rousing right DSB-stopping conduct and recommends that these perspectives might be more critical to represent than monetary motivators [13].

Campus bike-sharing is well-known as a popular mode of pro-environmental transportation for college students. To improve bike-sharing competitiveness, service providers can cancel the deposit and instead use credit ratings based on big data, as well as a variety of additional regulatory consequences [14]. As a clever

method for shared versatility, the sharing bike gives an assortment of potential outcomes to metropolitan occupants' regular drive. There were clear morning and evening tops in the sharing bike travel designs for the two non-weekend days and ends of the week. It could add to the conversation around shared mobility by highlighting a Chinese scenario typified by fast-emerging MICTs and providing guidance to local governments on how to improve densely populated areas [15].

Bike-sharing is a business transportation administration, not a sharing economy, as far as monetary characteristics; be that as it may, as far as transportation capacities, shared bikes have the double elements of further developing public transportation comfort and decreasing gridlock and contamination emanations; as far as generally impacts, bike-sharing has set off underlying changes in metropolitan transportation and primary responses in the bike business; and shared bikes have set off underlying changes in the bike business [16]. There is a lack of comprehension of how the common versatility market emerged, how it reshapes day-by-day travel designs, and what, all things considered, shared portability adds to natural objectives, especially environmental change alleviation [17]. Another study evaluates the carbon reduction potential of shared electric bicycles (SEB) in Changsha, showing a 3.3% decrease in emissions. SEB proves more sustainable than infrastructure or car restriction options. Increased travel distance is key for greater carbon reduction [1]. The impact of bike-sharing on urban traffic congestion in Beijing, Shanghai, and Wuhan, finding significant short-term congestion reduction. It highlights that initial bike-sharing deployments reduce road congestion by boosting metro ridership, offering valuable policy insights for traffic management [2].

Statistically, a study analyzes over 721,000 posts from Sina Weibo to assess public attention and attitudes toward shared bikes in China. It has been found rising interest since 2018, with positive sentiment driven by discounts, though negative reactions arise from poor parking management, offering insights for policy improvements [3]. However, the spatial-temporal travel patterns of shared bikes and e-bikes in Kunming, China, using machine learning methods. It finds similarities in trip attributes and spatial distribution, with e-bikes showing more dispersed networks and shared bikes relying more on public transit for commuting [4]. Further, the study develops a comprehensive framework to analyze bike-sharing for integrated public transport systems (BIPTS), using multi-catchment areas and SHAP to identify commuting demands and driving factors. A case study in Beijing shows that this approach improves demand identification by 48.6%, revealing key factors and three distinct commuting patterns for better integration [5]. Another study uses XGBoost and SHAP to analyze how built environment factors influence dockless bike-sharing (DBS) and metro integration, finding that route attributes have a stronger, nonlinear impact than traditional factors. The findings

offer insights into optimizing vehicle allocation and sustainable transportation planning [6].

Consistently, a study finds that e-bikeshare negatively impacts transit ridership in Yancheng, with a 1% increase in e-bike trips leading to a 0.618% decrease in transit ridership. It suggests targeting areas with limited transit options and adjusting strategies based on weather conditions to maximize complementary benefits [7]. Moreover, a study finds that electric bike-sharing (EBS) significantly substitutes for for-hire vehicle (FHV) ridership in Yancheng, with a 1% increase in EBS trips leading to a 0.810% decline in FHV use. The impact is stronger in central areas and weakened by unfavorable weather, highlighting the need for a balanced integration of EBS in urban mobility systems [18]. A similar study uses a spatiotemporal random forest to analyze private e-bike trips in Wuhan, finding that trip frequency and POI density influence usage, with effects varying by location and time. The results provide insights into better transportation planning and policy [8]. However, four degrees of relaxation benefits (social, physical, individual, and mental advantages) and two out of four recreation benefits (social and mental advantages) that at last influence personal satisfaction are measurably impacted by the sharing economy's recreation highlights [19].

Data and Method

In this study, a SWOT analysis approach has been employed based on data from numerous websites and the findings of previous research. The SWOT analysis is a strategic tool used to assess an organization's competitive position and develop key strategies. It evaluates both internal and external factors, alongside existing opportunities, to provide a comprehensive understanding of an organization's strengths, weaknesses, opportunities, and threats. The analysis relies on real data and avoids assumptions or vague interpretations, ensuring that the findings are based on actual situations. Rather than providing direct solutions, SWOT analysis serves as a valuable recommendation tool for organizations. This method is widely used to assess performance, competition, risks, potential, and various aspects of an organization, such as product offerings, industry, or even specific departments. In our review, the SWOT analysis is grounded in the findings from previous studies, enabling a data-driven approach to understanding the dynamics of the industry or organization under consideration.

Review Analysis

Strengths

- a) Shared electric bikes (SEBs) contribute to a 3.3% decrease in emissions, proving their sustainability [1].
- b) Bike-sharing systems in cities like Beijing, Shanghai, and Wuhan help reduce traffic congestion and boost metro ridership [2].

c) Government policies in China have supported the growth of e-bikes, making them an ideal flexible transportation option for short and last-mile trips [10].

d) Shared bikes, including e-bikes, contribute to reducing traffic congestion and pollution, offering environmental benefits in urban mobility [16].

e) Mobike's strong bike capabilities and resources provide a competitive edge for long-term market advantage.

f) The company has accumulated numerous patents and copyrights, enhancing its innovation and intellectual property.

g) Mobike's has established strong relationships with suppliers and partners, benefiting from its industry experience.

h) Despite being more expensive than competitors, Mobike maintains a competitive position through investment in R&D.

i) Mobike's first-mover advantage and ability to grow in its home market offer a foundation for expanding into new territories with further innovation.

j) The Mobike bike has the benefit of being first to market in some categories. It has attempted to do so in several strategic areas.

Weaknesses

a) Public sentiment is negatively impacted by improper parking practices, despite the overall positive perception of shared bikes [3].

b) In Yancheng, an increase in e-bike trips leads to a decline in transit ridership, which may undermine public transport systems [7].

c) Despite government support, safety issues remain unresolved, and municipal policies are inconsistent, creating uncertainty about the future of e-bikes [10].

d) Free-floating and dockless bike-sharing systems lead to cluttered parking, which has caused public frustration and affected urban public spaces [13].

e) Mobike Bike struggles with underutilizing front-end technology and poor inventory and cash cycle management.

Opportunities

a) The integration of bike-sharing systems with public transport (BIPTS) can be optimized by identifying commuting demands and driving factors, improving urban mobility [5].

b) A better understanding of built environment factors can lead to more efficient allocation of e-bikes and better transportation planning [6].

c) The use of ICT can significantly enhance participation in and the use of free-floating bike-share schemes, aiding in the

optimization of bike-sharing services [11].

d) Using big data for credit ratings instead of deposits could improve the competitiveness of campus bike-sharing programs [14].

e) Mobike Bike can employ an adjacent industry strategy to increase its market, namely by enhancing the features of its current products and services.

f) In the international market, globalization has provided opportunities. Mobike's is in a strong position to capitalize on these opportunities and grow its market share.

g) Mobike Bike can develop agreements with local suppliers and shipping providers using an e-commerce business model in the international market. Growth in social media can help Mobike Bike reduce the cost of entering new markets and reaching out to clients with a smaller marketing expenditure.

h) Mobike bikes can use artificial intelligence to better predict consumer demand, cater to specific segments, and build stronger recommendation engines.

i) Over the last half-decade, the market has expanded at a breakneck pace. As a result of the influx of new clients, consumer preferences and tastes have changed.

j) Mobike bikes may be able to take advantage of increased disposable income to develop a new business model in which users pay for their usage of the company's products incrementally.

Threats

a) Public sentiment is negatively impacted by improper parking practices, despite the overall positive perception of shared bikes [3].

b) In Yancheng, an increase in e-bike trips leads to a decline in transit ridership, which may undermine public transport systems [7].

c) Dockless bike-sharing systems (DBSS) experience varied local usage rates, suggesting the need for tailored environmental strategies to encourage more widespread use [12].

d) People may be slow to adapt to shared mobility systems, limiting their full environmental and transportation potential [17].

e) Growing rising environmental costs, along with potential interest rate hikes, pose significant risks to Mobike Bike's expansion and profitability, especially with its reliance on debt for growth.

f) Increased buyer bargaining power and the presence of both domestic and international competitors using cost-effective client acquisition methods create added pressure on Mobike Bike's market position and profitability.

Conclusion

Mobike's or shared bicycles have amassed countless licenses and copyrights by advancing and buying them from the first makers. The homegrown market is both a wellspring of solidarity and an obstacle to the organization's development and advancement. Mobike Bike holds strong competitive advantages due to its technology, intellectual property, and government support. However, challenges related to safety, public sentiment, and inconsistent policies must be addressed for sustained growth. Opportunities lie in integrating with public transport systems, utilizing big data, and expanding into international markets. The increasing competition and environmental concerns require adaptive strategies to maintain profitability and growth. Mobike's ability to innovate and navigate regulatory landscapes will determine its success in the long term. Mobike bicycles will require a greater interest in innovative work in entering the worldwide market. Mobike Bicycle can utilize a contiguous venture technique to grow its market, especially by extending the attributes of its present items and administrations.

Globalization has set out open doors in the worldwide market for Mobike bicycles. Online business plans of action can help the organization shape associations with nearby providers and coordination suppliers. Mobike bicycle faces difficulties from various variables, including a growing imbalance in the Developed and Developing Worlds, expanding natural limitations, and contests from online business and web-based media stages. The organization's dependence on simple credit can be removed whenever, and it should zero in on bringing its dependence on obligation down to an extent. Mobike Bicycle's authoritative culture is yet described by turf fights between divisions, bringing about directors keeping data near their chests. Notwithstanding having fused innovation into backend processes, Mobike bicycles presently can't seem to bridle the force of innovation in front-end processes. The organization's stock and money cycle are not very much made do.

The implications of this SWOT analysis highlight key areas for strategic decision-making. Organizations can leverage their strengths, such as innovative capabilities and strong market presence, to sustain a competitive edge. Identifying weaknesses allows for targeted improvements in areas like technology utilization and inventory management. The analysis also reveals growth opportunities, such as expanding into new markets and enhancing product offerings, driven by technological advancements. On the flip side, recognizing external threats, including regulatory challenges and competition, enables proactive risk management. Ultimately, this study provides actionable insights for organizations to align their strategies with current market dynamics and industry trends.

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