Study on the Lack of Cycling Utilization in Shijiazhuang Area

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Abstract. The city of Shijiazhuang has solved the problem of the "last kilometer" of the public transport. However, the public has insufficient awareness of the use of bicycles. To improve the utilization rate of Shijiazhuang bike sharing and in a questionnaire, this paper analyzes the present situation of the application of bicycle Shijiazhuang sharing, using statistical analysis and using SPSS software concrete study of the main reasons of the lack of bike sharing utilization and accordingly put forward to step up investment in a Shared bicycle parking bays distribution carries on the reasonable planning advice. At the same time, simplify the use of bike sharing way, under the capital safety guarantee of the user, make the bike sharing to effectively improve the utilization rate of situation.

Introduction

With the rapid development of economy in our country, the rapid increase of urban population, which can lead to traffic jams and pollution of the environment problem increasingly serious, and as a heavy pollution in Shijiazhuang city is facing these problems particularly. Public transportation development is to solve urban traffic problem is simple and effective way. Shared bike travel not only environmental protection low carbon, and meet the needs of residents travel “the last kilometer”, and with the country's emphasis on environmental protection, share the development of the bicycle industry attention will increase. At the beginning of January 2017, the bike sharing was officially launched in Shijiazhuang. More than half a year later, the bike sharing was developing rapidly in Shijiazhuang, and gradually affected the way of traveling of Shijiazhuang residents. In the backdrop of the environmental protection, the national environmental policy, therefore, “bike sharing” arises at the historic moment, and accompanied by Shijiazhuang underground opening.

Analysis of the Current Situation of Cycling Application in Shijiazhuang

The Disorderly Stop is Obvious

In the present economic development of “sharing economy” become a new breakthrough, bike sharing has become a new trend of urban development, along with the continuous development of bike sharing and an increase in the number of people using the bike sharing also is in rapid growth, questionnaire showed that 73% of people think disorderly parking place is a bike sharing, In this context, the bike sharing disorderly parking place not only affects the city of shijiazhuang, also easy to cause chaos, increase traffic pressure.

The Vacancy Rate Increases

With all the bike sharing competition between enterprises and companies to share the bicycle last on the “mode”, lead to serious beyond market just need to input the number of demand, cause serious waste of resources. Shijiazhuang in 2017 invested more than 30 Shared bicycle. With bike sharing number increasing, the capital of the company will be more and more heavy burden, recover the cost will be more serious, at the same time, also lead to sharing a bike the vacancy rate is higher and higher, the problem of insufficient bike sharing utilization will be more and more prominent.

The Cost of Bike Sharing Is Too High

Bike sharing as a new service, money is a key issue, But the deposit as an important point of profit
is crucial. Taking students at Hebei University of science and technology, for example, the cost of the bicycles is 0.079 yuan every time. For example, the bike sharing OFO is used as an example, and the rent is at least 0.5 yuan per rental, The cost of MOBIKE is higher, and the cost is 1 yuan. Seriously exceeds student's purchase cost, so students tend to buy their own cars. Whether the deposit is safe or not, can you withdraw the deposit at any time? The user will have to evaluate the risk or give up the registration before using it.

An Empirical Study of Underutilization of Bike Sharing

Index System Construction and Data Sources

Combined with the characteristics of the bike sharings in Shijiazhuang, after data processing and screening, this paper constructs the empirical research index system from three aspects: market environment, social development environment and bike sharing utilization environment (refer with Table 1).

<table>
<thead>
<tr>
<th>Primary index</th>
<th>Secondary indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market environment</td>
<td>I heard, no chance to use(X1)</td>
</tr>
<tr>
<td></td>
<td>Never heard of, do not understand(X2)</td>
</tr>
<tr>
<td>Social development environment</td>
<td>Money security reasons(X3)</td>
</tr>
<tr>
<td></td>
<td>Cost reasons(X4)</td>
</tr>
<tr>
<td>Bike sharing utilization environment</td>
<td>Tedious use of the process(X5)</td>
</tr>
<tr>
<td></td>
<td>Cannot quickly find the surrounding available bike sharing(X6)</td>
</tr>
</tbody>
</table>

The survey method select the survey method, on the premise of listening to the opinions of relevant experts, combined with the actual situation in Shijiazhuang, developed a questionnaire designed to study the reasons for the lack of utilization of bike sharings in Shijiazhuang. A total of 24 members of the investigation team, the survey sent a total of 450 questionnaires, the final questionnaire recovery 427, the recovery rate was 95%, Effective questionnaire was 400, the effective rate of 89%. Due to the availability of data, comparability and objectivity, this paper selects a horizontal approach to empirical analysis the reasons for the lack of bike sharing utilization in Shijiazhuang.

Bike Sharing Utilization Is Not Enough Horizontal Comparison

(1) Variable inspection. Before using SPSS software for factor analysis, we need to carry out KMO value and Bartlett's test on the variable data, to determine whether the data variables to be analyzed are suitable for factor analysis. After testing, the KMO statistic of the bike sharing indicator is 0.593, which is greater than the minimum standard of 0.5, and Bartlett's spherical test, rejecting the unit-related null hypothesis, P<0.001. Therefore, the selection of the reasons for this indicator is suitable for the use of factor analysis. (2) Extraction factors. In this paper, the principal component factor analysis of data variables using SPSS software, the extracted principal components in line with the eigenvalue greater than 1 and the cumulative variance contribution rate ≥76% conditions, the specific empirical results are as follows:

<table>
<thead>
<tr>
<th>composition</th>
<th>Initial eigenvalue</th>
<th>Extract the sum of squares and loads</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>total</td>
<td>variance(%)</td>
</tr>
<tr>
<td>2</td>
<td>1.062</td>
<td>17.705</td>
</tr>
<tr>
<td>3</td>
<td>1.046</td>
<td>17.432</td>
</tr>
<tr>
<td>4</td>
<td>0.507</td>
<td>16.776</td>
</tr>
<tr>
<td>5</td>
<td>0.942</td>
<td>15.704</td>
</tr>
<tr>
<td>6</td>
<td>0.487</td>
<td>8.123</td>
</tr>
</tbody>
</table>
Table 2 shows that the six indicators in underutilization of bike sharing can be divided into four common factors, its cumulative contribution rate has reached 76.173%, so named F1, F2, F3, F4 respectively. As the main factors F1, F2, F3, F4 load value is difficult to fully explain the reasons for the lack of bike sharing utilization in Shijiazhuang, therefore further variance maximization orthogonal rotation, On the basis of factor rotation, and regression method was used to estimate the score coefficient of the factor, as shown in table 3:

Table 3. Factorial loading matrix after rotation and .factor score matrix.

<table>
<thead>
<tr>
<th>index</th>
<th>The common factor F1/Fe1</th>
<th>The common factor F2/Fe2</th>
<th>The common factor F3/Fe3</th>
<th>The common factor F4/Fe4</th>
</tr>
</thead>
<tbody>
<tr>
<td>I heard, no chance to use(X1)</td>
<td>0.917/0.436</td>
<td>0.256/0.409</td>
<td>0.212/0.003</td>
<td>0.356/0.017</td>
</tr>
<tr>
<td>Never heard of, do not understand(X2)</td>
<td>0.214/0.051</td>
<td>0.176/0.166</td>
<td>0.145/0.202</td>
<td>0.047/0.909</td>
</tr>
<tr>
<td>Money security reasons(X3)</td>
<td>0.098/-0.025</td>
<td>0.830/-0.515</td>
<td>0.049/0.757</td>
<td>0.256/-0.050</td>
</tr>
<tr>
<td>Cost reasons(X4)</td>
<td>0.342/0.104</td>
<td>0.240/0.489</td>
<td>0.369/0.397</td>
<td>0.401/0.418</td>
</tr>
<tr>
<td>Tedious use of the process(X5)</td>
<td>0.243/-0.585</td>
<td>0.276/0.123</td>
<td>0.248/-0.188</td>
<td>0.823/-0.011</td>
</tr>
<tr>
<td>Cannot quickly find the surrounding available bike sharing(X6)</td>
<td>0.056/0.375</td>
<td>0.312/-0.477</td>
<td>0.923/-0.386</td>
<td>0.395/-0.047</td>
</tr>
</tbody>
</table>

From the table 3, The index of “I heard, no chance to use” in the common factor F1 maximum load value, therefore, the common factor F1 can be put as an Market environment factor; The " Money security reasons " indicator has the highest load value on the common factor F2 and the common factor F2 on the Social development environment factor; "Cannot quickly find the surrounding available bike sharing " and " Tedious use of the process " in the common factor F3 maximum load value, so common factors F3 and F4 are named Bike sharing utilization environment Factor.

According to Table 3, this article can write the factor score function, as follows:

\[
F_1 = 0.436X_1 + 0.051X_2 - 0.025X_3 + 0.104X_4 - 0.585X_5 - 0.375X_6
\]  
\[
F_2 = 0.409X_1 + 0.166X_2 - 0.515X_3 + 0.489X_4 + 0.123X_5 - 0.477X_6
\]  
\[
F_3 = 0.003X_1 + 0.20X_2 + 0.757X_3 + 0.397X_4 - 0.188X_5 - 0.386X_6
\]  
\[
F_4 = 0.017X_1 + 0.090X_2 - 0.050X_3 - 0.418X_4 - 0.011X_5 - 0.047X_6
\]

(3) Determination of weight. Determine the main reasons for the lack of bike sharing utilization, we need to calculate the weight of the four main components, therefore, the cumulative contribution rate of the four principal components of the eigenvalue of 76.173% is calculated as 1. The formula is: weight of principal component I = contribution of variance of principal component I /cumulative contribution of N principal components, I = 1,2,3, N = 4, the calculation process and the result is:

\[
U_1 = \frac{24.260}{76.173} = 0.318
\]
\[
U_2 = \frac{(41.965-24.260)}{76.173} = 0.232
\]
\[
U_3 = \frac{(59.397-41.965)}{76.173} = 0.229
\]
\[
U_4 = \frac{(76.173-59.397)}{76.173} = 0.220
\]

Therefore, according to the size of the weight we can see, the main reason for affecting the lack of bike sharing utilization is “I heard, no chance to use”, the index of “Tedious use of the process”
“Cannot quickly find the surrounding available bike sharing” “Money security reasons” are less weight difference. Through the analysis of the results we get the publicity of bike sharing done better, However, there are deficiencies in the distribution of bike sharing and in the way of using bike sharings.

Countermeasures and Suggestions for Promoting Bike Sharing Operation

Through the analysis of the above results, the problem of bike sharing is mainly reflected in two aspects: bike sharing parking spots distribution are not reasonable and the use of bike sharing is complicating, Proposed the following three suggestions to better promote the operation and promotion of bike sharing.

The Distribution of Bike Sharing Parking Points Are Reasonable

We need to consider the following two aspects to change this situation. Firstly, as a provider of public services, the government should provide all aspects of convenience in sharing the development of bicycles actively and allocate parked areas for bike sharing promptly; Secondly, the management and maintenance of the bike sharing needs the broad masses of the people to participation actively, the users need to improve the quality of themselves, and the users have the right to propose relevant government departments and enterprises to improve the relevant infrastructure and improve the regulatory mechanism, and cooperate with the government and cooperate with the government and enterprises to do a good job of public utilities.

Simplify the Use of Bike Sharing

At this stage, the use of bike sharing mainly operates on APP, WeXin and Alipay, the operation flow can be operated according to the electronic manual steps as compared with those who use mobile phones frequently. Therefore, in order to expand the use of bikes and increase the use of frequency of bikes, we need to find ways and solutions actively to solve the problem. Proposals a more detailed description of the use of bike can be made, specifically for the older population, in more detail than currently available on the bike to help beginners.

To Protect the User Funds Safety

It is recommended that businesses adopt a real-name system when registering users, try to optimize the official website and mobile phone APP to standardize them. If only a simple mobile phone number is registered and bound, it is difficult to hold the responsibility to individuals. It is suggested to be associated with a credit platform such as Alipay to enhance integrity management. By way of credit deductible will be completely resolved shared bike "deposit difficult" issue. Bike sharing industry insiders believe that if we can promote credit deductible, not only to share the economy, the entire leasing economy is likely to usher in a credit dividend.

Conclusion

As a green short-distance travel mode, bike sharing is a great significance to improve the traffic structure of Shijiazhuang, alleviate traffic conditions and energy conservation and emission reduction in the transport sector. In order to improve the efficiency of resource allocation and reduce the idle rate of bicycles shared by Shijiazhuang, This paper analyzes the reasons for the lack of shared bicycle utilization, draw the following conclusions:

(1) The main reason of lack of bike sharing utilization is mainly is unreasonable of bicycle delivery spots and over dosage.(2) The primary issue for users is deposit security , the industry must pay attention to it and solve this problem.(3) The use of bikes has age-related effects and should be changed in the way of use.
References


