

Analyzing users' attitudes and behavior of free-floating bike sharing : an investigating of Nanjing



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RESEARCH BACKGROUND

01 RESEARCH BACKGROUND

- Free-floating bike is a type of bicycle that can be unlocked by scanning QR code. Unlike a public bicycle, free-floating bike sharing system do not have a fixed parking place restriction, so there is no site construction and maintenance costs.



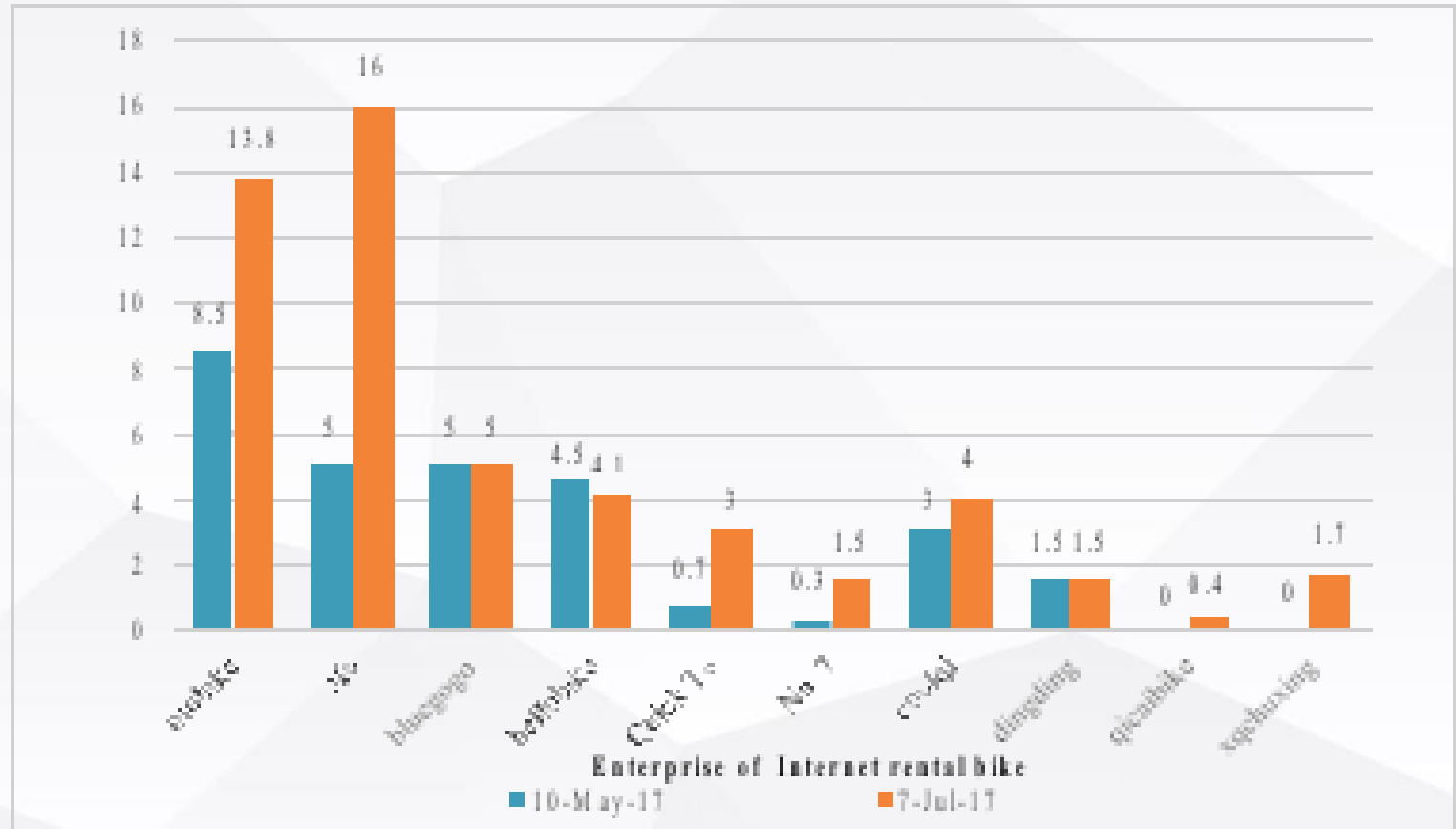
- Until July 2017, less than a year, free-floating bike has been extended to the cities of Jiangsu province, such as Nanjing, Wuxi, Yangzhou, Changzhou, Zhenjiang, Nantong.
- On May 22, 2016, the Ministry of Transport issued “The Guidance on Encouraging and Standardizing the Development of Internet Rental Bicycles” (Draft for Comment), and publicly solicited opinions from the whole society.
- In this background, the usage of FFBS in Nanjing were investigated, help the urban management department to make relevant policy recommendations, provide a reference for enterprises to improve the quality of service.

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STATUS OF THE USE OF FFBS IN NANJING

02 STATUS OF THE USE OF FFBS IN NANJING

According to the data provided by the enterprise for statistical analysis, as of May 10, 2017, there are 8 core brands that have entered the Nanjing free-floating bike sharing market





3

MATERIAL AND METHODS

3.1 Data collection

At the end of May 2017, a total of **700** questionnaires were randomly distributed on the street through field surveys, and we were successfully recovered 686 valid questionnaires, which the recovery rate was 98.00%. After data cleansing, deletion errors and missing item data, the sample data volume is **624** copies. Among the respondents, **users accounted for 72.60%**, respectively, **non-users accounted for 27.40%**. The basic information summarized in Table 1.

Table.1 Basic information of Nanjing respondents

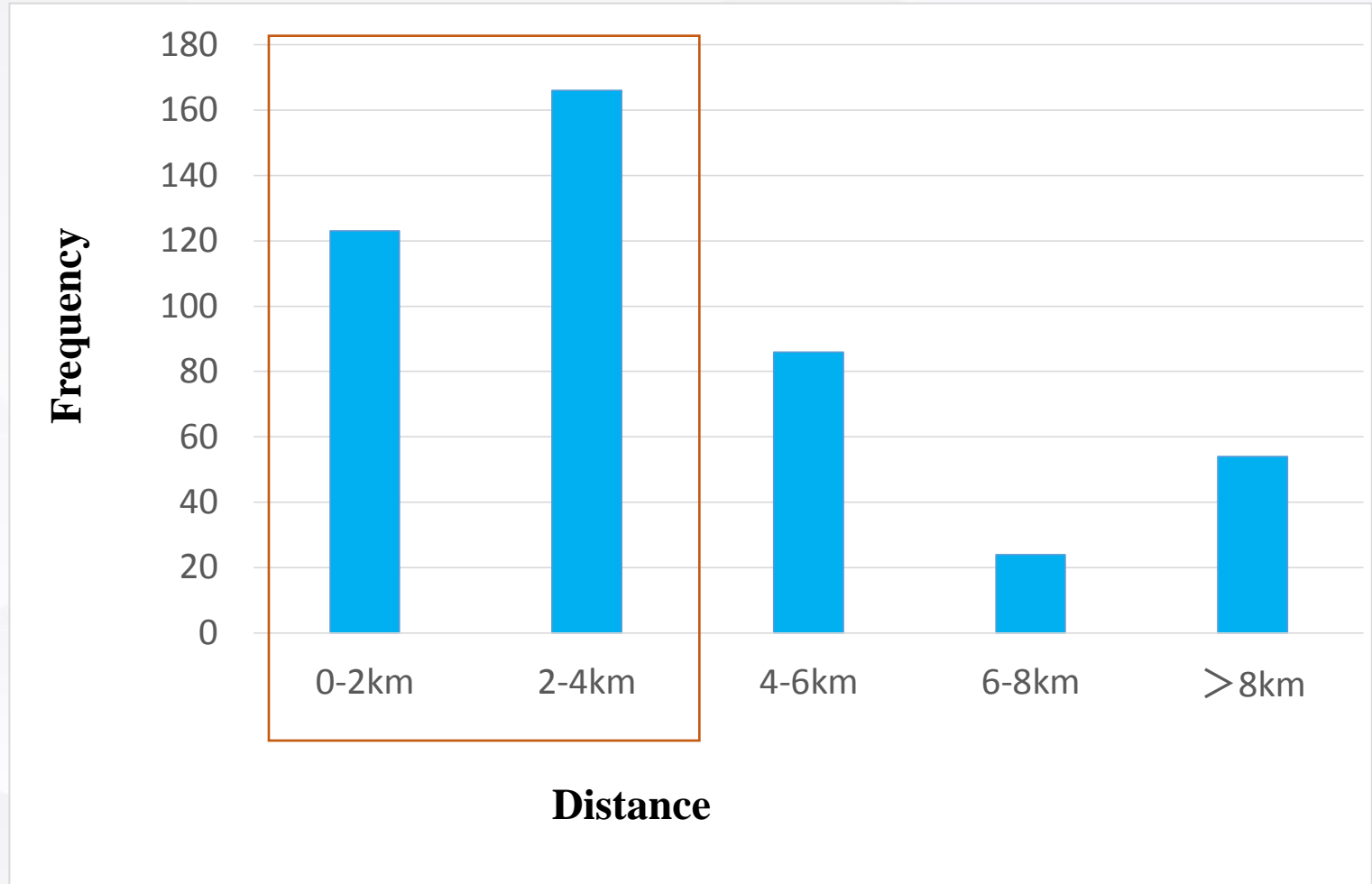
Attributes	Users		Non-user		Total characteristics	
	Frequency	%	Frequency	%	Frequency	%
Age						
<12year	2	0.44	2	1.17	4	0.64
12-18year	42	9.27	18	10.53	60	9.62
18-40year	399	88.08	144	84.21	543	87.02
41-65year	9	1.99	6	3.51	15	2.40
>65year	1	0.22	1	0.58	2	0.32
Gender						
Male	265	58.50	103	60.23	368	58.97
Female	188	41.50	68	39.77	256	41.03
Education						
Did not complete high school	6	1.32	5	2.92	11	1.76
Did not complete high school	37	8.17	18	10.53	55	8.81
Associate's	57	12.58	19	11.11	76	12.18
Bachelor's	257	56.73	113	66.08	370	59.29
Graduate	96	21.19	16	9.36	112	17.95
Average income						
<RMB 60000 yuan	308	67.99	127	74.27	435	69.71
RMB 60000-120000 yuan	93	20.53	31	18.13	124	19.87
RMB 120000-200000 yuan	34	7.51	13	7.60	47	7.53
RMB 200000-300000 yuan	9	1.99	0	0.00	9	1.44
>RMB 300000 yuan	9	1.99	0	0.00	9	1.44
Job						
Student	255	56.29	108	63.16	363	58.17
Teacher	24	5.30	5	2.92	29	4.65
Employee's	94	20.75	24	14.04	118	18.91
Civil servants	16	3.53	1	0.58	17	2.72
Worker	14	3.09	7	4.09	21	3.37
Doctor	8	1.77	3	1.75	11	1.76
Retired	6	1.32	4	2.34	10	1.60
Others	36	7.95	19	11.11	55	8.81



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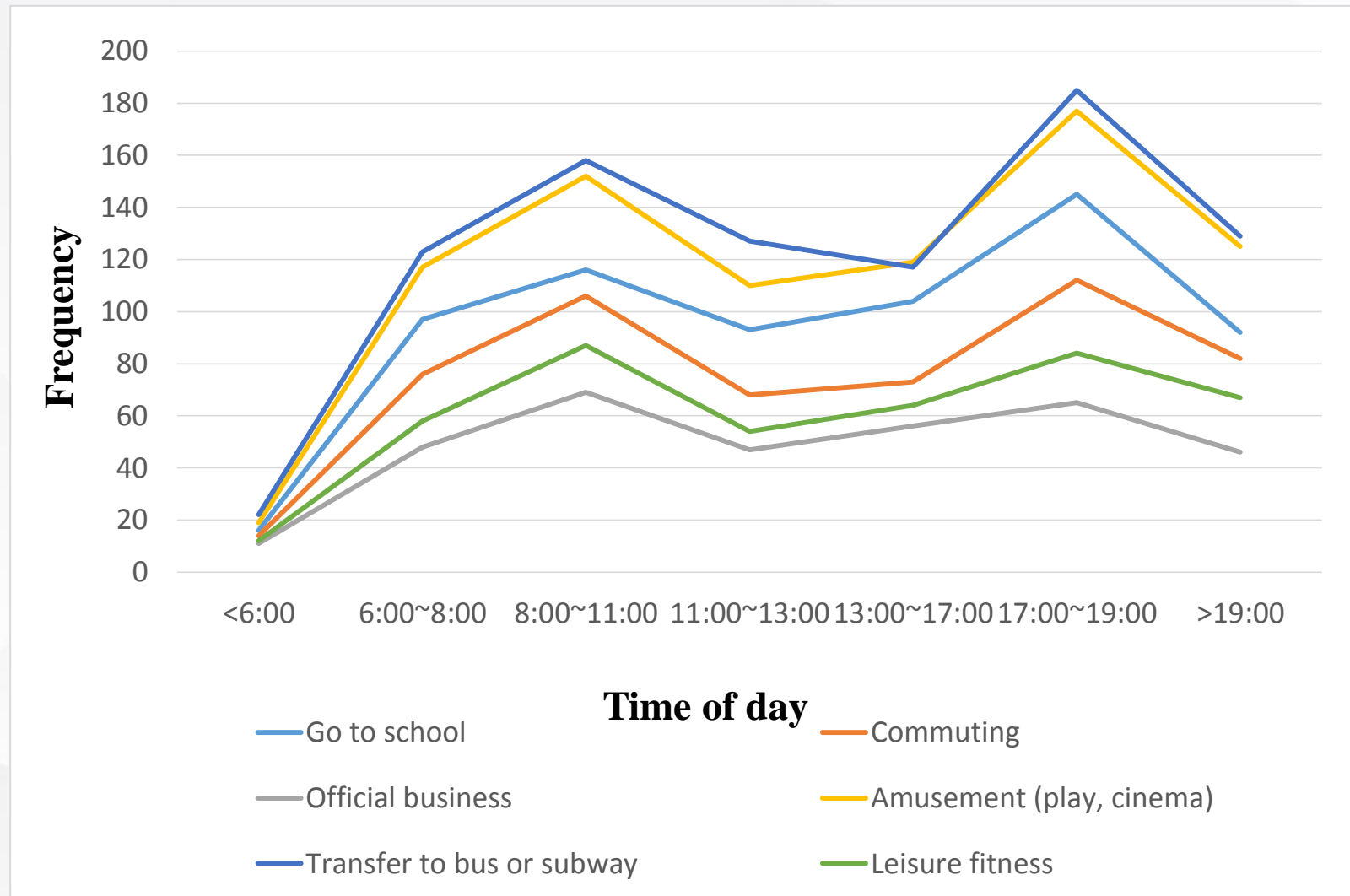
RESULTS AND DISCUSSION

Figure 3 indicate that Nanjing Free-Floating shared bikes are mainly used for short distance travel between 0 and 4km.



04 Topic 1: travel distance and travel time distribution

From Figure 4, we can see that the **peak travel time** of the Free-Floating shared bike users is morning and evening, respectively, the morning peak hours is **8:00-11:00** and the evening rush hours is **17:00 to 19:00**. There are a few differences in the peak hours of travel groups for different purposes. Two peak hours at the same time superimposed shopping and entertainment, leisure and fitness and other travel needs.



04 Topic 2: The focus of the user's choice of travel mode

Through the investigation of the focus of the user's choice of travel mode, can help FFBS enterprise to improve service quality and help city management to understand the travel needs of the people, so they can improve the city travel environment, the quality of travel services.

Table.2 Points that users concern when they choose to travel

Factor	Time saved	Economically	Cozy	Green	Safe
Especially	61.15%	32.01%	23.62%	20.53%	52.10%
Concern	30.24%	45.92%	45.70%	41.28%	35.10%
Generally	7.95%	20.09%	27.37%	31.13%	11.70%
not	0.22%	1.77%	2.65%	5.08%	0.66%
hardly	0.44%	0.22%	0.66%	1.99%	0.44%

04 Topic 3: Attract points of Free-Floating bike sharing to the travelers

By analyzing attractiveness of Free-Floating bike sharing to travelers, looking for the reasons of rapid development of FFBS and the advantages of using it.

Table.3 Analysis of the Attractors of Travelers in Nanjing

Factor	Especially	Attract	Generally	Not	Hardly
Travel convenient	59.82%	34.88%	4.64%	0.66%	0.00%
Cheap rent	23.62%	37.75%	30.02%	6.40%	2.21%
Easy get	35.54%	33.33%	26.05%	4.64%	0.44%
Easy park	40.84%	40.40%	15.01%	2.87%	0.88%
Leisure and fitness	18.32%	34.88%	35.98%	9.27%	1.55%
Easy to pay	28.26%	47.24%	19.87%	4.42%	0.22%
Relax	24.28%	36.64%	30.91%	7.06%	1.10%
Convenient for sightseeing	26.49%	38.63%	28.70%	5.52%	0.66%
Green	35.32%	39.07%	21.85%	2.65%	1.10%
Convenient public transport connections	36.87%	34.00%	24.06%	3.75%	1.32%

04 Topic 3: Attract points of Free-Floating bike sharing to the travelers

Table.4 The recognized of FFBS as a short-distance travel mainstream way

Factor	whether recognized FFBS as a short-distance non-motor vehicle travel mainstream way	
Strongly agree	43.71%	
More agree	11.48%	71.52%
generally	16.34%	
Not agree	28.48%	
Hardly agree	0%	

Table.5 The attitude of FFBS long lease business

Factor	Whether use the long-rent business of FFBS
Yes	43.05%
No	56.95%

04 Topic 4: Cluster Analysis of the crowd in Nanjing who use FFBS

Cluster 1 is consists of mainly by highly educated students and employees, which accounted for 18.54%. Cluster 2 is consists of mainly by highly educated students and civil servants, such people accounted for 26.49%. Cluster 3 is consists of mainly by employees and other staff, which accounted for 17.66%. Cluster 4 is consists of mainly by college students, which accounted for 37.31%.

Attributes		Cluster 1	Cluster 2	Cluster 3	Cluster 4
Age	<12year	0.00%	0.00%	0.00%	1.18%
	12-18year	5.95%	13.33%	6.25%	9.47%
	18-40year	92.86%	86.67%	83.75%	88.76%
	41-65year	1.19%	0.00%	8.75%	0.59%
	>65year	0.00%	0.00%	1.25%	0.00%
Gender	Male	51.19%	67.50%	52.50%	58.58%
	Female	48.81%	32.50%	47.50%	41.42%
Education	Did not complete high school	0.00%	1.67%	2.50%	1.18%
	Did not complete high school	9.52%	6.67%	20.00%	2.96%
	Associate's	17.86%	11.67%	26.25%	4.14%
	Bachelor's	65.48%	53.33%	40.00%	62.72%
	Graduate	7.14%	26.67%	11.25%	28.99%
Average income	<RMB 60000 yuan	60.71%	58.33%	36.25%	93.49%
	RMB 60000-120000 yuan	23.81%	23.33%	47.50%	4.14%
	RMB 120000-200000 yuan	9.52%	12.50%	11.25%	1.18%
	RMB 200000-300000 yuan	4.76%	2.50%	1.25%	0.59%
	>RMB 300000 yuan	1.19%	3.33%	3.75%	0.59%
Job	Student	40.48%	51.67%	6.25%	91.12%
	Teacher	3.57%	4.17%	7.50%	5.92%
	Employee's	29.76%	23.33%	45.00%	2.96%
	Civil servants	3.57%	8.33%	3.75%	0.00%
	Worker	3.57%	1.67%	11.25%	0.00%
	Doctor	3.57%	2.50%	2.50%	0.00%
	Retired	2.38%	0.83%	3.75%	0.00%
	Others	13.10%	7.50%	20.00%	0.00%
The number of samples per category		18.54%	26.49%	17.66%	37.31%

04 Topic 4: Cluster Analysis of the crowd in Nanjing who use FFBS

Cluster 2 has the largest usage count of free floating bike per day and Cluster 4 has the minimum. Most people use a free floating bike to travel for **no more than 20 minutes**.

Table.7 Analysis of the behavior impact of FFBS users in Nanjing per cluster

Attributes	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Average number of times	2.08	2.45	1.85	1.60
Travel time				
5 minutes or less	9.52%	7.50%	8.75%	8.28%
5 to 10 minutes	35.71%	40.00%	40.00%	49.11%
10 to 20 minutes	34.52%	35.83%	33.75%	26.63%
20 to 30 minutes	11.90%	10.83%	12.50%	14.20%
30 minutes or more	8.33%	5.83%	5.00%	1.78%
Influences on the number of private car trips				
Yes	38.10%	54.17%	46.25%	41.42%
No	61.90%	45.83%	53.75%	58.58%
Influences on the number of public transport trips				
Yes	73.81%	68.33%	53.75%	69.82%
No	26.19%	31.67%	46.25%	30.18%

04 Topic 5: Suggestions on Regional Planning of Bicycle Parking in Nanjing

From table below we can find out that Nanjing residents most want to plan parking area is near the subway station, bus station, residential area, school. This shows that the use of FFBS in Nanjing is **mainly used for daily commuter connection.**

Factor	Nearby residential area	Nearby enterprises	nearby Subway or bus station	Nearby school	Near by the mall	Nearby park or tourist attractions	Nearby hotels or hotels
Especially	54.75%	38.63%	61.15%	53.86%	41.50%	48.57%	31.35%
Important	36.87%	37.53%	30.02%	31.13%	33.77%	35.10%	28.92%
Generally	7.73%	21.85%	7.51%	13.02%	20.97%	14.57%	30.68%
Not	0.66%	1.77%	1.32%	1.32%	3.53%	1.32%	7.73%
Hardly	0.00%	0.22%	0.00%	0.66%	0.22%	0.44%	1.32%

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CONCLUSION

05 CONCLUSION

- 01 Advantage** convenient parking, easy access, easy payment, green
- 02** The major cyclists in Nanjing of FFBS are college students, enterprise's staff, aged between 18 and 40 years old.
- 03** The people in Nanjing use FFBS mainly for daily commuter connection, travel, school, and presented morning peak hour, evening rush hour.
- 04** Among the respondents, 71.52% of free floating bike users agree to use FFBS as the mainstream mode of short-distance travel, and 43.05% of users are willing to use FFBS's long-term service.
- 05** FFBS has an impact on the number of public transportation and private car trips to employees, mainly for short distance public transport trips.
- 06** The average number of FFBS used in Nanjing is about 2 times a day, and most people travel for less than 20 minutes.

**ANALYZING USERS' ATTITUDES AND
BEHAVIOR OF FREE-FLOATING BIKE
SHARING : AN INVESTIGATING OF NANJING**

THANK YOU

