

A review of PPP mechanisms in PBS

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Abstract — The aim of this study is public private partnership (PPP) mechanism in public bike sharing (PBS) over the different model of PPP. Mainly 3 model of PPP is involved in PBS such as BOT, O&M and Turkey. All 3 model is certain advantages and disadvantages in PBS. The different case study is also including in this paper. In this case study is included benefit of PBS system over PPP, private firm investment in the PBS and work distribution of the private firm and public agency.

When the PPP mechanism comes to the picture in case of PBS it is observed that it provides assistance in designing the station infrastructure as well as they provide funds for various components of PBS. To promote PBS, public agency specifies location of docking station and provide space for station as well as provide supporting infrastructure such as bicycle track and advertising spots to the private sector. Hence, Government provides land for development while all the cost related to investment and development are carried out by private sector.

Keywords— Infrastructure, PPP, PBS

I. INTRODUCTION

THE term ‘Public Bike Sharing’ popularly known as ‘PBS’ System describes a network of bicycles distributed in an urban part, available for public access from docking stations. Public bicycles can be taken at any station and returned to any other station in the network part, making them suitable for point A point to B point travel. PBS is deliberate to inspire useful of short trips and for hopeful the usage of environment friendly, convenient and less expensive travel strategies related to the motorized transportation. In the meantime, PBS can likewise be focused at travelers and comfortable bike trips.

A bike share program is characterized by its minimal effort and high convergence of stations. Open bikes contrast from run of the mill bikes in their heavier development for solidness, and the utilization of restrictive parts to decrease robbery. The bikes are intended to suit a scope of body sorts and clients. The bikes include incorporated, light reflectors and space for conveying individual things and a locking component. The basic role of PBS is not to create benefit through client expenses, but instead to upgrade existing travel alternatives; in this manner participation rates and utilize charges are kept as low as could be allowed.

PBS can be seen as a supplement to the current open travel arrange, at a similarly minimal effort. At the point when found near travel exchanges, business territories, vacationer ranges or colleges, PBS may go about as the first and last leg of a travel.

PBS is existence as a system of supportable transportation above 125 cities. The general pattern all inclusive has been that despite the fact that such activities have not been fiscally appealing, Urban Local Bodies have bolstered such plans. This is because of the way that minimal cost of interest in PBS is by and large set off by an equivalent or higher minor advantages. These advantages can come as transportation advantages to the general population of the group, and wellbeing and natural advantages that enhances provincial personal satisfaction.

A. Elements of a PBS system [1]

A PBS system is defined by a set of key elements essential for planning, designing and operating PBS in a city. Resulting from a universal study of best practices and lessons learned from PBS initiatives in India, the following section presents 8 guiding elements serving as the building blocks for launching PBS schemes. Each element is further elaborated in detail, complete with descriptive supporting strategies and relevant graphics in the following sections.

- PBS System size – Converge and Size;
- Cycle – Variance;
- Station design and Placement;
- Intelligent technology integration;
- Intergrade transport System;
- Redistribution in PBS;
- Financial Model in PBS;
- PPP Mechanism in PBS.

II. PPP INVOLVED IN PBS

Towards the late 1990s, two global advertising competitors, JCDecaux and Clear Channel, identified a new opportunity to access advertising space in key urban markets by entering the public bike operation arena. Already engaged in contracts to provide street furniture and transit shelters to transportation and municipal agencies both companies went on to establish successful automated bike sharing programs, notably Clear Channel in Barcelona and JCDecaux in Paris and Lyon. Today, the PPP models in PBS can be seen in a large number of

European cities, where advertising companies in lieu of advertising space, provide equipment for the bicycle scheme and operate and maintain the system. The distribution of roles and responsibilities in a PPP model for public bicycle sharing is described below (adapted from Bike Sharing Guide).

Globally, PBS schemes have been implemented through PPP mode with considerable success, though in India PBS is still in the nascent stage. In most cases, the authority specifies docking stations locations and provides space for stations. It also provides the advertising spots and undertakes construction of supporting infrastructure such as bicycle tracks. Depending on the type of contract, the authority may also invest in the bicycles and the construction of docking stations. The private player (which is usually a private advertising company or a private bicycle operator) usually provides the bicycles, station infrastructure and related equipment, and operates the service through its own appointed staff. The typical sources of revenue include advertisements, sponsorships and membership charges/ user charges.

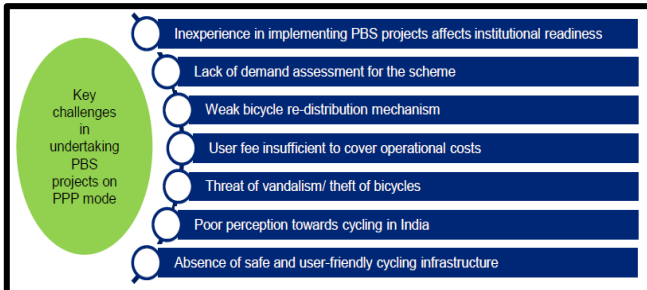


Fig 1. Key challenges in PBS (Source: [2])

Based on the allocation of responsibilities for the various identified activities in the value chain of PBS development and operation, the following three types of PPP models have been proposed:

- A. BOT Model
- B. O&M Model
- C. Turnkey

A. BOT Model [2]

Under this model, the authority plans the PBS scheme, undertakes demand assessment, acquires land, provides specifications for the design of bicycles and layout of the docking stations, and sets service quality standards. The authority then engages a private operator to build the civil infrastructure and operate the scheme. The operator procures the bicycles, operates and maintains PBS and collects user fees, advertisement revenue, and kiosk rental. The public authority continuously monitors the performance of the private operator against the pre-specified standards. The bidding parameter is the System Management Fee (Positive/Negative).

• Responsibility allocation

The division of responsibility between the public authority and the private player under this model is provided below.

PHASE	PLANNING	IMPLEMENTATION	O&M
	MONITORING		
ACTIVITY	Demand Assessment	Land Acquisition	Service Quality Monitoring
	Service Quality Standards / Bicycle Specifications	Civil Construction and Utilities Connection	Customer Service / Marketing and Branding
	System Specification – Number of Bicycles, Siting of Docking Station	Providing advertising space	Maintenance of Bicycles/Docking Stations
	Operation Plans – Operation Span/Time	Control Room Construction	Redistribution
	Tariff Fixation/Structuring	Kiosk Construction	Revenue Collection
	Investment Planning and Funding	Procurement of bicycles / revenue collection equipment	MIS Data Acquisition/Analysis
	System Detailed Design	Equipping docking stations	Control Room O&M
	Legend	AUTHORITY	PRIVATE OPERATOR

Fig 2. Responsibility allocation under BOT model (Source: [2])

• Advantage and Disadvantage

Advantage:

Since maintenance is the responsibility of the private operator, it would incentivize the operator to provide high quality infrastructure so as to minimize maintenance costs over the life of the project. Hence, the system benefits with quality infrastructure.

Disadvantage:

Demand is highly uncertain, since no formal demand surveys have been conducted for the scheme, and past data with respect to India is not available. Hence, revenue risk is huge and in this model, the private sector would assume this risk. Revenue sources for PBS scheme are limited and this increases the revenue risk for the operator(s).

Since the private operator(s) is assuming the revenue risk and PBS is a relatively new concept in India with uncertain demand, financiers may be hesitant to finance such a project through the BOT model.

B. O&M MODEL [2]

Under this model, the authority undertakes demand assessment, acquires land, provides bicycles and docking stations, constructs control room and other civil infrastructure and sets service quality standards. The authority hires a private operator to operate and maintains PBS, in lieu of a fixed O&M Fee. The private operator collects user fees, advertisement income and kiosk rental. The bidding parameter is the O&M fee quoted by the private operator.

• Responsibility allocation

The division of responsibility between the public authority and the private player under this model is provided below.

PHASE	PLANNING	IMPLEMENTATION	O&M
	MONITORING		
ACTIVITY	Demand Assessment	Land Acquisition	Service Quality Monitoring
	Service Quality Standards / Bicycle Specifications	Civil Construction and Utilities Connection	Customer Service / Marketing and Branding
	System Specification – Number of Bicycles, Siting of Docking Station	Providing advertising space	Maintenance of Bicycles/Docking Stations
	Operation Plans – Operation Span/Time	Control Room Construction	Redistribution
	Tariff Fixation/Structuring	Kiosk Construction	Revenue Collection
	Investment Planning and Funding	Procurement of bicycles / revenue collection equipment	MIS Data Acquisition/Analysis
	System Detailed Design	Equipping docking stations	Control Room O&M
	Legend	AUTHORITY	PRIVATE OPERATOR

Fig. 3. Responsibility allocation under O&M model (Source: [2])

• **Advantage and Disadvantage**

Advantage:

Since the private operator receives a pre-decided fixed O&M fee, it is assured of a fixed payment and is free from any revenue risk. Accordingly, the model may attract higher number of bidders from the private sector.

Easy access to finance because fixed revenue stream to private operator.

Disadvantage:

Monitoring effort required on the part of the authority would be immense, since the operator receives a fixed O&M fee and hence has limited incentive to improve service quality.

The public authority may not be able to leverage advertising/commercial potential in the most efficient manner.

The authority assumes the revenue risk in this model. Hence, the authority would need to have robust financial capacity in order to make this model successful.

C. *Turnkey* [2]

Under this model, the authority undertakes demand assessment, sets service quality standards and broad bicycle specifications. Private operator undertakes complete system design, construction, financing, operations and maintenance of PBS. Revenue accrues to the private operator, primarily from advertisement spaces. The bidding parameter is the number of advertisement spaces.

• **Responsibility allocation**

The division of responsibility between the public authority and the private player under this model is provided below.

PHASE	PLANNING	IMPLEMENTATION	O&M
	MONITORING		
ACTIVITY	Demand Assessment	Land Acquisition	Service Quality Monitoring
	Service Quality Standards / Bicycle Specifications	Civil Construction and Utilities Connection	Customer Service / Marketing and Branding
	System Specification – Number of Bicycles, Siting of Docking Station	Control Room Construction	Maintenance of Bicycles/Docking Stations
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	Tariff Fixation/Structuring	Procurement of bicycles / revenue collection equipment	Revenue Collection
	Investment Planning and Funding	Equipping docking stations	MIS Data Acquisition/Analysis
	System Detailed Design		Control Room O&M
Legend	AUTHORITY PRIVATE OPERATOR		

Fig 4. Responsibility allocation under Turnkey model (Source: [2])

• **Advantage and Disadvantage**

Advantage:

Private operator may be able to bring in efficiencies in the system, given complete responsibility for the system. Globally implemented models could be customized by the operators who have experience in PBS and could be suitably implemented in the Indian context.

Disadvantage:

Control by the authority in this model is limited, since the private operator undertakes design, financing, implementation and operation activities, and also collects revenue;

Since the private operator fixes the tariff for the scheme, the authority may not be able to ensure that the fares are subsidized in line with the social objective of providing affordable public transport.

	BOT	O&M model	Turnkey
Operational efficiency	Medium, since operator's revenues are directly linked to efficiency of the system, operator would try to minimize cost & increase revenue	Medium, since operator's revenues are linked with only system performance	High, since the operator is the owner of the system and would try to operate in the most efficient manner
Investment Requirement	Medium for private proponent, limited investment on the part of the authority	Medium for authority (capex), low for private player (only operational expenses)	Low investment on the part of the authority, private sector brings in resources and expertise
Access to finance	Difficult, since revenue stream is dependent on uncertain demand, and the operator is bound to operate at fares fixed by the Authority	Easy, since the revenue stream of the private operator is assured in the form of a fixed O&M fee	Difficult, since operator's revenues are contingent on demand (uncertain)
Incentives for private player	Low, since the operator's revenue is dependent on demand, which is highly uncertain and is dependent on supporting infrastructure	High, since the private operator need not assume revenue risk, and is assured of a fixed O&M fee	Medium, since the private operator has freedom to operate the system and tariff fixation and operational planning are within his control
Project viability	Given the low revenue stream due to uncertain demand and socially driven tariffs, PBS is usually not self sustaining, needs grants	Given the low revenue stream due to uncertain demand and socially driven tariffs, PBS is usually not self sustaining, needs grants	Tariff fixation being under the domain of the private operator who has greater control, viability of this model is relatively higher
Suitability	When the Authority does not have the financial strength to invest in PBS infrastructure	When the Authority possess the financial strength to assume revenue risk and robust monitoring capacity	When authority wants to leverage global expertise in designing and operating the system

Fig. 5. Parameter wise feasibility of PPP model for PBS (Source: [2])

III. CASE STUDY

A. *Mysore, India* [3]

• **Benefit of Mysore project on PPP mode:**

Participation of private enterprises in implementation of a scheme has many financial as well as non financial benefits. In the case of a PBS scheme, the benefits encompass together the public agency (government) as well as the users.

Public bike sharing system universal run on technologies which have been perfected and developed over the course of period. Implementing this project on public private partnership would tolerate an effective mechanism for this familiarity to be accepted by the government.

Secondly, a PPP structure allows for diversification of risks and optimal allocation of the same between all concerned stakeholders. It also allows the private sector to bring in operational as well as managerial efficiencies in the system.

Furthermore, PBS is a system which is exactly targeted at definite user groups, the structure of PPP would be helpful for advertising the system to these groups.

Finally, a PPP structure would also reduce or defer the financial burden of public asset development on the government.

• **Development of structuring alternatives:**

In the current development plan(DP), the finance of the project of PBS have been separated into two part:

- Capital finance, including cost of docking stations, IT infrastructure, bicycles and land;
- Operations and Maintenance (O&M) cost, including repairs cost of system.

The following two substitutes were taken for structuring of this project :

- Alternative 1: The first is a Build Operate Transfer (BOT) made structure. They key components of this structure is that Mysore City Corporation (MCC) will transfer all rewards and risk related with this PBS project to the private firm. Whole concession contract of project should be given to one private firm and MCC should allocation sites at commonly agreed sites to concessionaire for the reduction period.

Development responsibility of related infrastructure along with gaining of bicycle fleet dishonesties with concessionaire. All capital requirements of fund would be set by the concessionaire. During the period of the Directorate of Urban Land Transport April, 2012; Report of feasibility for developing a PBS system in Mysore on PPP base Deloitte Touché Tohmatsu India Private Limited 29 concern, the project related all reward are moved to the concessionaire in lieu of a possible concession fee payable to the government. All effects are shifted to MCC on the achievement of business term;

- Alternative 2: The second alternative is an Engineering Procurement Contract based mechanism. In this method, MCC will obtain all possessions from a single or multiple contractors and control them on its own. It will keep the ownership of all the properties. Money for this PBS project will have to be set by the MCC. All risks with technology risk shall have to be tolerated by MCC.

From the above sections, it is illustrated that PBS schemes that too based on PPP have however to be developed in India at a huge scale. So, the public (government) authorities do not have skill in carry out such a system. Additionally, technologies related with developing such a system, containing bicycle tracking mechanism, have been patented and are at present obtainable with several private firm throughout the world. Hence, it has been concluded that Alternative 1 is most suitable for this project.

B. Delhi cycle sharing system, India [4]

The Delhi cycle sharing system will be structured as a public-private partnership in which GNCTD, through an SPV, carries out planning and oversight activities and the private sector handles day-to-day operations. The points narrated below indicates the respective roles of the government and the private sector.

Respective responsibilities of the government and the private sector:

- Government SPV responsibilities:
- System planning and implementation;
 - Cover system operating costs;
 - Provide space for stations and control center;
 - Set service level benchmarks;
 - Monitor the operator's performance;
 - Collect fares and revenues;
 - Market and conduct outreach.

Private operator:

- Maintenance of cycles and stations;
- Redistribution of cycles within stations to maintain optimum number;
- Customer service;
- Operate the control center;
- Provide information on real time basis.

C. Velib system, Paris, France [5]

The system is funded by the 'JCDecaux Advertising Corporation', in return for city of Paris authorization over the revenue from a considerable portion of the on street advertising

hoardings. The JCDecaux won the contract over a rival bid from Clear Channel.

JCDecaux paid startup costs of about US\$115 million and employs the equal of about 285 people full time to activate the system and repair the bikes for 10 years. The city takes all revenue from the programmer as well as a fee of about US\$4.3 million a year. In return JCDecaux takes exclusive control over 1,628 city owned billboards; the city obtains about half of that advertising space at no charge for public interest advertising. This model was main used in France in 1998 by Adshel (now part of Clear Channel) in Rennes.

Due an unpredictably high rate of vandalism compared to the Lyon system, the Paris City Council has ready to pay US\$500 per bicycle requiring replacement, which is predictable to cost up to US\$2 million per year.

IV. CONCLUSION

When the PPP mechanism comes to the picture in case of PBS it is observed that it provides assistance in designing the station infrastructure as well as they provide funds for various components of PBS. To promote PBS, public agency specifies location of docking station and provide space for station as well as provide supporting infrastructure such as bicycle track and advertising spots to the private sector. Hence, Government provides land for development while all the cost related to investment and development are carried out by private sector.

Also, the public agency do not have sufficient expertise compare to private company and hence the risk is transferred from the public agency to the private sector in PPP.

The PPP models in PBS can be seen in many European cities, where advertising companies in lieu of advertising space, provide equipment for bicycle scheme and operate and maintain of the system.

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