



Civil Society Organisations Advancing Cycling

Reflections on the Bicycle Partnership Program Experiences



Interface for cycling expertise



The role of CSO's in the implementation of public bicycle systems

February 2011

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3.1 Introduction

3.1.1 About this essay

This essay is about public bicycle systems and the role that civil society organisations (CSOs) can play in the set up and management of these systems. In the past decade urban public bicycle systems have mushroomed around the globe as a successful form of non-motorised public transport. Dozens of systems have been implemented in Europe, but their popularity has recently also spread to North-America, South-America and Asia. In this essay, special attention will be paid to public bicycle systems in developing countries; a very new and interesting phenomenon.

This essay is of interest for those who want to understand more about public bicycle systems in general and about public bicycle systems in developing countries and the possible role of CSOs in the process, in particular. The essay should also be of interest to policy makers in cities which consider implementing a public bicycle system and to CSOs that want to push the issue.

In most cases public bicycle systems are implemented by a company which works together with the local authority. In some cases however, civil society organisations, in most cases organisations representing certain groups of urban cyclists, have played a role in the development, implementation and for promotion of these systems. This essay pays special attention to those cases and explains the role these CSOs played.

In chapter 2 the concept of public bicycle systems and the different types of public bicycle systems will be explained. This chapter also pays attention to the mobility function of public bicycle systems and to factors that are important for success or failure of the system. In chapter 3, a number of cases are discussed of public bicycle systems currently operating outside of Europe, including in developing countries.

The next chapter, chapter 4, focuses especially on public bicycle systems in developing countries where CSOs have played a role. Chapter 5 zooms in on the process that led to the introduction of the public bicycle system in Rio de Janeiro. This case is particularly interesting because here a civil society organisation has been very active in all the stages of the introduction of such a system in a city. The 6th chapter concludes with some recommendations for the implementation of public bicycle systems with special attention to the role civil society organisations can play.

With the rapid developments in the world of public bicycle systems with new systems being inaugurated every week, this essay does not intend to provide an exhaustive overview of public bicycle systems around the world. Examples

discussed are merely illustrative and also to provide a better understanding of the many types of systems that exist and the many functions they can perform.

3.1.2 The role of civil society organizations

Civil society organisations (CSOs) are organisations formed by citizens, joined around a certain theme or interest. They can represent certain groups of people or fight together for a certain cause. Examples relevant for this essay are cyclists unions and CSOs that, for whatever reason, promote sustainable modes of transport such as walking, cycling and public transport.

So, how can a civil society organisation be helpful in the implementation of a public bicycle system? The short answer is that cycling-related CSOs have done a lot to promote cycling and its culture. These CSOs therefore can bring a lot of relevant knowledge and information to the table and cooperation between the company or local authority implementing the system and the CSO can be a good way to ensure that the wishes and desires of potential users are taken into account when developing the system. This would probably also help to get more local support for the system. Practical experiences with CSO-involvement can be found in chapter 4 and 5.

3.1.3 The public bicycle: a new phenomenon

Public bicycles are known under a large number of different names. City bikes, White Bicycles, Yellow Bicycles, Community Bicycles, Smart Bikes, Bike sharing, etc. In this paper we use 'public bicycles' and 'public bicycle system' for the total system of bicycles and stations as rolled out in a city.

So, what is a public bicycle? Public bicycles are bicycles that are available throughout the city or a part of a city, for instance the city-centre. Either at a limited amount of stations or spread out within an area without fixed stations. A public bicycle can be picked up at any time and any location (or station) in the area and returned at another station. Most schemes can be used 24/7. Typically registration is needed and for the most modern systems use is either free, or free for a limited amount of time. The schemes are ran and maintained by a private company or by the local government.

3.2 The public bicycle - A new mode of transport

3.2.1 The history of public bicycles schemes

In the last decade public bicycle systems have been implemented in many cities, but public bicycles are not a completely new phenomenon. The first public bicycle schemes were implemented in Amsterdam, Hoge Veluwe (nature park with modern art museum in the Netherlands) and La Rochelle (France) in the 1960's and 1970's. And since 1995 a public bicycle system functions in Copenhagen. These old generation public bicycles systems functioned without much technology. The Amsterdam project was an informal one without support of the city which soon found all its bicycles stolen, but the other two systems are still operational today.

In 1998 a different kind of public bicycle system was implemented in the French city of Rennes. This was the first one of a new generation, the so-called 3rd generation, using modern technology, and it started a development that has swept all over Europe and, since 2008, also other continents. The scheme in Rennes was small with only 200 bicycles and 25 stations, but larger schemes followed later. In 2005 a scheme of 4000 bicycles was implemented in Lyon, in 2007 a scheme of 6000 bicycles started in Barcelona and in the same year the so-called Velib public bicycle system was implemented which anno 2010 has 24,000 bicycles and 1750 stations. Public bicycles had emerged as more than just a fashion and since then schemes have mushroomed all over the world. Public bicycle systems now exist in France, Germany, Italy, Spain, all Scandinavian countries, England, The Netherlands, Belgium, Switzerland, Austria, The United States, Canada, Brazil, Mexico, Chile, China, Taiwan, and an increasing number of other countries.

That anything written about public bicycle schemes is history within weeks is shown by the following data. At the end of 2008 there were 92 public bicycle systems of second (coin deposit) and third generation (high-tech) worldwide.¹ Whereas, as per 14 December 2010, there are at least 229 public bicycle systems of this kind operational.² This means 137 new schemes in two years or on average more than one new scheme per week. And this does not even include some of the public bicycle systems discussed in this paper such as low-tech systems at university campuses.

¹ DeMaio, Paul. 2008. Bike-sharing Wrap-up for 2008. December 31. <http://bikesharing.blogspot.com/2008/12/bike-sharing-wrap-up-for-2008.html>

² Bike sharing world map.

<http://maps.google.com/maps/ms?ie=UTF8&hl=en&om=1&msa=0&msid=104227318304000014160.00043d80f9456b3416ced&ll=43.580391,42.890625&spn=143.80149,154.6875&z=1&source=embed> [Accessed 14 December 2010]



Fig. 3.2.1 Public bicycle users in Paris [Photo Jeroen Buis, June 2008]

3.2.2 Public bicycles, private bicycles and rental bicycles

In section 1.3 a short explanation was given of what public bicycles are. In this section the difference between public bicycles, 'normal', private bicycles and rental bicycles is explained.

3.2.2.1 *Public bicycles or private bicycles?*

To get a better sense of what public bicycles have to offer, find some advantages and disadvantages of this mode of transport compared to 'normal' private bicycles, underneath:

Public bicycles have the following advantages over private bicycles:

- Users do not have to worry about storage, maintenance or theft of their bicycles.
- Public bicycles can be used for one-way trips and thus offer a flexibility that private bicycles do not provide. The other part of the journey can be done by another mode of transport, for instance public transport.
- Public bicycles are excellent for access and egress to public transport stations. For instance a commuter can use a public bicycle between the train or metro station of destination to cycle the last leg of his journey to work without the need to park a (second) bicycle at the railway station.
- Public bicycles offer the opportunity to city dwellers to experience urban cycling without the need to purchase a bicycle.

Disadvantages of public bicycles compared to private bicycles are:

- The area where the bicycles can be used is limited.
- The journey is not always door-to-door since the user has to walk to and from the nearest public bicycle station.
- Public bicycle stations can be empty when leaving or full on arrival.
- Users cannot choose what kind of bicycle they prefer to use.
- Some public bicycle systems are not open 24/7.

In short, public bicycles are a non-motorised form of public transport. They offer individual mobility without the need for a private vehicle and public transport without being dependent on time tables and fixed routes.

The figure underneath shows that the public bicycle is a rather unique mode of transport since it is both a public and an individual mode of transport.

Classification of transport modes	public	private
collective	Train Bus Tram BRT Metro ...	Charter transport –Company bus –Touring car –Charter plane Carpool ...
individual	Taxi Rickshaw Public bicycle ...	Walking Bicycle Moped Motorcycle Car ...

Fig. 3.2.2A classification of different modes of transport including the public bicycle

3.2.2.2 *Public bicycles or rental bicycles*

Of course rental bicycles have been around for a long time. So how do public bicycles differ from normal rental bicycles? There are a number of differences:

- To use the public bicycle system, users only need to register once, or as in the case of coin-deposit systems not at all. After registration, if required, users can use the bicycles simply by sweeping a smartcard or by showing a card to an employee. This means that collecting and returning the bicycle to any station takes much less time.
- Public bicycle systems allow users to return the bicycle to a different station than where they picked it up. Exceptions are return to location systems such as OV-fiets in the Netherlands. Therefore, according to this definition, this is not a public bicycle system but in this essay these kinds of systems are nevertheless discussed as well.
- Public bicycles, contrary to rental bicycles, can only be used for a short time, always less than a full day. The idea for most systems is to use it only for one trip, station to station. Return to location systems can be used for more than one trip, but typically are used for one return trip only.

The above shows that rental bicycles target other users than public bicycles. Users that want to use a bicycle for a longer period of time, tourists that want to

cycle into the countryside; recreational cyclists that want a bicycle to cycle long distances all are clients for rental bicycles, not public bicycles. Even for tourists in a city a public bicycle might be less ideal than a rental bicycle because after each trip the public bicycles need to be placed back in a docking station. Slowly cycling around for a day, stopping here and there is easier with a rental bicycle. When public bicycles were first introduced businesses that rented out bicycles were worried for their business. In most cases however the public bicycles, because they target a different user group, did not harm their business.

3.2.3 Different types of public bicycle systems

There are different ways to classify public bicycle systems. The most common way to do this is according to the operating system. The technology used. Later in this section this will be done, but there is also another way to classify public bicycle systems: According to mobility function.

3.2.3.1 Public bicycle systems according to mobility function

Public bicycle systems can fulfil different mobility functions. Often one system fulfils different mobility functions at the same time, but in most cases a main function can be distinguished.

Mobility functions that public bicycle systems can fulfil are:

- 1 Mobility for residents in the city
- 2 Mobility in car-free areas
- 3 Mobility for tourists
- 4 Mobility for public or private organisations in enclosed areas (university campuses, large company grounds)
- 5 Egress and access to public transport

In this classification the public bicycle systems are classified according to the main target group (1, 3, 4) and according to the areas where the system operates (2, 4, 5).

1 Mobility for residents in the city

These are the public bicycle systems that have boomed since 1998. The largest public bicycle systems such as those in Paris, Barcelona, Hangzhou or Montreal all have as their main function mobility for local residents and providing an alternative to walking, the car or motorcycle and public transport.

2 Mobility in car-free areas

In car-free areas or areas with limited car-access public bicycles can provide a faster alternative to walking and a more flexible alternative to public transport. Car-free city-centres are obvious areas for such systems. In these cases it makes sense that the bicycles are used by both residents and tourists. When developing plans to reduce the car-accessibility of inner cities, including public bicycles

from the onset, might well be a good way to counter resistance to such plans because public bicycles can guarantee accessibility.

3 Mobility for tourists

Many of the public bicycle systems in group 1 can also be used by tourists. But in these cases, such as in Paris this is not the primary target group for the system. Although in Paris day passes are available, registration is relatively difficult and for instance in Mexico-city only an annual membership is available which does not take tourists into account.

An interesting public bicycle system for tourists is the system in de Hoge Veluwe in the Netherlands. In this national park public bicycles are available for tourists to visit the forests.

4 Mobility for public or private organisations

In areas of organisations such as universities or companies with large company grounds, public bicycles can offer a practical internal transportation system to students and employees that did not arrive at work or the university by bicycle. Examples of such systems are those at Irvine University in California and university campuses in Latin America.



Fig. 3.2.3.1 Public bicycles at the university of San Marcos in Lima, Peru

5 Egress and access to public transport

Although the public bicycle systems of type 1 are often used for egress and access to public transport, there are also public bicycle systems that are specifically aimed at public transport users.

OV fiets in the Netherlands is an example of such a system. Here train users can take a public bicycle at a railway station and will have to return the bicycle within 20 hours to that same station. According to the definition in section 1.3 this system is not a public bicycle system because it does, with a few exceptions, not allow drop-off at a different location than where the bicycle has been collected.

As mentioned before commonly, public bicycle systems are classified according to the operating system used. This will be explained in the next section.

3.2.3.2 Public bicycle systems according to operating system

When looking at the operating systems and technology used, we could distinguish six main types of public bicycle systems:

- 1 Unregulated systems (first generation)
- 2 Systems with coin deposit (second generation)
- 3 Man-operated systems
- 4 Smart card systems (third generation)
- 5 Mobile phone operated systems
- 6 Return to location systems

Underneath we explain each of the different types of systems.

1. Unregulated systems

Examples of unregulated systems are the so-called white bicycles that were previously in operation in Amsterdam. These systems have no fixed stations and require no registration. The only restriction is the area of use.

Unregulated systems are easy to implement but have the disadvantage that theft is easy and the thief cannot be tracked easily since he is not registered. This is why the first public bicycle system, the White Bicycles, in Amsterdam failed.

2. Systems with coin deposit

Next are the systems with coin deposit or second generation public bicycles. Still very simple, these systems provide a small deterrent to theft or use of the bicycles outside the project area, since it would mean losing the coin. In the same way as not returning your supermarket trolley does cost you some money. The Copenhagen public bicycle system works like this. Although this system did suffer a lot of theft in the beginning, theft levels went down later. Also because the bicycles have a very typical design and social control by other citizens made that there was a deterrent on bringing the bicycles outside the project area. On top of that the bicycles have only one gear and solid rubber tyres which means less maintenance, but also less comfort for the user.

3. Man-operated systems

Another way to regulate a public bicycle system without using much technology is to make it a man-operated system. Here a person hands out the key to the user and keeps track of the use of the bicycles. These systems can be more expensive to operate but they create employment and in low-income countries they can also be quite cost-efficient. Generally these are smaller schemes. Typically with 50 to 300 bicycles and between 2 and 10 manned stations. A disadvantage is that it is harder to operate them 24/7. For instance in Terrassa,

Spain, the system functions only from 7.30 am till 7.30 pm, with 100 bicycles and 5 stations. ³



Fig 3.2.2 The Ambicia't system in the Spanish city of Terrassa

4. Smart card systems

The introduction of smart card operated systems was the real start of the public bicycle systems revolution. In these so-called third generation systems, the user needs to register and a smart card is used to release a public bicycle from docking stations in the street. The largest systems today, from Paris to Lyon to Barcelona, and many others function like this. The size of the smart card schemes vary from 100 to over 20,000 bicycles in Paris and 50,000 in Hangzhou.



Fig. 2.3 Registration for the public bicycle system in Paris [Photo Jeroen Buis, June 2008]

outdoor advertising companies Clear Channel (Barcelona) and JCDecaux (Paris) operate the majority of these systems worldwide.

In Paris, registration is possible with a credit card on registration pillars placed at each public bicycle station (see figure 2.3). Here, besides long-term registrations, also registration for 1 day or 1 week is possible. In that case a paper card with a number is provided instead of a plastic smart card.

³ <http://www2.terrassa.cat/ambiciat/funciona.htm>



Fig. 2.4 Velib bicycle at its station in Paris. [Photo Jeroen Buis, June 2008]

Figure 2.4 shows a smart card operated bicycle of Velib (Paris) at its station. Just placing the smart card on the stand beside the bicycle releases the bicycle.

5. Mobile phone operated systems

Another type of automatic system is the mobile phone operated public bicycle system. These systems are popular in Germany where the national railway company Deutsche Bahn (DB) runs a system called Call a Bike in many cities.



Fig. 2.5 Mobile phone operated public bicycles in Stuttgart, Germany.

In the mobile phone operated system, the technology is placed in the bicycle, not in the bicycle docking station. This makes this system more flexible than the smart card system because only a very simple bicycle stand is needed to lock the bicycle. Also here users need to register first. Once registered, a bicycle can be unlocked by calling a number by mobile phone.

6. Return to location systems

An example of a 'return to station' system is OV-fiets in the Netherlands. This railway-station based system requires users to return the bicycle to the same location and hence has more characteristics of the traditional bicycle rental system than of the more flexible public bicycle systems. Therefore, as mentioned before, this is not truly a public bicycle system since bicycles cannot be dropped off at another location than the station of pick up.

Interesting is that the system is currently expanding to other locations than railway stations such as metro stations and because there are also automatic stations expanding it to a fully-fledged public bicycle system is in principle possible.

3.2.4 Financial models and costs for users and management

Financial models

Different financial models are used for public bicycle systems. Some examples are:

- The largest public bicycle schemes are a public private partnership (PPP) between the local authority and an advertisement company. Clear Channel and JCDecaux are two large outdoor advertising companies that run many different systems in many different countries.
- Some schemes, for instance in Spain, are mainly or completely publicly funded.
- In Barcelona car parking fees pay most of the system. A total of 2.23 million Euros per year. The German Call-a-bike and the Dutch OV-fiets are commercially operated by rail companies. The users pay the operating cost by paying per use and an annual subscription fee.
- The Spanish IDAE (Instituto de Desarrollo para el Ahorro de Energia) provides subsidies to public bicycle systems in Spain.
- The Bikla public bicycle system in Guadalajara, Mexico, are funded by establishments such as bars or restaurants who buy the stands and then use the bicycles thus attracting extra customers and providing better accessibility to their establishments.
- The b-cycle public bicycle system in Denver, USA, is funded by government grants, private donations and sponsoring by companies who can sponsor a station with 10 bicycles for a year or longer. In exchange the company logo is printed on the bicycles and the docking station.
- And of course almost all schemes get some of their income from user subscription and sometimes user fees.

Partnerships between local authorities and an outdoor advertisement company operating the public bicycle system are very popular. In cities like Paris and Barcelona this functions as follows: The local authority gives a concession to the advertisement company to sell a certain amount of advertisement spaces in the city. In Paris for instance JCDecaux has concessions to sell 1600 locations. In return the advertisement company runs the public bicycle system.

Of course this does not mean that the systems are costless. Normally the local authority would charge the advertisement company. Different sources estimate that the costs of automated public bicycle systems is between € 1500 and € 4000 per bicycle per year. With 6 to 12 uses per bicycle per day this means about € 0.50 to € 2.00 per public bicycle journey.⁴

Costs for users

In principle the cost for users is not related to the type of public bicycle system. Different examples of pricing policies are:

- Completely free: The man-operated public bicycle systems in Spain allow the use of the bicycle for 2 to 4 hours without any costs to the users.
- A free time frame after which the price increases: This is how most of the smart card systems work. For example the first 30 minutes free, then € 1.00 for the next 30 minutes, then € 2.00 for the next 30 minutes, then € 4.00 for any additional 30 minutes. So 1 hour costs € 1.00, while two hours cost € 7.00. This encourages use for short journeys.
- Pay per minute: Call-a-bike in Germany, for instance, costs € 0.08 per minute.

Management of public bicycle systems

The different financial models mentioned above, also come with different management models. For instance, where the system is run by a private company such as JCDecaux, the municipality is not as free to do with the public bicycle system what they want as in the case where the municipality funds the whole system. For instance, in Paris, JCDecaux, who run the Velib public bicycle system, does not share user information with the municipality because they consider it information that is confidential because of competition with competitors in the field.

The information gathered includes all the origins and destinations of all trips made by public bicycle and is thus extremely valuable information for urban- and transport planners. These are issues that the local authority should discuss with the operating company when discussing a deal on a new public bicycle system in the city.

This is also an area where CSOs could play a role. Maybe even by demanding that data on the use of a public bicycle system should be made publicly available.

3.2.5 The use of public bicycles

Apart from the technical characteristics, it is relevant to get some understanding of the use of public bicycles.

⁴ Sebastian Bührmann, Rupprecht Consult

Availability and amount of trips made by public bicycles

A relevant factor is the availability of public bicycles in relation to the amount of inhabitants. For instance in Paris and Lyon there are 9 public bicycles per 1000 inhabitants in the area where the public bicycle system functions. But in Rennes there is only 1 bicycle per 1000 inhabitants⁵.

For instance in July 2007, four months after the introduction of Bicing, the public bicycle system in Barcelona, with only 1500 bicycles, no less than 18,000 trips per day were made. Or 12 uses per bicycle per day. Use was so intensive that it was often hard to find a public bicycle. Later the system has been extended to other areas and to a total of 6000 bicycles. Still the system is so successful that availability of public bicycles remains an issue. A survey by Velib (Paris) from May 2008, shows that 70,000 journeys with the 20,600 public bicycles are made per day. In other words, 3.5 per bicycle per day. According to Velib expert Eric Britton the ideal use is 5 to 7 uses per bicycle per day (Eric Britton, Paris, 6 June 2008).

Another issue that is relevant for availability is the possibility to find an empty station (when leaving) or a full station (when arriving). The operators of the public bicycles do redistribute bicycles but it is not easy to assure availability. In Paris the information pillar at each station shows where the nearest station with free spaces is or where the nearest station with still bicycles available is located.



Fig 2.6 At 3 PM at Gare de Lyon in Paris almost all the public bicycles are gone; taken by those who arrived in the morning by train to cycle to their (work) destination in the city.

⁵ Census of population of 1999.

Availability can also be measured as the distance between stations. In Paris for instance a spacing of 300 m is used, some Chinese cities have a spacing of only 100 metres and in most successful schemes the spacing is not more than every 500 meters. In the later case the maximum walking distance to a station is 500 metres (grid road system) or about 350 metres ($\sqrt{2} * 250$ m) with diagonal roads).

Length of trips by public bicycles

Public bicycles are typically used for relatively short journeys. The fact that the first 30 minutes of use is free in SmartCard operated systems such as in Barcelona and Paris stimulates users to quickly return the bicycle to a station. In Paris the average trip length is only 18 minutes and in Barcelona 93% of all trips is shorter than 30 minutes⁶, while the average trip length in July 2007 was 3 kilometres.

3.2.6 The urban mobility function of public bicycles

Public bicycles have proven a big success: used intensively and praised by their users. But what role do public bicycles play as a mode of transport? Do they provide a significant contribution to solving problems created by urban traffic in cities?

Public bicycles, like private bicycles, are an environmentally friendly and space efficient mode of transport. But do they replace those modes of transport that are least appropriate in urban areas? Figure 2.7 shows which modes were substituted in Paris, Barcelona and Lyon by public bicycles. The majority of journeys replaced were by public transport, followed by walking. But still 7 to 10% of the public bicycle journeys substituted a car or motorcycle trip.

⁶ La Vanguardia, 30 June 2007, Vivir 3

Trip replaced	Velib Paris ⁷	Bicing Barcelona ⁸	Velo'v Lyon ⁹
Public Transport	65%	51%	50%
Car or Motorcycle	8%	10%	7%
Taxi	5%	NA	–
Walk	20%	26%	37%
Private bicycle	–	–	4%
Otherwise not made	–	–	2%
Not defined	2%	13%	–
	100%	100%	100%

Fig 2.7 Modes of transport replaced by public bicycle trips in three cities

Besides the substitution of journeys by other modes, it is interesting to see how significant public bicycles use is in urban transport. In Lyon, a city with 1.2 million inhabitants (greater Lyon), after two years of operation (mid 2007) of the public bicycle system with 4000 public bicycles, cycle use in the city had increased from 1.7% to 3.0%. Of all cycle trips 25% was by public bicycle and 75% by private bicycle.¹⁰ In that same period the number of accidents with cyclists had only increased with 6%. Because Velo'v, the public bicycle system was so successful the city implemented pro-cycling policies such as 30 km/h zones and two-way cycling on one-way roads.¹¹ A few years ago Lyon had 300 kilometres of cycle tracks and lanes. The objective was to increase this to 500 in 2010.¹²

The information above shows a number of things:

- Public bicycles can help to create a culture of cycling and encourage local authorities to invest in cycling-inclusive plans and projects (cycle tracks,

⁷ Source: www.velib-pourri.com online survey, March 2008

⁸ www.elperiodico.com, October 2007 (Translink Public Bike Study, Environment Scan, March 2008, page 23.)

⁹ Niches Policy Note. New Seamless Mobility Services. Public Bicycles. (www.miches-transport-org)

¹⁰ Guia metodologica para la implantación de sistemas de bicicletas públicas en España; IDEA, Madrid, November 2007

¹¹ Guia metodologica para la implantación de sistemas de bicicletas públicas en España; IDEA, Madrid, November 2007

¹² <http://lyonvelo.free.fr/accueil.htm>

traffic calming, etc.). This does not only benefit the public bicycle user but can lead to an increase of overall cycling in the city.

- Most public bicycle trips replace public transport and walking trips. However, in three cities in Europe up to 10% of trips substituted were by motorcycle or car.

The experience with the implementation of public bicycles on a sufficiently large scale has proved successful in many cities in Europe. Public bicycle systems have proven to help create a cycling culture in cities with previously low cycle use and have helped to create public and political support for investments in cycle-friendly infrastructure. Because public bicycles are 'en vogue' they attract users that would normally not cycle and can help to change the image of urban utilitarian cycling. Although the share of public bicycles in the modal split of a city will always remain rather limited, it can provide a catalytic effect on general cycle use as the experiences in Lyon, Paris, Barcelona and other cities have proven.

3.2.7 Success factors for the introduction of public bicycles systems

The many experiences with public bicycle systems, mainly in Europe, allow us to draw some conclusions about the critical success factors for the implementation of public bicycle systems in a city. We can distinguish the following:

- 1 *A sufficiently large city or community.* In general at least 200,000 inhabitants is considered ideal. This can be the whole city or the size of the city-centre of a larger city. Exceptions of course are special systems such as those serving nature reserves (as the Hoge Veluwe in The Netherlands) or systems running in a university campus.
- 2 A spacing of at most 300 (or maximum 500) meters between stations. Some Chinese systems even have a spacing of only 100 metres!
- 3 *A sufficiently cycle-friendly urban traffic system.* One way to measure this is by the amount of cycle tracks and lanes in the city per square kilometre. In Paris this is currently about 3.5 km per square kilometre. But cycle-friendly is much more than cycling infrastructure. What it means first and foremost is if the city is cycling-inclusive.
- 4 In Barcelona, for instance, the lack of cycle-friendly infrastructure has led to widespread use of footpaths by cyclists and conflicts between public cyclists and pedestrians.
- 5 *Enough public bicycles in relation to population.* Preferably there should be at least 5 public bicycles per 1000 inhabitants in the area where the system is introduced.
- 6 *A high population density can be an advantage.* For instance the city-centre of Paris (205 inh/ha) or Barcelona (162 inh/ha) creates a natural demand for the public bicycles.
- 7 But this does not mean that public bicycle schemes cannot be successful in cities or areas with lower urban densities. For instance, in rural areas or areas with a (very) low density, public bicycle systems can be very valuable too, because in such areas densities are too low for a fine meshed public

transport network. Here, a good, coarsely meshed public transport network, in combination with public bicycles as feeder transport could be ideal.

- 8 *Sufficiently large in terms of number of bicycles and stations.* It is okay to start small and then expand. Doing a small pilot project is, in general, not a good idea because the size of the pilot could well be the reason that it is not successful.¹³
- 9 Finally, it is important to *carefully* select the area where the scheme will operate and think about the target group(s) for the scheme.

None of these factors are set in stone. But it is advisory to keep them in mind.

Concerning the operational side of the system, the following should be taken into account:

- 1 *Theft.* Theft is a reality in public bicycle schemes. The automatic systems have a number of mechanisms to counteract theft. One is that each user is registered and prepays a certain deposit on his credit card that he loses in case he does not return the bicycle to the station (1). Another mechanism to counteract theft is the unique look of public bicycles, which makes it hard to sell them and will make use of public bicycles outside the dedicated area conspicuous (2). It is also possible to include chips in the bicycle which make it possible to track them with GPS systems (3). Nevertheless the exploitation of the system should reckon with a certain amount of theft. Theft has been exceptionally high in the Velib system in Paris where with 20,600 bicycles from the start in the summer of 2007, according to a study by Velib¹⁴ in the beginning of 2009, no less than 7,800 public bicycles had disappeared against an average cost of 400 Euros per bicycle. This means about 6000 bicycles stolen per year or close to 30%. In other schemes theft levels are much lower and, in schemes such as in China and Brazil even close to zero.
- 2 *Vandalism.* Also vandalism has proven a problem. In Paris this is counteracted by employing young, lower educated people and offenders from the suburbs (banlieues) to work on maintenance and redistribution of the public bicycles. Still in 2007 and 2008, no less than Because this is the typical profile of those who commit vandalism, employing them brings down vandalism. Of course making citizens proud of the public bicycles and making the bicycles as much vandalism proof as possible, also helps.
- 3 *Maintenance.* Maintenance is critical for the operation of a public bicycle system. In Paris technology in the bicycle notices flat tires and failing lights, automatically. Velib has about 300 to 400 employees for maintenance and relocation of bicycles from full stations to empty stations.

¹³ Note the difference between 'starting small' and 'doing a small pilot project'. Starting small means that the decision has already been made to expand later, whether or not the first phase of the project is considered successful or not. A small pilot project is something else. In this case the decision to continue or expand the public bicycle system is taken after evaluation of the pilot project.

¹⁴ Thefts Puncture Paris Bike Scheme. BBC News, February 10, 2009.

<http://news.bbc.co.uk/2/hi/europe/7881079.stm>.

When seen from the perspective of urban traffic planning, the following should be taken into account when considering the implementation of public bicycle systems:

- 1 *Public bicycle systems are not cheap.* It is important to not let these costs weigh on the municipal budget for non-motorised transport. The Barcelona approach to use parking fees in combination with the subscription fees to fund the public bicycles is an interesting one.
- 2 *Be aware of the risk of window dressing.* When public bicycle schemes, which generally create a lot of goodwill, come instead of policies to promote non-motorised transport and restrict car-use, little is gained. Experiences in Paris and (later) Barcelona where car parking spaces have been converted in public bicycle stations and where traffic lanes have been converted into bicycle tracks are examples how public bicycle systems can be part of a policy to promote sustainable transport.



Fig. 2.8 Here, in Paris, the public bicycle station replaces car parking.

- 3 *It is possible to use the implementation of public bicycles systems to improve public space.* Public bicycle systems can create great opportunities to improve public space. Certainly also because they make it easier to create car-free areas since public bicycles can be used as a mode of public transport to access these areas. Thus they can justify a re-allocation of road space.
- 4 Public bicycles make mass public transport more attractive by providing access and egress to public transport stations. The implication here is that providing public bicycles, at least at the main public transport stops, is highly recommended.
- 5 *Public bicycles have proven to improve road safety for cyclists.*¹⁵ The increase of the number of cyclists and the media attention of the public bicycle system makes other road users more aware of the presence of

¹⁵ In Lyon where cycling increased by 80% in two years after the introduction of the Velo'V public bicycle system in 2005, *FUBicy* (The French Federation of Bicycle Users) reported that the risk of accident per cycle ride was 1.7 times lower in 2007 than in 2004. Source: http://www.thewip.net/contributors/2009/06/comment_allezvous_by_bike_of_c.html (accessed 13 Dec 2010)

cyclists. Additional cycle friendly infrastructure by the government can also help much to make cycling safer.

- 6 *Public bicycle systems can be used as social projects.* For instance in Paris young offenders are working for Velib and use this experience to find back their pride and dignity and integrate back into society.

3.3 Public bicycle Systems outside Europe and in Developing Countries

Until very recently public bicycles systems were only implemented in Europe and a few schemes in the US and Canada. This has changed and currently public bicycle systems are also operating in Latin-America and in Asia. In this chapter we provide a number of examples of public bicycle systems outside Europe, with special attention to public bicycle systems in developing countries.

3.3.1 Public Bicycle Systems outside of Europe

While public bicycle systems were invented and first introduced in Europe, in recent years, they have spread all over the world. This chapter will first provide an overview of public bicycle systems in other parts of the world and then zoom in on public bicycle systems in developing countries.

Public Bicycle Systems in Canada and the United States

In developed countries outside of Europe, public bicycle systems are on the rise. Currently there are only a limited number of these schemes, but many cities have plans to implement a public bicycle system.

Bixi - Montreal, Canada ¹⁶¹⁷

Since May 2009, Canada's first public bicycle system, Bixi is up and running in Montreal. With 3000 bicycles at 300 stations it is the biggest scheme in North America. This system is special for a number of reasons. To start with it is run by the city's parking authority, Stationnement de Montreal, and not by an advertising company. Stationnement de Montreal has designed and implemented the system and operates and maintains it.

Secondly, the system is designed in such a way that the stations can be taken away in winter. Because of the harsh winters in Montreal, the system does not operate from the beginning of December until the end of April.¹⁸ And finally, since the system is not developed by the usual suspects, JCDecaux or Clear Channel, but by a new company called Public Bicycle System Company (PBCS) the design is quite different from other public bicycle systems.

¹⁶<http://newmobilityagenda.blogspot.com/2009/07/best-public-bike-system-in-world.html>

¹⁷ <http://www.bixisystem.com/home>

¹⁸ <http://montreal.bixi.com/rolling-with-bixi/how-it-works>



Fig. 3.1 The original design of the BIXI public bicycle system in Montreal

Public bicycle systems in the United States

Smart Bike - Washington DC¹⁹

The public bicycle system in Washington DC was the first public bicycle system in the United States, launched in August 2008²⁰. It started as a small scheme with only 10 stations and 120 bicycles, run by Clear Channel Outdoor. The system was aimed at residents and not accessible for (short term) tourists. The use of the system has been disappointed with on average only one bicycle journey per bicycle²¹, where systems in other cities have 4 to 10 rides per bicycle per day. A lack of promotion and its small size was blamed for the low uptake.

In September 2010, DC's public bicycle system was replaced by Capital Bikeshare with 1100 bicycles and 114 stations in Greater Washington DC. Interesting here is that the expanded system will not be run by Clear Channel Outdoor anymore because Clear Channel was not interested in an arrangement where local authorities would pay expansion of the system, instead they were only running it to grow their advertising business. The SmartBike program allowed Clear Channel to advertise on bus shelters in return for running the system.²² The fact that part of the expansion took place in neighbouring Arlington where advertisement on bus shelters was not allowed was another reason Clear Channel was not interested in expansion.²³

The new system will be based on Montreal's Bixi system and also be accessible for tourists who can register for one day only.

¹⁹<http://smartbikedc.com/>

²⁰ <http://www.treehugger.com/files/2008/08/dc-bike-sharing-smart-bikes.php>

²¹ <http://www.washingtoncitypaper.com/blogs/housingcomplex/2010/09/16/r-i-p-smartbike-good-riddance/>

²² <http://greatergreaterwashington.org/post/5913/arlington-dc-announce-1100bike-regional-bike-sharing/>

²³ <http://georgetownmetropolitan.com/2009/06/19/smartbike-expansion-hits-a-flat/>

Zot wheels, Irvine University - California²⁴

This public bicycle scheme at Irvine University in California was inaugurated in October 2009. It runs on the campus grounds of the university with only 25 bicycles and four stations. But despite its small size it uses the modern technology that other public bicycle systems in cities use.

Denver b-cycle, Denver^{25,26}

The second city public bicycle system after Washington DC inaugurated in April 2010 with 400 bicycles at 40 stations.

Most interesting about the system is the management model and the financial model. The system is operated by one company, Denver Bike Sharing²⁷, and designed by another company B-cycle LCC which provides the technology and the bicycles. B-cycle, hence, is another competitor for Clear Channel, JCDecaux and BIXI with yet another high-tech public bicycle system.

The financial modal is interesting too. Denver Bike Sharing is funded by individual foundation and government grants, corporate sponsorships, user memberships and transaction fees. It is possible to sponsor a B-cycle station for US\$ 30,000 for one year. In return the company that sponsors the station gets their logo on the station and on the 10 bicycles at the station. A 3-year sponsorship of US\$ 60,000 is also possible. Individuals can also donate to the system.

Depending on their success with funding and sponsorship, Denver Bike Sharing hopes to add another 500 bicycles to the system in 2011.



Fig. 3.2 Denver b-cycle station 4 days before inauguration with company logos on the registration pillar and the bicycle baskets

²⁴ <http://www.parking.uci.edu/zotwheels/main.cfm>

²⁵ <http://www.denverbikesharing.org>

²⁶ <http://denver.bcycle.com/home.aspx>

²⁷ <http://www.denverbikesharing.org>

Nice Ride, Minnesota^{28,29}

In June 2010 the third large public bicycle system in the US was launched in Minnesota with 1000 bicycles. The system is the BIXI-system, the same one as running in Montreal.

Public bicycle systems in Australia and New Zealand

The Next Bike³⁰ public bicycle system, with 170 bicycles, in Auckland in New Zealand was the first public bicycle system in New Zealand and Australia.

Melbourne, Australia

In June 2010 the first public bicycle system was inaugurated in Melbourne, Australia. It was the fourth city to implement the BIXI public bicycle system. The system is funded by the state government. It launched with only 100 bicycles in 10 stations and was expanded to 600 bicycles at 50 stations at the end of June. In the first week it was only used 253 times, or an extremely low 36 times for the 100 bicycles or 0.36 uses per bicycle per day.³¹ The weather was blamed for the low uptake but already there was other criticism. Usage continued to be low even after all the bicycles were placed. The website Copenhagenize published that on Friday October 15th, 5 PM Melbourne time only 3 bicycles, or 0.7%, of the bicycles were in use. At that same time, 8 AM in London with similar weather as in Melbourne, there were 404 bicycles, or 9% of the bicycles in use and in Dublin at that moment, 20% or 76 bicycles were in use.³²

Different explanations can be given for the lack of uptake in Melbourne. The most frequently mentioned one being the compulsory helmet use for cyclists. The city even introduced a helmet machine with helmets for sale at only 5 Australian dollars (about 5 US\$). But use of the public bicycles continues to be low.

Public Bicycle Systems in Asia

In Asia public bicycle systems have only mushroomed since 2008, but the first public bicycle system was launched already in 1999 in Singapore. The system was called “SmartBike” until 2004 and “TownBike” until the program ended in 2007. More recently, however, many new systems have been launched. A number of systems are discussed underneath.

Hangzhou, China

In May 2008, the city of Hangzhou in China started a public bicycle system with similar technology as the one used in Paris. Interesting is that in Hangzhou not the first 30 minutes, but the first hour is free of charge. The next hour cost only

²⁸ <http://livegreentwincities.com/news/newsitem.aspx?newsid=1053&newsitemid=7493>

²⁹ <https://www.niceridemn.org/>

³⁰ <http://nextbike.co.nz/>

³¹ <http://www.theage.com.au/victoria/bike-share-scheme-saddles-up-slowly-in-bleak-weather-20100611-y3oe.html>

³² <http://www.copenhagenize.com/2010/10/bike-share-usage-comparisons.html>

one yuan (0.10 Euro). The bicycle system has rapidly expanded. In October 2009 it counted with 40,000 bicycles and 1600 stations³³, which made it the largest public bicycle system in the world. In a city of 2.65 million inhabitants, this means 15 bicycles per 1000 inhabitants, already a higher bicycle density than the system in Paris. The system will expand to 50,000 bicycles, with stations every 100 metres³⁴. Originally the objective of the system was to improve the access of public transport³⁵, but the system has become so successful that it has developed into a mode of transport of its own used by residents and tourists in this popular tourist destination.

Remarkable, and underlining that different cultures pose different challenges, is that in the first year of operation of the system no bicycle had been stolen and very few had been vandalised. This was in stark contrast with the schemes in for instance Paris or Lyon where, particularly in the first year, a significant percentage of the bicycles were stolen and vandalised.

Some other public bicycle systems operating in China are:

- Wuhan
Wuhan has a public bicycle system running with 50,000 yellow bicycles as per January 2010.
- Shanghai – Rent me a bicycle
As of February 2010 there are 9 public bicycle stations. In July 2010 the number of stations had increased till 230 with no less than 12,000 bicycles.³⁶ This shows that in Shanghai the stations are large with on average more than 50 bicycles per station. The plan is to have no less than 3500 stations operational by 2012³⁷.
- Beijing³⁸
Beijing introduced a public bicycle system with 100 bicycles at 3 stations in March 2010.

Kaohsiung City, Taiwan

The first Taiwanese city to launch a public bicycle system was Kaohsiung City, which launched a 1500 bicycle, 20 station, system on the first of March 2009³⁹. In May 2009, the system had expanded to 4500 bicycles with stations along the city's mass rapid transit (MRT) lines.

Two weeks after Kaohsiung City⁴⁰, Taipei was the second city in Taiwan that introduced a public bicycle system, called YouBike, using bicycles made by Taiwan bicycle manufacturer Giant.⁴¹

³³ http://bike-sharing.blogspot.com/2009_10_01_archive.html

³⁴ <http://dirt.asla.org/2009/07/31/hangzhou-to-expand-bike-sharing-program-to-50000-bikes/>

³⁵ <http://www.cityryde.com/blog/bike-share-system-flourishes-in-the-far-east/>

³⁶ <http://www.hindu.com/2010/07/11/stories/2010071156631800.htm>

³⁷ <http://www.psfk.com/2010/02/shanghai-gearing-up-for-modern-bike-rental-system.html>

³⁸ http://www.chinadaily.com.cn/china/2010-03/02/content_9525138.htm

³⁹ <http://www.taiwanheadlines.gov.tw/ct.asp?xItem=150180&ctNode=10>

⁴⁰ http://www.cardif.fr/pdf/cp_france/CP-Youbike_Taipei-03-2009-A.pdf

FreMo - Thane, India

Early 2010, FreMo, Freedom to Move, India's first public bicycle system, was inaugurated with 6 indoor stations and 100 bicycles⁴² in Thane, near Mumbai. The main objective of the system is to provide feeder transport to public transport, mainly the train for commuters who commute between Thane and Mumbai.

This system is unique in the sense that it is a commercial project without any government support. The pricing structure is also unique with 5 different kinds of memberships that work similarly to mobile phone plans: If you buy more minutes, in this case to cycle, you get a lower rate per minute. User rates go from Rs 4.80 per hour (Rs. 0.08 per minute), for the one year Platinum plan to Rs 18.00 per hour (0.30 Euros) for the FlexiPlan. The deposit is Rs 2000.⁴³ The main objective of the scheme is to provide climate friendly transport for people living in Thane and working elsewhere (in most cases Mumbai). They can pick up a bicycle near their homes and cycle to the station in the morning and vice-versa in the evening, thus saving money on public transport or fuel, time to wait for a bus or autorickshaw, and the environment.⁴⁴

FreMo works with manned stations, taking advantage of the low costs of labour in India, instead of the technology of third-generation smartcard-operated public bicycle systems.

GreenBIKE - New Delhi, India⁴⁵

GreenBIKE, the small public bicycle system in New Delhi, is also focussed on providing access to public transport, in this case the BRT, bus rapid transit. This system has only 5 stations and in total 50 bicycles. The system is manned and users are allowed to return their bicycle at a different station. The costs for the first 4 hours is only INR 10 (0.17 Euros), every extra hour costs Rs. 5. The system is similar to that of OV-fiets in the Netherlands with the difference that OV-fiets charges a fixed rate of 2.85 Euros for 20 hours. In the Delhi system, using the bicycle to go to work (from the BRT-station) is relatively expensive as a 9-hour use costs INR 35, INR 25 more than a 4-hour rental.

A survey by GTZ seems to prove this: 33% of the trips with the bicycles is for shopping and accessing services, 30% for commuting to work, 12% for visiting relatives and also 12% for leisure.

NUBIJA - Changwon, South Korea

In October 2008, NUBIJA, a combination of the first letters of the Korean words for 'moving around' and 'bicycle' and an acronym for Nearby Useful Bike,

⁴¹ <http://blog.taiwan-guide.org/2009/03/taipei-u-bike/>

⁴² <http://bike-sharing.blogspot.com/2010/03/indias-first-bike-sharing-service-fremo.html>

⁴³ <http://fremo.in/Default.aspx>

⁴⁴ <http://ecomovesolutions.com/RentAcyclefightglobalwarming.htm>

⁴⁵ <http://www.slideshare.net/jaaaspal/greenbike-cycle-sharing-concept-in-india>

Interesting Joyful Attraction, kicked off with 430 bicycles and 20 stations.⁴⁶ The system is unmanned and bicycles have technological extras such as information about the distance, time and average speed of the journey.⁴⁷ Changwon is an obvious place for a public bicycle system as it has the country's most extended bicycle path network of almost 100 kilometres. In July and August 2009, each bicycle was used 7 times per day.

Tashu - Daejeon, South Korea

Also in October 2008, the public bicycle system of the city of Daejeon was inaugurated. Interesting enough, the system started off with 1000 bicycles at 73 volunteer manned stations. Daejeon is in the process of converting the system in an unmanned system with eventually 10,000 bicycles.⁴⁸ Just as in Changwon, the public bicycle system in Daejeon is operated by the local government.

Toyama, Japan

In March 2010, the Japanese city of Toyama launched Japan's first public bicycle system. The system is operated by Cyclocity a subsidiary of JCDecaux and has 150 bicycles at 15 stations in central Toyama. Advertisement space on the bicycles and the stations, together with user registration costs will pay for the operating costs of the system. As in Paris, the first 30 minutes use is free of charge.

A small public bicycle system operates in Bangkok in Thailand.

Public Bicycle Systems in Africa

Although the South African city of Cape Town has played with the idea of implementing a public bicycle system, there are currently no concrete plans for public bicycle systems in Africa.

Public Bicycle Systems in Latin-America

Since 2008 public bicycle systems have been implemented in Latin-America. Most are low-tech systems but in Mexico and Brazil third-generation high-tech systems are operational. Underneath a few examples in Chile, Mexico, Brazil and Colombia are presented.

b'easy - Santiago, Chile ⁴⁹

The public bicycle system in Providencia, in greater Santiago in Chile, is the first one in Latin America and was inaugurated on the 22nd of September 2008.⁵⁰

⁴⁶ <http://www.cityryde.com/blog/korea-deploys-nations-second-public-bike-system/>

⁴⁷ <http://116.122.37.231/english/english.htm>

⁴⁸ <http://www.kiet.re.kr/UpFile/report/economy/1257745067759.PDF>

⁴⁹ <http://www.bicicletaspublicas.cl/>

⁵⁰ http://www.providencia.cl/prontus_noticias/site/artic/20080922/pags/20080922133933.html

The system started with 100 bicycles and 10 stations. Subscribers can sign up at a station or online. The system was created by Centrolniciativa, a business incubator, of the Economics Faculty of Diego Portales University. All bicycles and stations are locally produced⁵¹.

Ecobici –Mexico City, Mexico

Launched on February 16th 2009, the largest system in Latin America is a Clear Channel operated system, with 1,114 bicycles and 85 stations.

The system started in four different neighbourhoods and there are plans to expand within the city with a total of 6,000 bicycles. The yearly cost is \$300 MXN (about 17 Euros). The first 30 minutes of a rental has no charge, the next 30 minutes costs \$10 MXN (0.60 Euros), and after that it costs \$35 MXN (2.00 Euros) an hour⁵². It is part of the Green Plan of Mexico City and the efforts being made to strengthen the current public transport network, with a positive impact on quality of life.⁵³



Fig. 3.2 Ecobici in Mexico-city (photo Jeroen Buis, Aug. 2010)

Bikla – Guadalajara, Mexico⁵⁴

The public bicycle system of Guadalajara is worth mentioning, not because of its size – as per November 2010 it had only 80 bicycles and 22 stations – but because of its original operating system. The system is a hybrid between low- and high-tech. It is manned, but the ‘stations’ are not stand-alone stations but low-tech cycle parking facilities at cafes and restaurants, museums, shops, etc. The staff at these locations manages the public bicycles besides their normal job and gives out the keys of ordinary bicycle locks to the users.

The high-tech part is that registration is done online and that the availability of bicycles at the stations can be seen online. Unique as well is that companies or organizations that want a Bikla station buy the station. After that they have to

⁵¹ <http://bike-sharing.blogspot.com/2008/12/first-south-american-programs-underway.html>

⁵² <http://www.merca20.com/ecobici-nuevo-sistema-de-transporte-para-el-df/>

⁵³ <https://www.ecobici.df.gob.mx/home/home.php>

⁵⁴ <http://www.bikla.net/>

run it but of course they benefit from the fact that users visit their restaurant or shop.

SAMBA – Rio de Janeiro, Brazil ⁵⁵

Acronym for Sistema Alternativo de Mobilidade por Bicicletas de Aluguel (Rental Bikes Alternative Mobility System) started in December 2008 as the First large Latin America public bicycle system. It runs managed by a private company called Serttel under supervision and contract with the municipality. The whole system including the bicycles are made in Brazil and it is also a high-tech system using 3G connections, solar powered stations and cell phone or credit card operation . It started in one neighbourhood with 80 bikes in 8 stations. In January 2010 it had 190 bicycles in 19 stations in 6 neighbourhoods and the complete system, will have 500 bicycles in 50 stations in 12 neighbourhoods. Surprisingly contrary to what was anticipated, in the first year, only five bicycles were stolen.

SAMBA – Blumenau, Brazil ⁵⁶

Blumenau is a medium-size city with 300,000 inhabitants that uses the same SAMBA system as in Rio de Janeiro, with 5 stations (30 planned) and 35 bicycles. It is part of a larger city-wide plan that gives priority to collective public transport and individual non-motorised transport.

Bicicleta Livre – Brasília, Brazil ⁵⁷

This system runs in the Universidade Nacional de Brasília – UNB campus. The bicycles are available at any bicycle parking inside the campus and can be used by everyone who needs one. It is not allowed to take the public bicycles outside the campus area. The bicycles are 100% reassembled with parts from old donated bicycles by a group of volunteers.

BiciRRun – Bogotá, Colombia ⁵⁸

This system is used on the campus of the Universidad Nacional de Colombia. It is a low tech system having various special designed bicycles designed and made in its own workshop. These bicycles are distributed over the campus on Mondays and collected again on Thursday and Friday.

3.3.2 Operating public bicycle systems in developing countries

Section 3.1, provided an overview of public bicycle systems outside Europe. Many of these systems however run in developed countries such as the USA, Canada and New Zealand. Also the high-tech countries of South-Korea and Taiwan, although less wealthy then the previously mentioned countries, can, no longer, be called developing countries. It nevertheless can be useful to take note

⁵⁵ <http://www.zae.com.br/zaerio/home.asp>

⁵⁶ <http://www.mobilicidade.com.br/>

⁵⁷ <http://www.bicicletalivre.unb.br/index.html>

⁵⁸ <http://www.bienestarbogota.unal.edu.co/bicirrun/>

of these projects as some of them have introduced new concepts and technology that has not been applied in Europe.

In the last few years, however, quite a few developing countries have implemented public bicycle systems. The middle income countries Chile, Mexico, Thailand and China have public bicycle systems and also some lower income countries (with enormous income differences though), such as Brazil and India, have successfully introduced public bicycle systems.

The central question in this section is whether the different reality in these countries has a consequence for the technical and operational aspects of the public bicycle system.

However, before doing this, it is useful to ask some more fundamental questions about the utility of such systems for developing countries when compared to wealthier countries.

3.3.2.1 The relevance of public bicycle systems for developing countries

While (large scale) public bicycle are a relatively new phenomenon in the developed world, they are an extremely new phenomenon in developing countries. It was not before 2008 that the first public bicycle systems were inaugurated in countries such as China, Chile and Brazil.

As public bicycle systems boomed in Europe, people in countries with a history in urban cycling and cycle infrastructure development such as China, India, Colombia, Chile, Brazil and others got more and more interested. Now that public bicycle systems have been implemented in these and other countries, it is useful to ask the question what relevance public bicycle systems can have in cities in developing countries.

So what could be the value of a public bicycle system in cities in developing countries?

The main answer is of course: the same as in developed countries. The transport function of public bicycles as a flexible form of individual public transport without the need for users to worry about their own bicycle is a universal advantage of public bicycles. But there are also some differences as mentioned underneath.

Bicycle theft

In the first place, the fact that users need not worry about their own bicycles, might be an additional advantage for developing countries where bicycle theft is common, because in developing countries the price of a new bicycle is much higher for low-income users in relation to income. Hence, buying a new bicycle after the old one is stolen can be a much bigger deal and even a reason to stop cycling altogether. Public bicycle systems take away this disadvantage.

On top of this, public bicycle systems can reduce theft of private bicycles, because in some cases the public bicycle provides the service a stolen bicycle would have performed or instead of a private bicycle a public bicycle gets stolen.

Public bicycle expert DeMaio⁵⁹ remarks about this:

“As has been proven in Copenhagen, City Bikes reduce bicycle theft. In the five years that the Copenhagen City Bike program has been around, Copenhagen has experienced a 30% drop in bicycle thefts according to the Danish Statistics and Insurance Information Organization. This has occurred because the City Bikes provide the same service that a stolen bike would provide.”

To what extent this also applies for the high-tech third generation systems of course remains to be seen since these, unlike the second-generation coin deposit system of Copenhagen, do require registration and will thus, be a less likely alternative for theft.

Low transport costs – low income users

Obviously, in developing countries, cost is a mayor issue for many potential users. Public bicycle systems can provide mobility per trip at exceptionally low prices. Where for low-income users, buying a bicycle can be a big expenditure, only paying for what you use can be a good alternative. For instance, the New Delhi GreenBIKE public bicycle system, which provides feeder transport to the Delhi Bus Rapid Transit (BRT) and to the Metro system, charges INR 100 (about 1.70 Euros) for an annual membership and INR 10 (0.17 Euros) for 4 hours hire (DIMTS, 2010). The typical user of the system earns between INR 2,000 (34.- Euros) and INR 10,000 (170.- Euros) a month (Dhingra and Kodukula, 2010). So for these users a bicycle costs a month salary and public bicycles can thus be an affordable alternative.

Status – middle class users

In European countries without a strong urban cycling culture such as France or Spain, public bicycles have made cycling ‘chic’. In other words, unlike urban cycling before, it has given status to cycling. For developing countries this is even more important because the idea that cycling is for the poor is particularly strong in developing countries (and nonexistent in wealthy cycling countries like the Netherlands and Denmark).

That the public bicycle systems in Santiago and in Mexico-city, operate in the wealthier and trendier parts of the city (Providencia and La Condesa), underlines this. Here the main target groups are not the poor but middle class people who use the bicycles to go to work or also, as in Mexico-city, to move between bars and restaurants. In these cases public bicycle systems can help tremendously to improve the status of cycling.

⁵⁹ Paul DeMaio (2000): *Helsinki's City Bike Program* [accessed online by Eva Helmeth 15/01/2008: <http://members.aol.com/humorme81/helsinki.htm>]

Investment priority

Public bicycle systems, as will be discussed in the next section, are costly. Whether, when investing in non-motorised transport, public bicycle systems are the first choice or not, is not obvious. It depends on different factors.

Where cycle use is significant (4 or 5% or more in the modal split), but cycle-friendly infrastructure is lacking, it makes sense to prioritise investments in infrastructure for existing cyclists rather than investing in a public bicycle system.

However, even with significant cycle use, sometimes a public bicycle system can be useful because it can help the status of cycling and attract middle-class people who would otherwise not cycle.

Sometimes a public bicycle system can get political support whereas other measures to promote cycling do not.⁶⁰ Many politicians and public administrators consider public bicycle systems as something sexy whereas investments in cycle infrastructure, however necessary, are considered less interesting. In this case, the introduction of a public bicycle system can be a first step after which there will be more support for investments in cycle-friendly infrastructure.

In cities where cycle use is (very) low, less than 1% or 2%, a public bicycle system, can be a good investment to help create a cycling culture. Cities such as Lyon and Paris prove this because they saw their cycle use double thanks to the introduction of public bicycles systems.

Feeder transport

Public bicycle systems can play an important role as a feeder system to collective public transport such as train, metro or bus rapid transit (BRT). This can be particularly interesting for cities in developing countries because here, the networks of heavy rail (metro or train) or BRT are generally small and coarsely meshed. For instance metro systems in cities like Sao Paulo, Mexico-city or Rio de Janeiro do not reach the low-income suburbs. Hence residents of these areas need feeder bus services to access the metro lines and spend a lot of extra time and money on this part of their journey. Public bicycle systems can be very valuable in such areas.

In Greater Mumbai , 25% of all bus trips are feeder trips to the train with an average trip length of 2 to 5 kilometres (Dhingra and Kodukula, 2010: p24.). This shows a great potential for public bicycle systems to provide efficient, fast and low-cost feeder transport to mass collective public transport. Hence it is not surprising that the Indian public bicycle systems FreMo near Mumbai and GreenBIKE in New Delhi focus on feeder transport to train and BRT.

⁶⁰ Anno November 2010, this is the case in the Indian city of Pune, a city with more than 10% cycle use, where the new municipal commissioner has embraced the idea of a public bicycle system but not given support to other measures to make the city more cycle-friendly.

3.3.2.2 Technical and operational issues for implementation of public bicycle systems in developing countries

After discussing the value of public bicycle systems for cities in developing countries, in this section, the technical and operational issues that deserve special attention when implementing public bicycle systems are discussed. We will focus on a small number of aspects.

Manned or unmanned stations

One question to ask when implementing a public bicycle system is whether to use manned or unmanned stations. Although high-tech (third generation) public bicycle systems are the most common and spread throughout the world from Europe to North-America to China, Mexico, Taiwan and Korea, manned systems can still be found as well. For instance in Spain, many smaller systems run with manned stations and also the public bicycle system in Thane, India, runs with manned stations. The Dutch OV-fiets system works with both manned stations (at the larger railway stations) and unmanned stations (at other locations and at smaller railway stations).

Interesting is the case of Daejeon in South-Korea which started with no less than 73 volunteer manned stations and later 'upgraded' to an unmanned automatic system.

Although the third-generation systems as operational in Paris are the ones that have made the boom in public bicycle systems, in low-income developing countries and in countries with high levels of unemployment, manned public bicycle stations should not automatically be discarded. Systems with manned stations could mean lower implementation, operation and maintenance costs. Of course, in the end, all systems are manned because employees are needed for repair, maintenance and redistribution of bicycles.

In India, the public bicycle systems that have been implemented to date, all operate with manned stations because the automatic docking systems such as those that operate in Paris or Barcelona are considered unsuitable for the heat and dust of Indian cities.

In a culture like the Indian one, where maintenance is often neglected, using low tech solutions that need little maintenance can be a great advantage. This is probably the case in many other developing countries as well.

Bicycle theft and vandalism

There might be some expectations that theft will be a bigger problem in low-income developing countries than in wealthy developed countries. But recent experience has shown that this is not necessarily the case. For instance, particularly in the beginning, the public bicycle systems of Paris and Lyon had to deal with extremely high numbers of bicycles stolen and vandalised, whereas

in Hangzhou China none of the 20,000 bicycles had been stolen in the first year of operation and in Rio de Janeiro only 5 bicycles were stolen in the first year.

Costs

The cost of the system is an interesting factor. The high-tech European public bicycle systems cost between 1500 and 4000 Euros per bicycle per year. Automatic systems in developing countries are cheaper, but still costly. Manual systems can be cheaper. So costs should also be included in the choice for a system.

Registration, payment and deposit

The last thing to discuss is registration and payment by the users. The high-tech European systems use credit cards for payment. However, in most developing countries many people, and certainly those from the lower-income target group, do not have a credit card. So other systems, for instance using cash, are to be preferred. A good alternative is the FreMo system in India, where users can get prepaid cycle minutes the same way prepaid credit for mobile phones can be bought.

The deposit is another important issue. A deposit is important to deter theft. But if the deposit is high enough (in relation to the costs of a bicycle) to deter theft, it also means that the attractiveness for low-income users goes down significantly. Hence to determine an appropriate deposit, the risk of theft needs to be balanced against the risk to deter low-income users to use the system.

3.3.3 Conclusions

This chapter shows clearly that, since 2008, public bicycle systems are booming also in countries outside Europe. In developing countries the systems vary from very large third-generation systems in Chinese cities to much smaller low-tech systems in India (New Delhi, Thane) and very small low-tech systems in university campuses in Latin-American cities. This plethora of systems shows that the concept, picking up a bicycle at one location and dropping it off at another, is functional and can be elaborated in many ways.

Some systems target low-income users (such as those in India), while others also target middle-class people (such as in Mexico-city) for whom the public bicycle is a trendy way to move around.

The local situation should be leading in what system to choose and how to set it up. The experiences in the past two years, in any way, have shown that public bicycles are not just for developed countries but can be applied successfully in developing countries too.

The next chapters cover this with special attention to the role of civil society organisations in lobbying for and development of public bicycle systems.

3.4 Public bicycle Systems outside Europe and in Developing Countries

This chapter describes the different possible roles of CSOs in the creation of public bicycle systems in cities once the system is implemented.

A number of civil society organisations have been lobbying for the implementation of public bicycle systems and in some cities they have been active in assisting in the implementation of the system. Some examples from South America and South Africa illustrate this.

3.4.1 Quito, Ecuador: CSO initiative

Civil Society Organization Biciaccion presented a proposal for a project to start a feasibility study for a public bicycle system in Quito to the Municipality, the Ministry of Electricity and Energy, and other entities. The authorities said that it was a very important and original project and that it made them think about the possibility of a public bicycle system in the city. At the same time the media started to report about public bicycles and different experiences in other countries. As per December 2010, the authorities have not taken any steps towards even a feasibility study for a public bicycle system. But with their actions, Biciaccion put the issue on the agenda and now are following up to get the authorities to take the first steps.

3.4.2 Blumenau, Brazil: CSO as a broker between parties

In the beginning of 2009, the municipality of Blumenau in the south of Brazil, asked a local CSO, called ABC, Associação Blumenauense pró Ciclovias, to take part in one of their monthly meetings in which a new mobility plan for the city was presented. Input from ABC was requested since the plan included cycling. The plan was a BRT (Bus Rapid Transit) plan that could use cycling for feeder trips. Proposals were included for bicycle infrastructure like cycle lanes and tracks, bicycle parking at stations and a public bicycle system similar to Velib in Paris, thus giving priority to mass transportation and individual non-motorised transport.

ABC endorsed the proposals and connected the municipality of Blumenau with Sertell, the company that operates the public bicycle system in Rio de Janeiro, and made contact with Transporte Ativo, an organisation from Rio de Janeiro that was already involved with the development of a public bicycle system in Rio de Janeiro. After that, in an I-CE Mobility Seminar in Florianopolis, people from ABC met people from Sertell and then introduced them to the technicians and decision makers of the municipality of Blumenau.

ABC also took part in many meetings between the municipality and Sertell, informing them about important routes for cyclists and suggesting dates for the launch and names for the system.

The public bicycle system opened on Car Free Day 2009, with 5 stations, and 30 planned, (see figure 4.1) 35 bicycles and 5 km of new cycle tracks. ABC is paying close attention to the developments and monitors the system deployments.



Fig 4.1 Blumenau, Vila Germanica Station

3.4.3 Brasilia, Brazil: CSO as project developer

The project in Brasilia has the same structure as a public bicycle system but is for use on a specific site. This is the type of public bicycle systems which in section 2.3.1 was called “public bicycle system to provide mobility for public or private organisations in enclosed areas”.

In this case the area was that of the campus of the National University of Brasilia, UNB. The project was born within the Faculty of Physical Education, set up by an informal CSO, called Bicicleta Livre Project, modelled along the lines of the “White Bicycle” project of the 60’s in Amsterdam.

The idea was to improve the mobility inside the campus, make a large donation campaign of used bicycles, do the necessary maintenance and review, standardising and distributing the bicycles freely around the campus, for use by students, staff and visitors. A group of volunteers from other universities and civil society organisations joined the project.

The Bicicleta Livre staff currently holds dialogues with students from other universities, such as UNICAMP and USP, in São Paulo State, in order to exchange information and experience so that similar projects can also be implemented in these universities. In addition, the project's success attracted the interest of the academic community and support from the University.

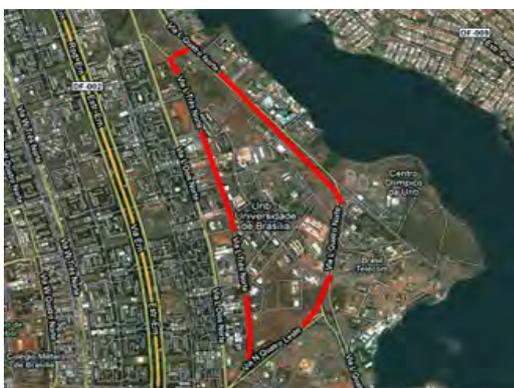


Fig 4.2 UNB Campus in Brasilia



Fig 4.3 Bicicleta Livre at UNB Campus –
Foto: Isabela Lyrio

3.4.4 Cape Town, South Africa: CSO thinking strategically on contribution of public bicycles to cycling promotion and stakeholder involvement

The local CSO Bicycling Empowerment Network (BEN), began a project in which the objective was to present the possibilities and advantages of implementing a public bicycle system, by impact assessment, and by social economical research among (non)users, including an assessment of how this changes the public opinion on bicycle use.

Representatives from JC Decaux from Paris and Serttel from Rio de Janeiro visited Cape Town in 2008 and 2009 respectively to explore the possibility of a public bicycle scheme, together with Andrew Wheeldon of BEN and the Department of Transport of the city of Cape Town. Although these talks developed for some time, the final result was that the city would wait until more bicycle infrastructure could be planned and built and until realisation of a revision of the municipal advertising by-laws, which at present preclude the advertising furniture necessary to be able to fund the bicycle scheme. The aim had been, and still is, to advise the municipality and companies about public bicycles for employees in and around the City of Cape Town and to encourage employers to implement cycling policies. BEN would be able to assist by measuring the potential of cycling in the inner city, and peri-urban settlements, targeted at the short travel; for employees.

Whilst the public bike scheme did not materialise, two small private companies began a bike rental business in the city close to the FIFA 2010 stadium, with limited success. The Central Business District of Cape Town had been identified as the focal point for this pilot project, and the run up to the 2010 Soccer World Cup was the pilot period.

The city has realised the importance of bicycle use in the central business district in order to reduce the number of cars and congestion on the roads. Some 400,000 commuters travel into the city each day - many of which are in private cars with all related problems. The need to address the imbalance between private motorised modes of transport and public and non-motorised modes of transport, improve park and ride facilities at public transport stations and promote intermodality between cycling and public transport has never been more critical. This is an opportunity to encourage the city of Cape Town and companies to implement cycling policies for their employees, as well as city officials and business in order to help improve the circumstances for cycling. Through this project, BEN wanted to promote the use of bicycles amongst the Cape Town municipality and businesses, transmitting a message of the importance of their involvement in bicycle programs, change the perception that bicycles are lower status modes of travel and begin to address bicycle usage in the city. This will provide low cost access to education and work and make a beginning to help poverty alleviation in many areas.

With the commencement of bicycle infrastructure in Cape Town and other South African cities, the municipal governments are beginning to demonstrate long term commitment to the future of cycling and with it the potential to implement bicycle rental, public bicycle and employee bicycle schemes.

3.4.5 Final comments

In all the cases mentioned above CSOs believe that bringing a public bicycle system to the agenda and to the media can push a behavioural change towards a more cycling inclusive city.

Positive input can be made by CSOs when implementing a public bicycle system. They can:

- Bring public bicycle systems to the agenda of companies, universities and municipalities
- Spread the issue in the media
- Sensitise authorities
- Help to determine routes and the preferred locations for stations
- Choose the specific type of bicycle ideal for the project area.

Civil society organisations also play an important role in developing the system and exchanging with companies and the municipality for a better result. They know the intricacies that only users know and can help to:

- Report about the state of maintenance of the bicycles
- Report unusual problems (with the bicycles or the system)
- Report trends and needs by users
- Promote the system
- Make sure that the whole project will be executed and ensure that planned bicycle infrastructure is both well-planned and then well-utilised by the general public.

3.5 The case of Rio de Janeiro

In Rio de Janeiro a public bicycle system has been implemented with a very strong input of a local CSO, Transporte Ativo (TA). This chapter describes the history of the Rio de Janeiro case. Special attention is paid to the role of TA in overcoming the difficulties encountered during implementation of the system and proposing changes to adapt the system to the local situation.

3.5.1 A plan for 30 km/h streets and public bicycles in Rio de Janeiro

In February 2008, with the objective to promote a shift in the understanding of cycle use and create a more cycle-friendly urban environment, a CSO in the city of Rio de Janeiro, Transporte Ativo (TA) presented a plan to make the streets safer by, for the first time in Rio, introducing traffic calmed streets with a 30 km/h speed limit to many different municipal departments like Environment, Urbanism and Transport. The plan was also presented to the State Transport Department and to private companies, like the company that operates the metro. This plan, creating 30 km/h zones, was then matched with a first phase for the public bicycle system in Copacabana (see fig.5.1).

The strategy was to show the plan to create 30 km/h zones and simultaneously implement a public bicycle system, at the same time to technicians and decision makers. By doing this, TA could prepare technicians for a transformation that could very soon be supported and requested by the decision makers. The process involving both decision makers and technicians helped both parties to see the feasibility of the initiative.

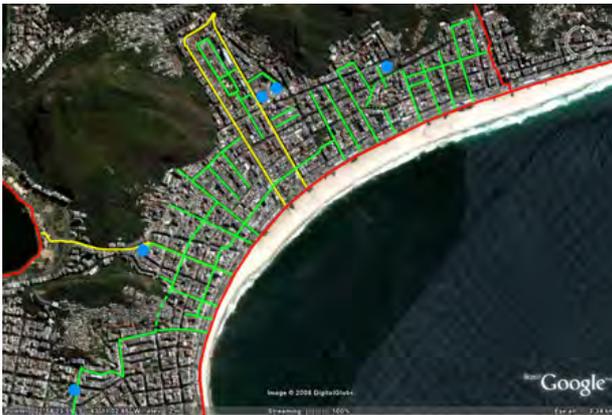


Fig 5.1 30 km/h streets in Copacabana, in green.

It was a nice first step because after that many technicians and decision makers began to understand the subject and when they heard about this again, a few months later, they were already informed about the issue. About six months later, in July 2008, the municipality launched a bid for a public bicycle system in the city. The bid included Copacabana as the first phase of the project with 8 stations and 80 bikes. The bid was won by Sertell, a Brazilian traffic and parking management company from the northeast of the country.

The opening of the first phase of the public bicycle system in Copacabana with 80 bicycles in 8 stations was in December 2008.

At that time, the plan to create 30 km/h zones in Copacabana, had not moved ahead, but Julio Lopez the Transport Secretary of the State of Rio de Janeiro, liked the idea presented by TA in February, and discussed it with the new municipal Transport Secretary who would be inaugurated in January 2009.

3.5.2 The CSO, Transporte Activo, gets involved in the public bicycle system and 30km/h streets are implemented

In January 2009, when the first phase of the public bicycle system had been running for just a month, Sertell, the company responsible for the public bicycle system contacted TA to create a kind of partnership in which the CSO could help the company to improve the system and get to know a bit more about cyclists' behaviour in the city. It was an important step to move forward.

Even though the system was already in use, TA still reviewed the designs of the bicycles and parts. They suggested some changes to facilitate handling and ergonomics. The bikes were introduced without a review from experts, so there were a few things that needed to be improved such as the low and

uncomfortable handlebars with tough grips, more gears than needed and knobby tires not ideal for use on tarmac.



Fig. 5.2 Rio de Janeiro Public Bicycles (photo Zé Lobo)

From the moment the system was operational the most common reason given by potential users, to not use the public bicycles was the lack of safe roads and infrastructure. The small public bicycle system in Copacabana had had a constant but very low use of about 500 journeys per month (about 0.2 journeys per bicycle per day). Potential users wrote letters to the media and the media interviewed people on the streets who expressed their concerns about road safety. Also many people approached TA about this issue. The demand for safer streets between stations became stronger and stronger.

Then, in July 2009, Transporte Ativo reminded the municipality of the 30 km/h plan, a safe and cheap solution that could not only connect stations but create a cycle network that can be used by any cyclist or by potential future cyclists in the city and resolve the road safety problems potential users and the media were bringing up. The suggestion to make the whole neighbourhood of Copacabana a 30km/h area, presented by TA, matched with the municipality's idea of connecting metro stations to existing bicycle tracks, so TA showed them examples from all over the world, of cycle infrastructure and public bicycle systems.

The municipality had already heard from TA about these plans in February 2008 and the new municipal Transport Secretary had been in touch with an enthusiastic state Transport Secretary in December 2009, but since then nothing had happened.

In that same period, summer 2009, technicians and politicians saw that public and private bicycle use kept increasing in the city and while new public bicycle stations were planned, they became increasingly concerned about the road safety for the new cyclists the expanded system would attract. This time, Julio Lopez, the Transport Secretary of the state of Rio de Janeiro, started to promote 30 km/h areas more actively. He discussed the issue again with the municipal Transport Secretary and the group responsible for cycle planning.

Now everything came together in support of the 30 km/h areas and the municipality was finally ready to start acting on the issue.

They started to plan an area with a maximum speed of 30 km/h and made designs for 30 km/h streets within this area. This approach is much better than just providing a few streets with 30 km/h as it makes a whole area safe to cycle and, when done well, should encourage through traffic to drive around the area. New cycle lanes connecting existing cycle tracks to metro stations were also proposed inside the projected 30 km/h area, with CSOs helping the City Cycling Workgroup to find the best ways and typology for each case. (see figures 5.3 and 5.4)



Figs 5.3 and 5.4 Cycle lane at Xavier da Silveira Street and Shared Street at Ministro Viveiros de Castro Street in Copacabana both in a 30 km/h area. (Photos Zé Lobo)

On car free day, the 22nd of September 2009, the municipality launched the 30 km plan in 34 streets of Copacabana, thus inaugurating a new era for cycling and safer traffic in the city of Rio de Janeiro. This made the whole neighbourhood 30 km/h with the exception of 3 main roads cutting through the neighbourhood and 5 roads that connect to other neighbourhoods which kept the original 60 km/h.



Fig. 5.4 30 A km/h street in Copacabana, Rio de Janeiro

3.5.3 Expansion of the public bicycle system

In November 2009, the public bicycle system expanded to the wealthy neighbourhoods of Ipanema, Lagoa and Leblon with an additional 11 stations and 110 bicycles. Only one month later 56 of the 190 public bicycles were stolen at once and found back one week later. After that, from mid December till mid March the public bicycle system was closed to change some parts in the stations and install cameras.⁶¹ The theft and closure of the system was published extensively in the media with front page coverage and articles which insinuated a nasty end to the public bicycle system with all bicycles stolen or vandalized. But in the first year of operation, before the big theft in November, only five bikes disappeared or were damaged.

Then Transporte Ativo contacted the media to try to counteract the negative reports by showing all the benefits that the system could bring to the city. Including a home-made video that shows how easy it is to use the system⁶². It took a while for positive reports to be published about the system because even most mainstream media did not understand the concept of the system. This underlines the need to also inform the media about the nature and benefits of a public bicycle system.

Ironically, the massive media attention, even though generally negative, helped tremendously to inform the population about the public bicycle system, and when the system reopened in March 2010⁶³ the use of the system increased from about 500 journeys per month in 2009 (or 17 journeys per day on the 80 bicycles) to 2870 journeys per month (or 92 journeys per day on the 190 bicycles) in May 2010. That is about 0.5 journeys per day per bicycle. As per December 2009 this has further increased to about 1 journey per day per bicycle. This is internationally seen still very low, but increasing. Apart from the media attention the expansion of course had also made the system more useful and in the wealthier neighbourhoods where the system was now operating live people who travel to Europe and might thus have experienced public bicycle systems in European cities.

As per December 2010 Rio's public bicycle system is operational in Copacabana, Ipanema, Lagoa and Leblon, with 19 stations and 190 bicycles and is intended to grow to eight districts in the city, with 500 bicycles and 50 stations for the whole system. Figure 5.5 below shows the stations and the cycle network connecting the stations. The distance between the stations is rather large, between 700 and 1000 m.

⁶¹ <http://blog.ta.org.br/2009/12/16/rio-perde-rebolado>

⁶² The video can be seen at: <http://transporteativo.org.br/videos/sambai.wmv>

⁶³ <http://blog.ta.org.br/2010/03/22/samba-voltou/>



Fig. 5.5 Public bicycle system stations and connecting cycle network in Rio de Janeiro.

Currently (December 2010) use of the public bicycles is free for the first hour and costs 5 Reais (about 2.25 Euros) for every next hour. The monthly fee is 20 Reais (about 9 Euros) and a day pass costs 10 Reais. After theft levels turned out to be low the deposit has to be removed in order to encourage low-income users to also use the system.

The experience in the first phase of the project in Copacabana, brought up the most common complaints and problems encountered by users, both concerning the bicycles and the operating system. All current stations are and new stations will be equipped with some kind of infrastructure that provides more security for the user, when using his cell phone, credit card or the public bicycle infrastructure. All this was done to prevent possible incidents.

3.5.4 How Transporte Activo assisted in improving the public bicycle system

In Rio de Janeiro TA, as a local information cycling reference, acted as a liaison between users and SERTTEL, the company that operates the public bicycle system. There was no specific research done but many public bicycle system users contacted TA to share their doubts and criticism. TA staff also are frequent users of the system and experienced all kinds of unexpected things which were then reported to SERTTEL. Issues brought up ranged from simple maintenance issues or inaccurate tire pressure to software mistakes during the process of taking the bicycle out of the docking station. These are small things that can make a big difference.

New stations will come with security cameras to prevent theft and different systems that allow various interfaces to connect with the system, so users can use a cell phone, a local public transport pass or a credit card to unlock the bicycles. This will make the system accessible for anyone. Providing three different options for users to access the public bicycles is unusual. It came from the conviction that users need to have different ways to get their public bicycle.

Potential users were arguing about the need to have a cell phone even though they themselves all had one.

The State Government which is responsible for the Riocard, the public local transport pass, was the first to talk about integrating the public bicycle system with the existing public transport. This is a clever solution that can help to attract new public bicycle users. But it comes with extra costs like card readers at stations, software upgrades and adaptations, and more.

In Rio, this integration of the public bicycle system with the public transport pass is scheduled to be operational in 2011.

Apart from consulting Sertell, the company operating the public bicycle system, Transporte Ativo has participated since the system is operational as a link between Sertell and the municipality, not only bringing up user needs but also supporting the company when problems could only be solved with the agreement of the municipality. In these cases Transporte Ativo helped to push for effective solutions.

This role can best be played early in the process and during the first steps of development and implementation of the system. After a while the operator and the municipality will be ready to do it by themselves. It is like giving the first push and then let them do it alone, like an inexperienced cyclist on a bicycle, but always with an eye on it.

For Transporte Ativo it took two years from first the first steps until the company was running the system alone. But TA still always keeps an eye on them and is still always looking for improvements.

Some of the activities carried out by Transporte Ativo were:

- Tips on bicycle design
Such as the kind of handlebar, the amount of gears and what kinds of locks are suitable to park the bicycle outside of the docking station. Because in Rio stations are relatively far apart (700-1000 m. versus 300 m. in Paris) sometimes it might be needed to temporarily park the bicycle elsewhere. For instance to visit a shop. Then a lock is needed.
- Reporting problems with bicycles
Issues like low tire pressure, lack of chain lubrication, and not well adjusted gears and brakes, can have a very negative influence on the system.
- Reporting problems with the stations and software used to connect the users with their cell phones to the system
Sometimes a user returns the bicycle but the system still thinks the bicycle is in use. Or there is a bicycle at the station but the operational system does not recognize it.

All these are common problems that were encountered while using the system daily and that could happen to any user. TA used to send daily reports to the operator. Currently (end 2010) most of the problems reported are quickly resolved.



Fig. 5.5 SAMBA public bicycle, Copacabana – Rio de Janeiro

Other activities by TA were:

- Reporting user impressions
TA members reported their impression about the bicycles and the user-friendliness of the system and users were interviewed at stations or while cycling. Also user impressions were reported daily to the operator of the public bicycle system.
- Disclose to the media, local and worldwide, news about the issue.
- Giving lectures in colleges, universities and the city
TA always promoted the use of bicycles including public bicycle systems with their intermodal possibilities and worked to make the general public to get used to it.
- Making contacts among stakeholders
As a cycling promotion organization, TA has many contacts in different sectors. Hence TA can connect people and groups with similar projects and/or ideas that could take advantage of a public bicycles system, directly with Sertell. Providing these connections sometimes can make things happen faster. For instance when a shopping mall wants a public bicycle station at its entrance or to inform Hotels Associations about the benefits of the public bicycle system for their customers.
- Continuous contact with the municipality
Taking advantage of all the opportunities is essential. Any news or rumours related to the public bicycle system are reasons to contact the municipality and exchange ideas on the public bicycle system. TA is always promoting high-quality infrastructure throughout the system to ensure its success. It is important to frequently contact technicians and politicians so that they don't forget about cycling and the public bicycle system.

All these activities are important to improve the system and very valuable for the operator company and the municipality. They also could lead to other cycling partnerships.

3.6 Recommendations

This chapter, in four parts, contains recommendations for the implementation of public bicycle systems, with a special focus on cities in developing countries. The recommendations are for any organisation involved in setting up a public bicycle system, be it companies, local authorities or civil society organisations.

Section 6.1 discusses recommendations related to policy and organisation. After that, in section 6.2, recommendations are given considering the technical characteristics while section 6.3 discusses recommendations for an effective role of CSOs in the process. In section 6.3 recommendations about the involvement of CSOs to local authorities and, if relevant, the company running the system are given, after that, in section 6.4, recommendations are given to CSOs on how they can play a role in any of the stages that lead to the implementation of a public bicycle system and in the operating phase of a public bicycle system.

In section 2.7 many issues have been raised concerning the introduction of public bicycle systems in general and in section 3.2 issues particularly important for developing countries have been discussed. Section 4.5 and 5.3 discussed what role CSOs can play in the development, implementation and operation of public bicycle systems.

All these sections contain recommendations which will not all be repeated here. In this chapter some recommendations not earlier mentioned are given and the most important ones from the sectioned mentioned above will be repeated.

3.6.1 Recommendations for policy, planning and organization

Policy and legal issues

- **Mobility function and target groups**

Determine the mobility function and main target group(s) for the public bicycle system. In section 2.3.1 different target groups and mobility functions are presented.

- **Alternative investments?**

Consider if a public bicycle system is the best way to promote cycling in the city or whether other measures are more (cost-)effective ways to promote urban cycling. This is particularly relevant if the implementation of the public bicycle system goes at the expense of budgets destined for cycling infrastructure.

- **Legislation**

If cycling is a rather new or unplanned mode of transport, which is the case in many developing countries that consider implementing a public bicycle system, make sure that legislation is put in place that gives cyclists a legal place in traffic.

- **Education**

Also, if cycling is a rather new or unplanned mode of transport, it is

important to educate (potential) cyclists but also other road users about traffic behaviour as a cyclist and when dealing with cyclists.

Organisation and finance

- **Stakeholder involvement**

When discussing and developing a public bicycle system it is good to involve many stakeholders: The municipality, CSOs, public transport companies and concessionaries, police, bicycle user groups, touristic organisations or entrepreneurs and of course, if possible, organisations and experts that have experience with public bicycle systems elsewhere. Important stakeholders that are not involved should at least be informed.

- **Public or privately operated?**

For a municipality that wants to implement a public bicycle system, when deciding on a financial model, it is important to ask the question what works best in any given local situation. Publicly financing the system operated by the municipality or a special municipal organisation, has the advantage of being in total control of the system. On the other hand it puts a heavy burden on tax-money and certainly in developing countries, companies often prove to be more efficient than government organisations.

- **Availability of information**

When choosing for a company to operate the system it is important to discuss which information (data about use of the system) the company will make available to the local authority because such information can be important for traffic planners to understand the mobility function of the system.

- **Financing**

The initial costs and the operating costs of public bicycle systems are significant and the payments by the users will never immediately cover the operation and often never will cover the operational costs, so other funds are needed to run the system.

Outdoor advertising, like in most European systems, sponsoring and advertisement on bicycles and stations such as in Denver, subsidy from car parking or fuel taxes can be considered as options as well as funding from the state or municipal budget.

There is no one best solution. It depends on the local situation, the municipal funds available and the preference for a government controlled or privately run system. A disadvantage of being dependent on outdoor advertisement can be that the company is more interested in advertisement than in public bicycles. In Washington D.C. this led to the termination of the contract with Clear Channel Outdoor. In the Denver solution the continuation of the system is dependent on sponsoring by companies, which also can be pose a risk for the continuity of the system.

- **Marketing of the public bicycle system**

This is another key issue. In a developing country, such as Brazil for instance, where commuting by bicycle is not usual, a good marketing strategy must be the starting point of a newly to implement system. In European countries where cycling is a common daily activity, almost everyone knows how to cycle in urban traffic and instantly understands how the system works. But in a developing country without a cycling culture it

has to be very well explained to citizens so they understand how it works. This, without such a strategy, was a problem in Rio de Janeiro. In cities like Paris and Brussels, Velib and Villo like many other European systems, had strong marketing and propaganda strategies that resulted in an immediate response from costumers.



Fig. 6.1 Advertisement for the public bicycle system Villo in Brussels, Belgium.

- In Rio de Janeiro where no marketing or propaganda were done, one year after the launch, most of the citizens did not even know that the system existed and the few that did know did not understand it entirely. Consequently, use was low until the media started to pick up on the system after about one year of operation.

Planning

- **Cycle-friendly roads and routes**

Make sure that the city is sufficiently cycle-friendly before implementing a public bicycle system. If this is not the case there is a risk of cyclists using the footpaths (as happened in Barcelona), people not using the system out of fear for cycling on the roads (as happened in Rio de Janeiro) or accidents creating bad press for cycling and the system. So it is advised to make roads more cycle-friendly, create a cycle network with cycle tracks, lanes, traffic calmed streets and car-free streets before or together with the implementation of the public bicycle system.

- **A small first phase**

Particularly when a new system is implemented (other than the systems of JCDecaux, Clear Channel or BIXI) it can be a good idea to start with a relatively small first phase such as in Rio de Janeiro with 80 bicycles in 8 stations and expand later. Problems encountered in the first phase can then be resolved in the expansion of the system later. Adaptations are harder to make if from the very beginning a large amount of bicycles are put on the streets. In this case it is important to realise that a smaller system is less functional and will hence attract fewer users, as was also the case in Rio de Janeiro. Starting with a small first phase can particularly be useful in developing countries or with unique local circumstances and when using technology and bicycles not applied elsewhere.

- **Locations of stations**

It is important to select crucial locations for stations such as public transport stops, shopping streets and malls, bars and restaurants, zoos, schools and universities, sports facilities, etc. This is something to discuss well with

many different stakeholders and of course involving cyclist user groups and CSOs can be wise. Also the distance between stations is important. Most sources advise 300 metres or less with a maximum of 500 metres. The public bicycle system in Rio de Janeiro, however, has stations 700 till 1000 metres apart. This low-density coverage could be one of the reasons that usage in Rio is still relatively low compared to other systems.

3.6.2 Recommendations for technical characteristics

Some topics that may require special attention are:

- **Redistribution and Maintenance:**
To make the system successful it is essential that the bicycles are well maintained. Another issue that requires special attention is the redistribution of the bicycles to avoid occurrence of empty or full stations.
- **Bicycle durability:**
Public bicycles are generally heavily used; averages of 5 to 10 trips a day are no exception. When on top of that they are not used very carefully it is essential that the bicycles are strong and durable.
- Climate can also damage the bikes. In rainy or coastal cities there may be a need to pay special attention to the quality of the components of the bicycles and stations. In a city like Rio de Janeiro, even aluminium bikes with stainless steel parts ended up with some rust or oxidation in less than four months, because some small parts were made of cheap materials. In this context it needs to be considered that the appearance of the bicycles can deter users from using the system.
- **System durability**
Not only the bicycles themselves, but also the docking systems are subject to wear and tear.
- **Protection against theft and vandalism:**
Surprisingly, theft and vandalism has not been very common with public bicycle systems in developing countries. But because this can never be ruled out when implementing a relatively new public transport system, this needs attention. Possible measures are security cameras in the stations and tracking devices on the bicycles. Both measures have been implemented in Rio de Janeiro.
Of course essential is the registration of the users with, if needed, a deposit for the use of the system which will be kept in case bicycles are not returned. In Rio de Janeiro, see below an alternative has been found for the deposit.
- **Costs for the users**
With most public bicycle systems there are three kinds of user costs: A one-off registration deposit, a subscription fee per day, week, month or year and possibly costs when using the system. There are countless possibilities and what is best depends on the local situation and the target group.
One thing to realise is that in developing countries the deposit to register for the system can be relatively expensive. For instance in Rio de Janeiro initially the deposit was R\$ 200 (about 85 Euros⁶⁴) which is many times more

⁶⁴ As per 2 April 2010

expensive than a second hand bicycle. This can be a problem in low income developing countries where many people are not even able to afford public transport. So here the deterrent for low-income users has to be weighed against the risk of theft when the deposit is too low. In Rio they removed the deposit and increased the subscription fee. Instead public bicycle users can now register with the police and will have to pay R\$ 200 if they don't return their bicycle. Without registration it costs R\$ 1350.

3.6.3 Recommendations for an effective role of CSOs in the process.

When implementing a new transport system or new infrastructure it is important to listen to the (potential) users, in order to cater for their needs. Civil Society Organizations, which are citizen that have come together for a certain cause, are the best to exchange information when implementing a public bicycle system that meets the needs of potential users. CSO involvement is particularly useful in the case of the implementation of public bicycle systems because of the peculiarities of urban cycling.

Some recommendations for an effective role of cycling-related CSOs in the process are:

- **Inform your local CSO**
Cycling related Civil Society Organizations have a lot of information on cycling around the world. In most cities, they know almost everything that involves cycling but almost nothing about the complexity and intricacies of urban and traffic planning or public transport systems. Therefore, it is important that local authorities inform CSOs about the, often sticky, reality of local politics and getting things realised within local government. This will help to explain to CSOs that what they think should be very easy can, in reality be very hard to accomplish and can avoid enmities based on unrealistic expectations of CSOs.
- **Involve CSOs in the search for solutions**
Invite CSOs to workshops, seminars, meetings and field visits where the public bicycle system is discussed. Bring them to discuss about the bicycles, stations and let them use and test the system and give opinions. By doing this, the CSOs can better understand how a city administration and a public transport operator works and share information in a more realistic way.
- **Listen carefully to the needs and desires of CSOs and users**
If the needs and desires of local cyclists are met, this can help inexperienced urban cyclists that are willing to use the public bicycle system, to use it safely.
Civil society organizations can play an important role to promote urban cycling. For local authorities or a public bicycle system operator, being partners, can be useful to provide a safer and more comprehensive infrastructure for cyclists and public bicycle systems that meet the needs of the users.

3.6.4 Recommendations to CSOs that want to play a role in the process of developing and implementing public bicycles systems.

Preparation

It is important to be very well-informed about public bicycle systems. Be prepared and prepare your municipal administration for it. Keep them up to date about what is happening in the world in this field. Get informed and show it to technicians, decision makers and the general public in your city such as for instance the CSO Biciaccion in Quito did (see chapter 4).

Often informing the local media can be the most effective way to get local authorities interested. But the most obvious starting point is to contact the municipal authority responsible for bicycle planning, or the closest to this, and tell them you want to present some changes that are happening in cities all over the world and explain them why you think this can also work in your city.

It is important to show to municipality that you are there to present solutions and help with this issue at any time. Be a partner. Always keeping in mind that progress in the “governmental structure” is never as fast desired. This at least is the case for the Brazilian situation; in other countries it might work a bit different.

There are also several international discussion groups about public bicycle systems where it is easy to get and exchange important information.

Development, Design and Implementation of the System

At this point participation is critical. CSOs here can assist the company or organisation operating the public bicycle system and the municipality (as in the case of Rio de Janeiro). Your CSO can help to select the right kind of bicycle for the specific city or situation and the best locations for the docking stations as well as helping to plan cycle routes and networks, working together with the municipality, public transport operators, shopping and entertainment centres, and, if your city is an important touristic destinations, hotels beside others. Try to put all those who speak on the subject or can have an interest in public bicycles in contact. Many questions will arise and the CSOs must be able to answer or find an answer fast so that things keep progressing well. Always checking if the local authority does what they promised is very important as well.

Operation

When the system is up and running CSOs can still play an important role.

In the case of Rio de Janeiro for instance, Transporte Ativo acted like a test pilot for the company operating the system, using the system and exchanging information about every detail: about the bicycles, about the use of the system, about the docking system and about the interface.

With the municipality the aim was to assure that the cycling infrastructure was of a good quality and implemented as promised and that the public bicycle system was expanded beyond the first phase. All this is important to have a good public bicycle system that fits the specific local situation and will be used intensively.

On a smaller scale, these recommendations can be used for small public bicycle systems such as on university campuses.

Biographies

Jeroen Buis



Jeroen Buis (1968) is an urban mobility specialist who graduated as a civil engineer from Delft University of Technology with a specialisation in traffic and transport planning. He worked at the municipalities of The Hague and Delft where he was responsible for the local (Delft) and a regional metropolitan (The Hague) cycling policy. From 1997 to 2002 he worked at the Interdisciplinary Research Centre at Delft University of Technology (DIOC The Ecological City), with architects, urban planners, civil engineers and psychologists of the built environment on research for more sustainable cities.

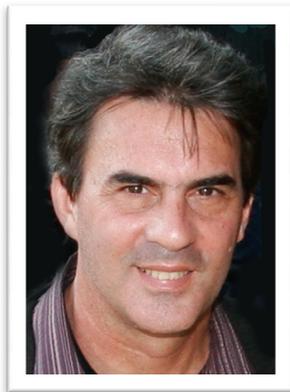
In 2002, after a short period at IHE Delft, he moved to Ireland where he was the main author of a new national cycle design manual at the Dublin Transportation Office. Later he joined the DTO and was, until 2005, responsible for funding and the design quality of new bus-lanes, cycle lanes and other schemes in the Greater Dublin Area as well as the regional cycle policy.

Since 1998 he worked as a free-lance consultant for Interface for Cycling Expertise in South Africa, Senegal, The Philippines, India, Thailand, Colombia, Chile, Peru, Brazil, Mexico, Turkey, Australia and South Korea. He gave capacity building courses on cycling-inclusive planning in most of these countries.

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Ze Lobo (Transporte Ativo)



Ze Lobo is a consultant specialized in promoting the use of bicycles, founder and President of Transporte Ativo association, winner of the Awards ANTP-ABRADIBI 2005 and IPB 2007 for the Promotion of Bicycle use, is a member of the Cycling Planning Group from Rio de Janeiro Municipality since 2003, and from ANTP - National Organization for Public Transport, is a board member of the Brazilian Cyclists Union, Technology Director of Instituto Pedala Brasi - IPB and is involved in projects to promote the use of bicycles as a means of transport at the municipal, state and national level, was also resident representative Brazil for ICE in the 2007 to 2010 period.

Zé Lobo was also a volunteer consultant for the company SERTTEL, responsible for the Public Bikes System in Rio de Janeiro, Brazil, during the first two years of the system.

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