

A REVIEW ON PUBLIC BICYCLE SHARING AS A FEEDER MODE FOR BRTS

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Abstract : Increase in traffic volumes due to growth of population and vehicles ownership creates problems in traffic operation. If a large proportion of the population cannot afford to use motorized transport private vehicles or public buses then they have to either walk or ride bicycles to work. Public Bicycle Sharing (PBS) is a term for the use of bicycles on a need basis for short trips without having to own one. Bicycle sharing is increasingly being popularized as an effective and environmentally friendly feeder system to road mass transport systems. Bicycles are parked in a closely spaced network of cycle stations. With the help of a smart card, cell phone applications, credit cards or any other form of identification, users can check-out a cycle from a cycle station, use it for a short trip and return it to any other bicycle station near the user's intended destination.

IndexTerms - Bicycle sharing, Traffic congestion, Sustainable transportation, Feeder mode;

I. INTRODUCTION

Urbanization is rapidly growing in India. Population density is rapidly expanding in the urban areas which are requesting large amounts of private and public vehicles in urban communities. Its impacts are congestion, delay, accidents and environmental pollution. An integrated feeder approach to public transit can be made attractive for the public transport, regarding mobility, easy access, convinces and comfort to the commuters. Integrated feeder service will reduce the total travel time of the commuters. In India, public transport users generally complete these trips by walking or on Intermediate Public Transport modes such as cycle rickshaws, auto rickshaws, and shared auto rickshaws. While substantial efforts have been made to provide and improve sustainable mass transportation in India, the focus on first and last mile connectivity and linking Intermediate public transport with mass transit into an integrated system to aid ease of access for users is lacking. The solution of traffic congestion and pollution is to reduce fuel consumption by providing bicycle sharing as a feeder system to the BRTS. Public bicycle sharing increases mode share of cycling in the city.

II. CONCEPT OF PUBLIC BICYCLE SHARING

Public Bicycle Sharing (PBS) is a high quality bicycle based public transport system in which bicycles, stored in a closely spaced network of stations, are made available for short-term shared use. Bicycle sharing programs involve installing multiple bicycle stations at several different key locations. A user checks-out the bicycle from one location, rides to his or her destination, and drops the bicycle to another location. The operators coordinate the redistribution of bicycles and ensure availability of cycles at locations with the highest demand at any given time.

Table 1: Bicycle Sharing in the World

1 st generation-1965	2 nd generation-1995	3 rd generation-1998	4 th generation-2005
Free bike system	Coin systems	Smartcard systems	Smart card systems
Components: 1.Bicycle	Components: 1.Bicycles 2.Docking stations	Components: 1.Bicycles 2.Docking stations	Components: 1.Bicycles 2.Docking station 3.Redistribution systems
Characteristics: 1. Distinct bicycles 2. Unlocked bikes 3. No charge 4. No stations	Characteristics: 1. Distinct bicycles 2. Locked bikes 3. Coin access 4. Specific stations	Characteristics: 1. Distinct bicycles 2. Locked bikes 3. Smartcard access 4. Specific stations	Characteristics: 1. Distinct bicycles 2. Locked bikes 3. Smart card access 4. Free30 mins. 5. Specific stations 6. Real time availability 7. GPS Tracking

III. LITERATURE REVIEW

This section comprises some of the literatures used for bicycle sharing developed by various researchers using various methods with their importance.

Mukti Advani and Geetam Tiwari (2006) [3] They have analyzed access and egress are the weakest links in a public transportation chain. They have carried out on board commuter survey on different bus routes of existing bus service. Average walking speed is approximately 1.2m/sec and average bicycling speed is approximately 3 times higher than the walking speed i.e. 3.6 m/sec. Therefore use of bicycle as an access trip makes significant addition in catchment area of public transit service and time savings to individual users. They have admitted that people not using bicycle despite the owning it given the reason behind that absence of parking facility, lack of cycling facility along the road, short distances from their origin. They have described the advantage of integrating bicycle with BRTS.

Ines Frade and Anabela Ribeiro, (2013) [1] Estimation of the demand is the one of the major problems in bicycle sharing system. Researchers proposed a methodology to estimate potential demand for a new bicycle sharing system. It includes various methods previously used different cities of the world and various parameters which are taken into account while designing bike sharing system for those cities. These are three groups of users identified, Commuters, Tourist, Recreational/Errand riders. Demand is studied on the basis of other case studies, according to physical characteristics of the city and by trip characteristics. Researcher focused in his study on the purpose of the trip, distance of trip and the slope of the city under consideration

Samyjit Basu and Vinod vasudevan (2013) [6] They found the effect of some of bicycle friendly infrastructure on urban Indian bicycling from the user perspective. A questionnaire survey was conducted in four major Indian cities. People were asked to give opinion about six most common bicycle friendly infrastructures and policies with a goal to identify the most preferred infrastructure which promote bicycling in urban India. Ordinal logistic regression model was used to form a public opinion model to rank some bicycle friendly infrastructures and policies based on public opinion using the data collected during the survey. Dedicated bicycle lane was found to be most preferred bicycle friendly infrastructure based on the public opinion and whereas facility to carry bicycle on public transportation was found to be the least preferred one.

Manjurali Balya and Rakesh kumar (2016) [2] They said on the basis of one mode choice as bicycle with four optional service categories such as exclusive bicycle lane, bicycle in mixed traffic, Bicycle Park and ride facilities and bicycle protection from theft & rain. The Multinomial Logit (MNL) Model was developed for proposed integrated feeder public transit service. Explanatory variables included are the demographic and socioeconomic characteristic of individuals, trip characteristics, feeder attributes. The model was developed using six independent variables household income, household size, vehicle ownership, travel time, travel cost and travel distance to analyze the attitudinal behavior of commuters towards the integrated feeder public transit service. After the survey there are several reasons why respondent's choices towards the bicycle feeder mode are less. The vehicle ownership is nearly 22%, monthly income per household for medium category is higher, so these people can afford motorized feeder mode.

Neelkumar Shah and Shimin V.V (2016) [4] Bicycle sharing as a feeder system to the BRTS solution to the traffic congestion, pollution and to reduce fuel consumption. They carried out questionnaire survey like how people reaches BRTS station, approximately how long they travel and their daily expenses on the trip. After the survey carried out they analyzed that 50% of the BRTS users using auto rickshaw as a Para transit mode while travelling in BRTS and around 20% users any mode of transport and reach BRTS station by walking. They provided various parameters for locating bicycle station. Plotting of station has been done on Google earth software. Bicycle transit innovative integration helps in improving the quality of life of people, reducing pollution and increases the overall growth of the city

Premjeet Das Gupta and KshamaPuntambekar (2016) [5] They proposed the study explores the opportunities and threats with respect to bicycle use in India, with reference to the recent literature on bicycle use. To understood the role of bicycles with respect to livelihoods and the urban poor in India. Trip characteristics of bicyclist in India. Variation in bicycle use in Indian cities. Future of bicycle use in Indian cities in do nothing scenario. The potential market for bicycle use in India. Bicycle is chosen by urban poor in India because of affordability issue. It is generally observed that higher the level of poverty in a state higher is the modal share of bicycle trips made by urban other workers in that state.

Tamas Matrai and Janos Toth (2016) [7] They presented a comparative assessment among 4th generation public bicycle sharing systems. Population increases day by day in urban areas, public bicycle sharing various definition and abbreviations, brief overview of the 4th generation system. The development process of the assessment framework as well as discusses the results and challenges. They discussed the already existing PBS systems and introduce a through, categorization and a comparison methodology.

IV. CONCLUSION

This paper presented literature review on bicycle sharing. There is good mass transportation system like BRTS is available, problem is that lack of accessibility in terms of reaching the BRTS station. If people reach with their own private vehicle, there is no parking facility available near the station. Rickshaw is the only option to reach the BRTS stations and rent is high. If the user to choose bicycle instead of auto rickshaw to reach BRTS station then save their money and to choose bicycle instead of walking to reach BRTS station then save their time by using bicycle sharing as feeder mode for BRTS. Bicycle sharing concept improves cycling image and increases catchment area of public transport.

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