SWOT Analysis and Optimization of Public Bicycle Promotion Based on Urban Motorization - A Case Study of Kunming

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Keywords: urban motorization; public bicycle; SWOT; optimization strategy

Abstract: Urban public bicycles provide a convenient means of transportation for people's daily travel and have made great contributions to alleviating urban congestion and protecting the environment simultaneously. Taking the public bicycles in Kunming as an example, this paper made a systematic analysis of urban public bicycles by SWOT analysis and proposed relevant development strategies.

1. Introduction

The research of many experts and scholars, and the traffic practice in developed cities all show that the development of public bicycles and the establishment of a sound public bicycle system can solve traffic congestion problems to a large extent. At present, many cities in China have begun to gradually build a public bicycle system, which fully reflects the importance of the development of urban public bicycles.

2. The Promotion Status of Urban Public Bicycles in China

Since its appearance in the Netherlands in the 1960s and 1970s, the public bicycle system has generally gone through three generations: the first generation of "white bicycles", the second generation of "coin bicycles" and the third generation of "IT technology bicycles". In China, although the public bicycle system started late, it has developed rapidly. In 2007, the public bicycle system with intelligent operational management and truly practical value began to enter China. It has successively launched pilot projects in major cities such as Beijing, Hangzhou and Wuhan, and gradually expanded to other provincial capital cities and some small and medium-sized cities.

In recent years, many cities across the country have flocked to the construction of public bicycles, such as Shanghai, Guangzhou, Jinan and Kunming. By the end of 2015, there are about 190 cities in 30 provinces, autonomous regions and municipalities directly under the central government constructing public bicycle systems. Among them, there are more than 20 cities and counties with public bicycle systems in Zhejiang, Jiangsu and Yunnan provinces. At the same time, with the wave of public bicycle development in the country, a series of problems have emerged. This paper mainly discussed the problems existing in the development of public bicycles in Kunming and conducted SWOT analysis of public bicycles. Finally, the paper proposed some suggestions for the development of public bicycles in Kunming.

3. SWOT Analysis of Public Bicycle Promotion Based on Urban Motorization

3.1 External opportunities and threat analysis.

(1) External opportunities. Many cities with relatively complete domestic bicycle system have clearly defined the positioning, planning, construction, operation and related supervision and management of public bicycles in the form of regulations. For example, Yunnan government officially released the "Yunnan Public Bicycle Management Measures" in August 2015; Kunming issued the "Kunming Bicycle Greenway Plan" and the "Public Bicycle Rental Management Measures". Meanwhile, as the corresponding laws and regulations were introduced, Yunnan government also gave support in subsidies. The continuous improvement of living standards has

  DOI: 10.25236/iwass.2018.074

prompted us to prefer a high-quality living and working environment, but the road traffic conditions in the city are different from our expectations. Traffic congestion and the lack of parking spaces have strengthened the public's traffic safety awareness and environmental awareness. Therefore, citizens in Kunming have a positive attitude towards the construction of the public bicycle system, and they all have expectations for the future development of the city's public bicycle system. In recent years, China's national economy has grown rapidly, and the overall national strength has also been continuously enhanced. China's economic growth is generally on the rise. The rising trend has promoted local governments' strength and willingness to contribute to the national bicycle system.

(2) External threats. In recent years, the haze weather in China has become increasingly serious, which has troubled people's travel in the city. In addition, with the increase of motor vehicles, the air pollution caused by automobile exhaust has harmed people's health. The survey shows that most citizens are unwilling to ride in the haze weather. The limiting factors in the development of public bicycles in Kunming include the restricted bicycle width and the encroachment of motor vehicles on bicycle lanes. The following aspects pose threats to public bicycles. Motor vehicles on non-motorized vehicle lanes and buses which enter or leave the station may be very likely to cause traffic accidents in the safety of bicycle riding. The survey shows that most people are unsatisfied about bicycle lanes and roads shared by motorized and non-motorized vehicles. Urbanization is the product of China's development, including the transformation of population occupation, the transformation of industrial structure, and the change of land and geographical space. However, it is accompanied by a significant increase in the number of urban residents and a great expansion of urban traffic. The demand for transportation is multiplied several times. In recent years, a new model of transportation called "B + R traffic model" has developed rapidly. The "B+R (Bike and Ride)" traffic model means that traffic travelers first arrive at the bus hub by bicycle and then transfer subway, BRT or other public transportation to the downtown. The public bicycle system will be under huge demand pressure.

3.2 Internal strengths and weaknesses.

(1) Internal advantages. Public bicycles are one of the greenest models of transportation without energy. For the emission of nitrogen dioxide, sulfides, carbon dioxide and other substances, bicycles have obvious advantages in maintenance of air quality, reduction of resource consumption and protection of living environment. Since the abolition of road maintenance fees in 2008 and the reform of various systems across the country, in recent years, the number of private cars in Kunming has increased significantly. Congestion has followed that, triggering a series of parking difficulties and increasing traffic accidents. The construction, development and popularization of the urban public bicycle system will certainly alleviate the traffic congestion in Kunming to a certain extent. The promotion of public bicycles will allow Kunming citizens to participate in fitness. Workers and office clerks always worked for long time and they lack reasonable exercise, causing many occupational diseases. This seriously affects health level of the whole people. The promotion of public bicycles can greatly increase the opportunities for people to exercise.

(2) Internal weakness. With the continuous improvement of the public bicycle system, the number of public bicycles will continue to grow. At that time, the division of various lanes is necessary. With the development and expansion of public bicycle stations, it is impossible to rationally separate various vehicles. This cannot ensure that cyclists and motorists follow their respective lanes to solve the congestion problem. On the contrary, the mixed traffic flow may cause more serious traffic problems. In recent years, the urban passenger taxi industry has insisted on starting from mechanism innovation to continuously strengthen management, improve service quality and facilitate travel for citizens and tourists, which has played a positive role in promoting economic and social development. However, with the improvement and the popularization of the public bicycle system, the characteristics of economy and convenience will promote the use rate of public bicycles, which will definitely have a certain impact on taxi industry in Kunming. The number of cars in Kunming is huge, and the plan of the current bicycle lanes is not perfect. The mixed flow of motorized and non-motorized vehicles has not been improved. Therefore, accidents

involving bicycles have occurred from time to time. With incomplete statistics, there are thousands of traffic incidents caused by bicycles every year.

4. Optimization of Public Bicycle Promotion Based on Urban Motorization

4.1 To deploy rental points according to local condition scientifically and rationally.

Different cities and different areas in the city should set up rental points according to the actual situation and the relevant standards. The service radius of public bicycles is generally 300 -500 m and the station spacing is 600 -1000 m. In the distribution of bicycles, it is necessary to adjust the station spacing according to the specific conditions of the city, the nature of the land and the intensity of land development.

First, the whole city is divided into a number of bicycle travel areas according to the road network. The boundaries of these areas with regular or irregular shapes are roads. Secondly, the rental points are divided into five categories: bus points, public construction points, residential points, recreation points and campus points. Finally, the number of rental points is allocated in the areas according to its size and the use of the specific land.

A public bicycle system with uniform network density and hierarchical rental points is deployed. The system will try to achieve a wider range of services, which is mainly to meet the service radius (300 ~ 500 m) standards, so that the rental points tend to be uniform in the space. In places with high intensity of land development, the system will increase the number of parking lots at the rental point to meet the needs of more people.

4.2 To create a comfortable bike riding environment.

In addition to planning bicycle lanes and marking lines, distinctive and personalized bicycle roads (similar to Europe and the bicycle environment of the bicycle race track) should be built in the surrounding areas of the downtown area with a certain radius, including parks, tourist attractions and other places where the environment is elegant to create a bicycle characteristic corridor. The government should advocate people to travel in an environmentally friendly way and make the bicycle road network the blood vessels of the city to ensure its healthy development in the future.

4.3 To implement regional differentiated development.

At each rental point, some parent-child public bicycles and cargo-load public bicycles should be reasonably allocated according to the nature of the rental point. This will attract more people to choose public bicycles for their needs. In front of public bicycles, there should be a place where umbrellas can be inserted to facilitate people to use public bicycles in different weather.

The government should define the service targets of public bicycles and implement regional differentiated development strategies. Due to the difference in the road network between the downtown area and the city's peripheral areas and the coverage of public transportation networks, it is necessary to implement differentiated development in public bicycles and guide rational use of public bicycles. For example, it is restricted in the main traffic lanes of the city center. The main roads in the urban peripheral areas are provided with separate lanes for motor vehicles or bicycles on both sides with marking lines.

4.4 To establish a reasonable feedback mechanism.

The public bicycle system of each city should carry out statistical analysis of bicycle use on a regular basis (at least half a year), which mainly includes indicator of the turnover rate of public bicycles. The government should conduct regular questionnaire surveys on public bicycle users, and give feedback of questions. When handling public bicycle cards, the applicant is required to fill out the questionnaire. The contents of the questionnaire include residence, work place, frequently used vehicles and purpose of handling the card.

4.5 To do a good job in government funding policy support.

The government should clarify that bicycles with low carbon and environmental protection is

green and give certain policies and financial support. At present, cities across the country pay great attention to the development of public transportation, but there are still many cities with low bus travel rates for a long term. The introduction and development of public bicycles is bound to penetrate the residential quarters. On one hand, bicycles are not greatly limited to the road network conditions and can provide citizens with personalized convenient transportation services. On the other hand, its green and low-carbon performance is conducive to improving the traffic environment to reduce traffic congestion and environmental pollution. Therefore, the government should give corresponding preferential treatment to the development and construction of the public bicycle system, and at the same time introduce corresponding preferential policies and protection measures.

5. Summary

With the development of urban transportation systems, traffic congestion has become an important issue in urban development. The advantages of public bicycles are inevitable because of its small size, low manufacturing cost, convenient use, flexible operation, high accessibility and environmental protection. In the development process of urban public bicycles, it is necessary to find out the development strategies for a city by combing the characteristics of its service objects and different conditions in the city.

Acknowledgements

Project Fund: Science Research Fund Project of Yunnan Provincial Department of Education (NO.2012Y425)

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