Research on Satisfaction Promotion Strategy of the Sharing Bicycle

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Abstract

With the rapid development of mobile Internet and Internet of things technology, the sharing bicycle have become the new favorite of residents' go out. However, users have different understanding and cognition about the service of the sharing bicycle. Based on questionnaires to survey the users' satisfaction with the sharing bicycle, this paper uses factor analysis to find out the factors that affect customer satisfaction. They are "bicycle performance factor" and "human cognitive factor". In this paper, we propose a strategy to enhance the satisfaction of sharing bicycles in order to make the sharing bicycle serve the public better.

Keywords

The Sharing Bicycle; Satisfaction Evaluation; Satisfaction Enhancement.

1. Introduction

The sharing bicycle refers to the bicycle sharing service provided by enterprises in campus, subway stations, bus stations, residential areas, commercial areas, and other public areas. This is a time-sharing lease mode. Green As a combination of Internet technology and traditional bicycle, The sharing bike creates a new format of "Internet plus"[1]. By the end of 2016, it is reported in the 2016 China Sharing Bike Market Research Report which released by the third party data Research Institute Bida that the total number of users in China's sharing bike market has reached 18 million 860 thousand, and its size will continue to grow substantially in 2017, and it will reach 50 million of users by the end of this year [2]. The sharing bike has gone through two stages:1. Piled public bicycle with government public management 2.No single pile sharing bike rised in the wave of "Internet plus" background. Compared with piled bicycles, the sharing bicycle is more conducive to solve the "last mile" problem of urban traffic, and improve the convenience of residents travel. However, more and more problems are exposed in the process of operation and service of the sharing bike. This paper takes this as an opportunity, based on the questionnaire survey data, uses factor analysis to find out the factors that affect the user satisfaction, and accordingly puts forward strategy to enhance the sharing bicycle satisfaction degree to make the sharing bike serve the public better.

2. Literature review

Although the sharing of bicycles is a new thing, the research on its predecessor public bicycles has been the focus of many scholars. The concept of public bicycle originates from the white bicycle in Amsterdam Europe. In order to successfully carry out the concept of public bicycle, foreign scholars have done many researches. Wafic El-Assis et al. [3] Used the historical travel data of the whole year to analyze the factors that influence the bicycle sharing passenger flow in Toronto. It is considered that building environment, weather, bicycle infrastructure and sharing travel will affect the public's recognition of public bicycles. Luca Di Gaspero et al. [4] use operational research theory to build models to optimize the bicycle site for the design and relocation of travel routes. H.M. Abdul Aziz et al. [5] Evaluated the influence factors of bicycle traffic mode choice from aspects of traffic safety, walking bicycle network facilities and land use attributes.

In order to further improve the efficiency of the service in the China public bicycle, domestic also emerged a large number of public bicycle scholars, the main research directions are bicycle network distribution, vehicle scheduling and control, public bicycle operation management mode, several

aspects of information management and user satisfaction etc.. In order to find a strategy to improve the satisfaction degree of shared bicycles, I hope to get some theoretical support from the related literatures on the improvement of public bicycle satisfaction. Yijie Cao6] surveyed the distribution of public bicycle sites in Hangzhou by observation. It was considered that the distribution of bicycle service points, the similarities and differences of bicycle numbers at various sites, and cycling scheduling of bicycles and other factors would affect bicycle service satisfaction. Jia Qian et al. [7] taking Suzhou city as an example by using the method of factor analysis and structural equation model to analyze the impact factors of user satisfaction that the use of public bicycles, flexible and convenient operation service, economic cost, layout design, comfort and environmental protection and safety of these six factors will affect the user satisfaction. Liqin Jiang and Baotai Wu[8]take Jiangsu Wuxi as an example by using the factor analysis method to analysis the influence factors of user satisfaction of public bicycle, explain the higher degree of the three factors empirical factor, service factor of a bicycle, factors of satisfaction, and that the rental object is the need to focus on improvement factor. Lei Zhang and Daoyong Wang[9] through the questionnaire survey, factor analysis and logistic regression analysis using the public bicycle service system and service elements satisfaction analysis, service efficiency, compensation mode, service quality, value-added services and Business Hours five factors will affect the user's satisfaction.

The sharing bicycle break the design of traditional public bicycles from the design concept. Therefore, compared with public bicycles, the problem of improving the satisfaction of the sharing bicycle is more unique. The topic of the sharing bicycle has also attracted wide attention from academia. At present, the research on the sharing bicycle is mainly focused on three aspects: the profit mode of the sharing bicycle, the research of the sharing bicycle operation mode and the future development direction of the sharing bicycle. From the profit model, Wenjing Ge [10], Kunwei Zhou[11]and other scholars calculated the rate of return on the investment of the sharing bicycle industry by case study. Yuan Tan [12] , Zixuan Zhang [13] and other scholars mainly studied the problems that appeared in the operation of the sharing bicycle, analyzed the reasons after the problem and put forward the corresponding solutions. Xinyu Ma [14] , Kunhao Li[15] and other scholars focused on the sharing mode of development and the introduction of the internet bicycle and the concept of government procurement. Some scholars also start from the mode of the sharing bicycle, and investigate the user satisfaction. Simeng Zhou [16] uses the structural equation model from safety and environmental factors, convenient and flexible factors, distribution and stop taking factors, appearance and performance factors, the service and maintenance of five aspects of factors put forward relevant assumptions, and evidence from there is a positive correlation between the five factors and user satisfaction. Qin Fang [17] use AHP to chime Mobike bicycle for the investigation of user satisfaction and put forward improvement opinions and suggestions related to Mobike bicycle.

According to the related literature, it is not mature to study the strategy of improving the use of single car. With regard to the evaluation of the satisfaction of sharing single vehicle, most of the existing mature studies have adopted the methods of analytic hierarchy process, expert scoring method and structural equation model. This study draws on the research methods of public bicycle satisfaction evaluation, applies factor analysis to find factors that influence user satisfaction, and puts forward corresponding strategies to improve satisfaction based on these factors.

3. Research design

3.1 Data sources

Because the online survey has the advantages of wide audience, fast speed and convenient data arrangement, this investigation adopts the method of network investigation. The survey was conducted in April 2017.In order to ensure the quality of the questionnaire, a small range of 30 copies issued in advance, screening problems and adjusting the structure of the questionnaire, and finally released the final manuscript on the Questionnaire Star. The survey involved primary school students, middle school students, college students, office workers and others.343 questionnaires were obtained, among which 299 were complete and effective, with an effective rate of 87.2%.

3.2 Questionnaire design

Referring to the relevant literature on the questionnaire design, the author designed a questionnaire based on the actual situation of sharing bicycle use. The questionnaire includes five parts: (1) personal information including gender, age and so on; (2) the basic usage of the sharing bike; (3) the user satisfaction survey, including 14 specific issues in the survey, using a Likert scale, namely 5 represents very satisfied,4 represents generation satisfied. 3 represents the general, 2 is not satisfied, 1 stands is totally not satisfied, let the user opt satisfaction for each problem; (4) open problems such as: "do you think what is the most part to improve for the bike sharing?" The respondents can answer the question according to the actual situation. (5) user perception, whether you will use the sharing bike in the near future?

The questionnaire designed satisfaction evaluation index system. The index system draws on the 23 items of six dimensions of scholar Jia Qian, and the division method of 15 dimensions of scholar Lei Zhang's five dimensions. Taking into account the characteristics of sharing bicycles, the accuracy of sharing bike positioning and the concept of the sharing bicycle without pile design are added. Finally, a total of 5 dimensions were included, including 14 indicators, as shown in table 1.

Table 1 Establishment of evaluation index

Dimension	Index name	Index number
Convenience	The time to find a sharing bike	X1
	Accuracy of sharing bike positioning	X2
	The rental mode	X3
Operation	Convenience of handling formalities	X4
service	Comfort of the sharing bicycles	X5
	Bicycle maintenance and repair by the sharing bicycle company	X6
	Additional facilities of the sharing bicycle	X7
	Operation convenience of APP or other software built-in programs	X8
Distribution	The idea of sharing a bicycle without piles	X9
mode	Bicycle scheduling	X10
economical	Pay the deposit price	X11
efficiency	The fee for renting a bicycle	X12
Security	Road conditions providing for bicycle driving safety	X13
	The safety of using bicycle	X14

3.3 Methods

Factor analysis is a technique that can simplify variables. It uses a few factors to describe the connections between many indicators or factors, and reflects most of the information of the raw data with fewer factors. Through reading relevant literature, the author referred to the relevant scale design, and selected 14 factors that may affect the satisfaction of shared bicycle use. The reliability and validity of these indicators were tested and descriptive statistics were carried out, and the main influencing factors were extracted by factor analysis. Using SPSS 17.0 to standardize the index data, the average value of the processed data is 0 and the standard deviation is 1, so that the result of factor analysis is not affected by the dimension of the data in the empirical process.

4. Results and discussion

4.1 Results

4.1.1 Descriptive results

After sorting out the questionnaire results, the basic information of the sharing bike users and the usage of the sharing bicycle were obtained. In the gender distribution, 43.02% of the respondents were male, 56.98% were female, while the female was slightly more than the male, but the overall difference was not big. In the age distribution, middle school students, college students and office workers were 14%, 30% and 27%, respectively, and the proportion of the three age groups was 71%.In the occupation distribution, the most is the students, followed by the company staff, and finally is the government staff. In terms of monthly income, the income is below two thousand yuan, followed by three thousand to five thousand, which also shows that the occupation distribution of students is mostly students. In terms of frequency, most respondents use three to five times a week, the frequency is relatively high. In terms of use time, most people ride less than 30 minutes a day. In the use of purposes, for commuting and daily travel more, followed by metro, bus and other tools to connect.

4.1.2 Factor analysis results

(1) Reliability and validity test

The Scholars use the Cronbach's alpha to evaluate the validity and reliability of the questionnaire data. The reliability coefficient of the scale is 0.76, and the reliability of the questionnaire is good. KMO and Bartlett are the important basis for testing whether the sample is suitable for factor analysis. The KMO value of the test result is 0.912, which shows that factor analysis method can be used, and the research results have credibility. The Sig value is 0, which indicates that the data obey the normal distribution.

(2) Factor extraction

The principal component analysis method is used to extract factors, the standard is that the eigenvalue is greater than 1.As the cumulative variance contribution rate of the factor is small, the smaller X3, X4 and X9 are excluded. The remaining factors are analyzed again. From table 2, we can see that the first is the factor number, the second is the cumulative contribution rate to extract the sum of squares, and the third is the variance contribution rate and the cumulative variance contribution rate of the sum of rotation squares. In this study, two principal factors were extracted from fourteen indicators, and the cumulative variance contribution rate was 78.436%, indicating that these two factors can reflect most of the information of the original variable. Considering the difference between individuals and cognition, we believe that two of the 78.436% cumulative variance contribution factors can represent the influencing factors of user satisfaction.

Table 2 Total variance of interpretation

Ingredients	Extracting square sum and loading	Rotated square sum loading		
	Cumulative %	Total	Variance %	Cumulative %
1	60.015	3.407	40.972	40.972
2	78.436	3.351	37.464	78.436

(3) Extraction factor and naming

Rotation of orthogonal variance is rotated to select the two factors representing user satisfaction, and the rotation component matrix is obtained, as shown in Table 3.

From table 3, we can see that the f_1 factors have larger loads on X11, X12, X13 and X14, which is called "human cognition" factor, and this factor accounts for more than 0.75 of the four economic indicators, such as deposit price, toll price, road safety and personal safety. The f_2 factor has a large load on X2 and X6. It is called "the bicycle performance factor", and the factor explains the two indicators of bicycle location accuracy and maintenance, which are all above 0.75.

Table3 Rotation component matrix

	component	
	1	2
X1	.213	.692
X2	.080	.808
X5	.490	.518
X6	.261	.752
X7	.358	.655
X8	.535	.563
X10	.435	.627
X11	.766	.171
X12	.788	.249
X13	.751	.248
X14	.820	.304

4.1.3 satisfaction factor model

After the naming of factors, the satisfaction factor model can be constructed according to the variance contribution rate of the factor. The human cognitive factor is f_1, and the bicycle performance factor is f_2. According to the matrix, the factor expression is written:

$$f_1=0.766X11+0.788X12+0.751X13+0.820X14 \quad (1)$$

$$f_2=0.808X2+0.752X6 \quad (2)$$

According to the above two functions and further using the method of factor weighted total score, the comprehensive evaluation formula for the use of the sharing bicycle is obtained.

$$F=0.410\ f_1+0.375\ f_2 \quad (3)$$

The weight coefficient of each factor in the upper formula is only considered from the simple quantitative relation, and the variance contribution rate of each factor is the weight. This function can be used as the basic evaluation formula for the satisfaction of the sharing bicycle. F shows the comprehensive score of user satisfaction. The greater the F value, the higher the user's satisfaction.

4.2 Discussion

The rise of the sharing bicycle is related to technology, but whether this industry can continue to develop is related to many factors, for example, the development concept of the sharing bicycle companies, the relevant policies of the government, and the expectations of the masses.

According to the data of questionnaire satisfaction, users are more sensitive to the "the sharing bike performance" and " the cognition for the sharing bicycle". Therefore, the following recommendations are put forward by the author:

4.2.1 The sharing bicycle companies should provide high performance bicycles

(1) The sharing bicycle is operated in a time-sharing leasing mode. Its frequency of use is much higher than that of private bicycles. In order to provide basic conditions of use, the sharing bicycle companies should consider the use of high-performance bicycles.

(2)The use of the sharing bicycle is influenced by weather. In the hot and rainy days, the sharing bicycle basically is fully exposed to the adverse weather conditions, so the attrition rate is much

higher than the private bicycle, but this loss is inevitable, so from the perspective of the attrition rate, the sharing bicycle companies should provide high performance bicycle.

(3)The relevant government departments have issued corresponding policies, which stipulate that all discarded sharing bicycles can no longer be used again. From the perspective of life cycle, the cheap and low performance sharing bicycle are a burden for enterprises. The high quality sharing bicycle can not only enhance user stickiness, but also reduce scrap rate and operation cost, enhance user stickiness and corporate image.

4.2.2 The relevant government departments should reasonably divide the road use arrangements

Now, users are starting to pay more attention to the security of using the sharing bicycle on the basis of the pursuit of low prices. The sharing bicycle can go into the city and make it easier for people to go out, but the infrastructure is not as flexible as a bicycle. Many cities' main roads have been built and used for many years. The proportion of non motorized driveway is less than that of motor vehicle. Many cities' auxiliary roads are dedicated bus roads, and roadside also has parking spaces. Therefore, there is a great potential safety hazard in the sharing bicycle. This requires the relevant government departments to reasonably divide the road use arrangement and give the new thing into a certain space.

4.2.3 The sharing bicycle companies need to make appropriate pricing strategies

The deposit of the sharing bike is dedicated to a special fund, and the way to make a profit is rent. Different deposit prices will make users form preferences, so the sharing bicycle companies can consider lowering the deposit price appropriately, and combining the deposit and user's bank reputation to attract users.

In addition to the survey of the satisfaction part of the questionnaire, the author also analyzes the issue of openness. The most open questions are the disordered parking of the sharing bicycles and the difficulty of borrowing bicycles at peak periods. In view of these two problems, the author puts forward the following two suggestions:

4.2.4 No pile is not equal to disorder, the government and the enterprise should negotiate to delineate the designated parking area

The idea of sharing a bicycle without a pile is just more popular among young people. In contrast, middle-aged and elderly people are more dislike the disordered parking of the sharing bicycles. Compared to a pile of public bicycle, the parking of the sharing bicycle is more flexible. But no pile is not equal to the disorder, the parking space can be devided into more" small chunks ", which specifies the designated parking area to regular the sharing bicycle. That is to say, a sharing bicycle can use as many designated parking areas as possible instead of a public bicycle’s site, so that it can be accessed flexibly, or it can also solve the problem of disorderly parking.

At the same time, it is not scientific to divide the designated areas of their own sharing bicycles at present. Users always solve problems according to the most convenient way. This requires the sharing bicycle companies to communicate with the government, only need to separate the parking area, and do not need to be specific to a company.

4.2.5 The sharing bicycle companies should join together to create ″interlibrary loan″ atmosphere

In the open question of the questionnaire, a large number of users mention the phenomenon that the bicycle can not be reached at the peak time period. Most users lease only one kind of bicycle, so there will be no bicycles that have leased, but there are many other bicycles. Taking into account the user's loyalty and convenience of the bicycle, the author boldly proposes a solution of smart circulation. The sharing bicycle companies can be combined the bike rental service together into a more comprehensive and more benefit services, like the bank to withdraw money, the company can provide a bicycle of their own to rival’s users with slightly higher cost.

5. Conclusion

The sharing bicycle is a new form of industry in the background of mobile Internet, which is the representative of Internet plus traditional industries. The sharing bicycle industry rapidiy rise in the short term and sccore a success, but the process of operation service also has some problems. Through reading the relevant literature and combining the actual situation of the users, this paper designs a questionnaire. This paper makes a survey on the satisfaction of the users of the sharing a bicycle, and puts forward some suggestions on the development of the sharing bicycle industry from the perspective of the consumer.

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