



Performance Evaluation of PBS system in various Cities

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ABSTRACT

Urbanization is increasing quickly in many countries. An improved life of cities has resulted in migration of an oversized population from rural to urban areas. Because of this migration, population density is being quickly increasing in urban areas that demands an oversized fleet of personal and public vehicles in cities. Presently a large a part of the transportation systems everywhere the world depends on standard vehicles that are propelled by non-renewable energy sources like fossil fuels. The depletion of those natural resources and therefore the pollution issues related to it ends up in vital transportation issues. To overcome these problems public bike sharing system is implemented in many cities. The bike-sharing is receiving growing attention as societies become a lot of attentive to the importance of active non-motorized traffic modes. This paper presents associate review of public bike sharing systems enforced in varied cities.

Keywords— PBS, PBS benefits, Pollution, traffic congestion, Performance evaluation, Non-motorized Transport, sustainability

1.Introduction

According to the United Nations forecast (United Nations, 2013), the current world population is 7.2 billion which can reach 8.1 billion by 2025 and by 2050 it will become 9.6 billion [1]. The biggest increase is predicted within the developing regions, whereas in developed ones, the population is barely growing. Together with this urbanization is predicted to extend, which suggests that the amount of urban inhabitants is anticipated to rise from three.3 to 6.4 billion [1]. The Asian countries are quickly growing and also the urbanization is increasing day by day in this countries. The use of private vehicles is additionally growing at a quicker rate that ensuing into the excessive utilization of fossil fuels. To beat the need of fuel we want to import fuel from the foreign countries. Because of this reason our foreign reserves are being additional utilised in fuels [2]. With the increase in this population the rate of using private vehicles is also increasing. This will create traffic congestion and pollution in the city. To overcome this problem the public bike sharing system which is known as PBS is implemented in many cities. The PBS system is a non-motorized transport system. As per New York town planning department 2009, public Bike sharing system contains of bike rental schemes that change bike to be picked up at any bike station and came to the other bike station, that makes bike-sharing ideal for point-to-point visits. PBS System is growing at an Average rate of 37% annually since 2009 [2].

The use of motorized vehicles cause the increase in the issues related to air pollution and traffic congestion which have led to the search of more non-mortised transport options. The use of non-motorized



transport system is reduce the pollution from fuel, traffic congestion and also decrease in the rate of accidents [3].

2.Literature Review

2.1.PBS

According to the European Cyclist Federation (ECF, 2012) a public bike sharing system define as: "A self-service, short-term, one-way capable bike rental offer in public spaces, for several target groups, with network characteristics" [1].

Another interpretation given by Department of city planning New York: "Bike-share programs are networks of public use bicycles distributed around a city for use at low cost. Bicycles can be picked up at any self-serve bike-station and returned to any other bike station" [1].

In Budapest the feasibility study of Mol-Bubi system is using following definition: "Public Bike Sharing (PBS) system is a new kind of alternative public transport service, which is an extension of the conventional public transport system. However, this service can provide flexibility to users same as private transport options. PBS systems provide public bikes for free or very small fee in the frequently used urban spaces. The system can be used for one way trip by anyone" [1].

The feasibility study of Public bike sharing system in Vancouver (Quay Communications Inc., 2008) state that: "The distance that a person is willing to walk or cycle is dependent on the purpose of journey along with other influencing factors. General planning guidance from the US and UK indicates that people are willing to walk up to 10 minutes for most journey purposes, although they will walk further to access work, up to 2km. Cycling distances generally fall within the 1 km to 5 km range, although, as with walking, people cycling to work have a higher upper threshold at around 8 km" [1].

2.2 Case studies of Performance evaluation of PBS system

Bhopal Municipal Corporation introduce Bike Sharing System to produce an affordable, environmentally friendly mobility choice to city residents. This is a flexible system of individualised public transport. Bikes are offered in a very closely spaced network of semi-automated stations. Users will check out cycles at one station and return them to the other station within the network. This system is connected with the BRT system for expanding the catchment areas of city's transit system. Key element of the PBS system is to expand the use of non-motorized and sustainable transport modes. There is a card verification devices at each station for the communication with Central control system by the station attendants. For the efficient operation and planning the central control system collects data from each station. For the redistribution of cycles during hours of operation this data will help to make decision. The PBS system is integrated with the fare collection system of the BRT system through the ITS system to aid the multimodal integration. There is 500 bikes spread over around 50 stations across the city. The PBS system is proved successful in the Bhopal. It reduce traffic congestion, vehicle emissions, and also reduce dependency on motorized vehicles. Use PBS system is expand



the health and wellness benefits of bicycle transport to new users. The system is helps in the transformation of streets to become environments where pedestrians and bicyclists feel safe and comfortable [8].

Sanjay Gupta al [6], 2016 studied Delhi PBS system and identified that the PBS system is plays vital role in economy of metropolitan city like Delhi. The PBS system is become increasingly important for the distributing the goods in wholesale market located in the walled city besides some selected whole sale markets located outside the walled city. The paper present the role of non-motorized transport system in the case study of selected five whole sale markets of Delhi which are dealing in textiles, auto parts, electrical, hardware, food grains etc. Among this five markets two markets are of fruit and vegetable market which located at Kotla and Okhla in south Delhi.

For the data collection primary survey, porter surveys, transport operator survey and establishment studies carried out. The NMT plays an important role in the Delhi in commercial areas of walled city as well as market areas namely Kotla and Okhla. The use of PBS in the narrow streets of this market area is reduce in the traffic congestion the parking problems.

Mmanake Maria Mokitimi al [7], 2016 studied the significance of non-motorized transport system in the rural areas of South Africa. The paper present the case study of Grater Tubatse local municipality, ward 27, 28 and 29 located in the Limpopo Province South Africa. In the methodology the research used combined qualitative and qualitative research method. The study also included pedestrian survey, site observations, interviews with various stakeholders, road safety audit and analysis of statistics given. The study mainly focus on NMT related problems regarding the rural community of Grater Tubatse municipality, Sekhukhune located in the Limpopo Province, South Africa. The well planned NMT system is plays significant role in particular rural area because most of the population from the rural areas and peri urban area use walking as a means of transport for the work and education. So it directly helps in to reduce the traffic problems in the urban area.

Neelkumar Shah al [2], 2016 studied the case study of existing PBS system in various cities. PBS system in Velib, Paris, France is the most successful example of NMT. This is a major scale bike sharing system which consist of 1230 bike stations and 14,500 bikes. The system is introduced on 15 July, 2015. The system is operated by the French advertising company namely Jdcaux. PBS system of Velib is the world's sixth largest system. In the initial stage there are 750 stations and 7000 bikes were introduced and after a year it increased up to 160000 bikes between 1200 stations. The distance between one stations is roughly 300m. In the initial stage there is 20 million trips were noted which increased after 6 years to the total of 173 million. There have been observed reduction in carbon dioxide emission up to 14,600 tons per year. This is the biggest advantage of this system.

In Gothenburg, Sweden has also provided PBS system as a means of transportation. There are 70 bike stations. They provide PBS system near the bus and railway station. It proved to be successful in the reduction of greenhouse gases emission and also protect the environment. The system is designed for the 20 minute of short trip. They provide bikes at the free of cost for the half hour and the user have to pay the additional charges for the use of more than half hour [2].



The PBS system in the Chicago, Illinois is known as Divy. Which has thousands of bike between 580 stations. The stations are fully powered by solar energy. The system has 9.95 dollar of 24 hour pass scheme and it also provides 30 minutes ride with free of cost. And for 30.-60 minutes 2 dollar, 6 dollar for 60-90 minutes and 8 dollar for additional 30 minutes [2].

3. Conclusion

PBS (Public Bike Sharing) System is proved successful in many cities. The PBS is the Non-Motorized type of transportation system. Many cities now a days facing problems related to pollution, parking problems, traffic congestion because of increasing urbanization. To overcome this problems the use of non-motorized transportation become necessary. The use of PBS is the best option as a solution in such cases. The PBS system helps to reduction in traffic related issues and also helps to reduce in the pollution. It increases in the health benefits. The PBS System is also use as a feeder system for the BRT system. The CBD and the market area of a city where there is a more problem of traffic congestion in that cases the bike sharing system is a best solution. The bike sharing system is also use for the recreational purpose. In the city like Surat, Gujarat where people's mind-set are not using public transport in such cases the Public Bike sharing system is use as a tool to increase accessibility to public transportation.

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