

Research on Shared Bicycle Problems Based on Game Theory- Take Ofo Sharing Bicycles as an Example

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ABSTRACT

Since 2016, various shared bicycles have mushroomed in our lives. However, many problems have also been encountered in the use of shared bicycles. This article takes ofo sharing bicycles as an example, based on game theory, analyzes the problems encountered during the use of shared bicycles, and analyzes each player. Finally, suggestions are made on the problems that have been analyzed so that shared bicycles can develop better.

Keywords Shared Bicycle; ofo; Game Theory

INTRODUCTION

Since 2016, various shared bicycles have mushroomed in our lives. However, there are many problems in the development of shared bicycles. This includes issues between shared bike users and owners, issues between shared bike users, and issues between shared bike owners and other stakeholders. The ofo is the "original ancestor" of shared bicycles and is also a representative shared bicycle. This paper observes the ofo problem from the perspective of game theory, and puts forward related suggestions based on the theory of game theory.

ANALYSIS OF OFO STATUS

"Shared bicycles" is a typical "Internet +" innovation. Sharing bicycles with the "Internet + traditional bicycles" eliminates the need for fixed piles in traditional municipal public bicycle parking and solves the "last mile" problem of public travel. In addition, shared bicycles are cheap and convenient, and are popular with the public. Their innovative business model and the concept of "green travel" advocated by them are the trend of social development^[1]. Of which, ofo is the first shared bicycle in China, and ofo shared bicycles are mainly based on "ofo". At present, ofo has covered 22 cities. As of the end of July 2016, it has accumulated a total of 160,000 bicycles, with more than 2 million users, and claims that it will put 1 million vehicles in the year^[1].

Many problems have also arisen when the sharing bicycle is booming. Recently, an article titled "Shared Bicycles, It's a Folk Mirror" has been lit up in a circle of friends. The pictures in the article show that shared bicycles suffer from a variety of "abuses": some are linked to trees. Some were thrown into the river and others were dismantled. These phenomena are not inconceivable. We can see that there are also signs of oblivion to the QR code on the school campus. You can see some of them are locked on the streets of the city and some of them are piled up.

THE VARIOUS PLAYERS OF OFO

The Game between Ofo Users and Ofo Owners

The owners of shared bicycles and owners of shared bicycles are "rational economic people." In the process of using shared bicycles, users of shared bicycles maximize their own interests (where benefits do not refer to money, but rather to satisfaction, convenience, etc.), and often privately lock and even relocate. . The owners of ofo want to bring benefits for themselves through sharing bicycles. The high utilization of ofo will bring more benefits to the company. Therefore, the owner of ofo hopes that ofo will not be occupied by a specific person alone. The game between the ofo users and owners is seen as a principal-agent game. Because in the game environment, there are two basic objective facts: personal profitability and information asymmetry.

The Game between Ofo Users

The users of shared bicycles are also “reasonable economic people” and the number of shared bicycles is limited. It is impossible for everyone to use them when they want to use a car. In the shared car use process, users all want to satisfy their own convenience to the greatest degree through the use of shared bicycles. When the greatest extent meets its own convenience, the interests of other users will be damaged. The contradiction between the users of shared bicycles is regarded as a tragedy of the commons, because ofo has no fixed person to supervise and ofo is a mechanical lock. As long as everyone downloads the APP, the game can be used. It is a tragedy of the commons.

The Game between Ofo Owners and Other Competitors

The large-scale development of shared bicycles is bound to bring impact to other stakeholders. According to relevant reports, due to the fact that the public transportation transfer system still needs to be improved and the traffic jams are serious, the blacksmiths that have emerged on the streets of Zhengzhou have become the “first choice” for rush of people in the peak period. However, the launch of shared bicycles also makes the blacksmiths really worry. Not only the drivers of Zhengzhou’s motorcycles are experiencing a cold winter. At the entrance to the Beijing Changyong subway where shared bicycles are more popular, the income of the drivers of most motorcycles is reduced by half. Some practitioners have to give up and start seeking other outlets^[2]. In the existing market, the number of consumers is certain, and companies want to obtain more consumers and gain more benefits. As a result, industries such as sharing bicycles and their stakeholders have generated a game. At present, shared bicycles provide more convenient and efficient services for more citizens through its green travel concept, and occupy a better position in market competition. However, with the development of the times, more competitors will compete with shared bicycles in the future market. As a result, the game problems that arise are close to the eye, and we must pay attention to it.

OFO USE PROBLEM SUGGESTION

Advice on issues between users of Ofo and Ofo Owners

The game between the ofo user and the owner is regarded as a principal-agent game. Among these, users of ofo are regarded as agents, and

ofo's owners are regarded as owners. The user experience that ofo brings to the user is treated as the income of the agent, and the user of ofo does not destroy the use of ofo as the agent's choice in consecutive intervals (e). Users of OFO have the benefit of not using OF (U) Then the question becomes the optimal contract between OFO user and owner.

Since the output effect is indefinite, R is a random function of e: $R = R(e)$; because of the uncertain effect of ofo on the user, it is only possible to determine how to give the user the basis of R. To effect w. The benefit function of the ofo user is: $R-w=R(e)-w[R(e)]$, and the benefit function of the ofo owner is: $w-C=w[R(e)]-C(e)$. According to the optimal contract model, when there is a balance between the user and the owner, the effect of ofo can be maximized, thereby benefiting the ofo user and the owner. The owner of ofo can use incentives to promote a balance between owner and user. The motivation object includes the user of ofo using the ofo multiple times without destroying the ofo, and the ofo user also reports the person who destroys the ofo. Incentives include discounted rides, free rides, etc.

Advice on Issues between Users of Ofo

When ofo cannot reach the intention of each user at any time, ofo users will take selfish measures to secretly lock or secretly lock the ofo. This problem is similar to the tragedy of the commons. To solve the problem of overgrazing by pastoralists, a method of contracting grass land was adopted. Because the herdsmen have the responsibility to protect the grassland, and have the right to enjoy the benefits of grassland. During the use of OFO, users only paid attention to the benefits of OFO and did not realize the responsibility of OFO and the rights of other users. Therefore, to solve the game problem among the users of OFO, it is necessary to strengthen the sense of responsibility, improve the supervision and punishment mechanism. Supervision includes oversight between the users of the OFO, oversight of the OFO owner and supervision of the relevant department^[3].

Ofo's Proposal to have Questions between you and other Competitors

The owners of ofo and other stakeholders (shared bicycles among other brands) can be seen as competitive relationships between companies. Therefore, we use the Hotelling model to solve this problem.



Consumers in the X position use ofo if and only if $P1+tX2 < P2+t(1-X)2$. The greater the parameter t, the more sensitive the user is to the difference between the two products. If $t=0$, then both products are completely substitutes. Sharing bicycles with traditional bicycles and motorcycles is not a complete replacement because shared bikes provide a more convenient and faster way of thinking and green travel. In the course of the game with traditional industries, shared bicycles are in an advantageous position^[4]. However, new competitors may emerge in the future. In the future competition, ofo needs to provide some more creative and more convenient services, so that ofo in the game in an invincible position.

CONCLUSION

In this paper, from the perspective of game theory, the principal-agent game model is used to propose the game between the OFO user and the owner. Based on the tragedy issue of the commons, the game is proposed for the OFO users. The application of the Howden model is OFO. Competition with its stakeholders proposes competition^[5]. At present, there is a lack of knowledge about the shared bicycle

market and game theory. Therefore, in the future learning process, relevant issues will be perfected as far as possible.

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