Bicycle Sharing in Developing Countries:
A proposal towards sustainable transportation in Brazilian median cities

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Abstract

Bicycle-sharing programs are a new trend in urban transportation. The main difference of a bicycle-sharing program with a regular bicycle rental is that is possible to get a bicycle in one station and return it in any other station. There are many models of bicycle sharing, each model with its pros and cons. This study analyzes the bicycle-sharing models in order to build a proposal of a bicycle-sharing program suitable for Brazilian median cities. The study begins with an overview of bicycle transportation, followed by the analysis of different bicycle-sharing programs. The last chapter formulates a proposal of a bicycle-sharing program suitable for Brazilian median cities.

This study uses both quantitative and qualitative methods. The analysis includes a case study on the bicycle-sharing program in Stockholm. This case study is based on interviews with the manager of the program in the company in charge, and with the responsible official in Stockholm municipality. A questionnaire was moreover handed out to users of the program. This case study is complemented with a questionnaire sent by email to managers of bicycle-sharing programs in some cities around the world, this in order to provide more examples on how bicycle sharing can be organized. Finally, another case study was carried out in a Brazilian median city in order to evaluate the local awareness concerning bicycle transport, and the possibility of implementing a bicycle-sharing program there. A questionnaire was handed out to a sample of the local population and an interview was made with the local transport authority.

The analysis of all data results in a proposal for a bicycle-sharing program suitable for the Brazilian context. The proposal comprises the choices of bicycles, stations, equipment related to the hiring process and service vehicle. It includes a complete financial appraisal with the necessary capital for implementing and managing the program. It shows that it is possible to build an affordable bicycle-sharing program adapted to Brazilian median cities. The program will create job opportunities and can contribute to a changed view of bicycle transportation in these cities. The proposal could also be applied in countries with the same characteristics as Brazil.

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List of acronyms

ANTP - Brazilian National Association of Public Transportation
BNDES – Banco Nacional de Desenvolvimento Econômico e Social (Brazilian National Development Bank)
CDM - Clean Development Mechanism
CO^2e - carbon dioxide equivalents
DENATRAN - Brazilian National Department of Traffic
EST - Environmentally Sustainable Transport
NMT - Non-Motorized Transport
PNMUS - Brazilian National Policy of Sustainable Urban Mobility
PPP - Public-private partnership
Sek - Swedish Kronas
RF - Radio Frequency
ID - Identification
GSM - Global System for Mobile communications

Introduction

Some years ago, I was living in São Paulo, one of the largest cities in the world. My job forced me to spend many hours every day in intense traffic jams. Because of this, I decided to change my life. I quit my job and went on a bicycle trip in South America and Europe with the purpose of living a more sustainable life. It finally brought me to Stockholm, where I started a master program in Sustainable Technology.

Fortunately, more and more people become aware of the necessity of changing both the societal, but also one's own lifestyle. The increasing debate about climate change caused by human activities is encouraging these behavioral changes. The increased use of alternative modes of transport is one example of a lifestyle change that can reduce emissions and improve the quality of life in cities. The transportation system in most cities prioritizes individual motorized vehicles. It is not sustainable to drive a fossil fuel-based vehicle, and even hybrid vehicles using renewable fuels or electricity cannot change the fact that the use of cars today is far beyond most cities capacity. The tailback of cars during rush hours demonstrates the failure of this way of transport.

However, it is possible to imagine a city with an infrastructure built for the safe use of non-motorized modes of transport, for example walking or cycling. The car is in average three meters long with a weight of about two tons, often carrying a single person that weight only 0.07 ton, or around 3.5% of the vehicle weight. On the other hand, a bicycle has around 15 Kilos, and carries approximately 467% of its weight. The use of bicycle is a good alternative to cars because it is:

- environmental friendly;
- energy efficient;
- healthy for the users;
- decreasing motorized road traffic;
- not emitting green-house gases (related to the global warming);
- cheap compared with other modes of transport;
- easily maintained;
- perfect for city distances, since it has a good range;
- an equalitarian vehicle.

One trend in recent years has been the introducing of bicycle-sharing programs in many cities around the world. The basic point of a bicycle-sharing program is the non-ownership of the vehicle. Bicycle stations are located in different spots in the city, and the user can take a bicycle from one station, use it, and return it to any other station. Enthusiasts of these programs claim that this new, alternative mode of transport is a solution for short distance trips in busy city centers.

Brazil is an example of a developing country with an urgent need of alternative modes of transportation, both in order to reduce the environmental impact caused by its massive car culture, and to improve the quality of life of the population. This study proposes a model of bicycle-sharing program adapted to the context of Brazilian median cities.

Aim and objectives

The aim of this thesis is to propose a model of a bicycle-sharing program that is suitable for a median city in a developing country. This analysis will use a Brazilian median city as an example, but the proposed model can also be used in other cities of similar characteristics. The study examines many aspects of bicycle transportation and sharing programs in order to reach this aim, such as:

- The impacts of bicycle-sharing programs in the modal share of cities;
- present and future importance of bicycle-sharing programs in the transportation systems of cities;
- The economic sustainability of these programs;
- The business models in different programs;
- Positive and negative points of each model;
- Alternative business models.

The analysis of the above-mentioned aspects will answer questions such:

- What model of bicycle-sharing program is feasible in a Brazilian median city?
- Would be the program economically sustainable?
- What is the best business model for a successful program?

The study concludes with a proposition of a type of bicycle-sharing program suitable for the context of Brazilian median cities.

Methodology

This study uses both quantitative and qualitative methods. During spring and summer 2009, a case study was conducted on the bicycle-sharing program in Stockholm. This includes semi-structured interviews with the manager of the program in the company in charge, and with the responsible officer at the municipal level. A structured questionnaire was also handed out to 38 users of the Stockholm program (see the calculation of this number below). There are variations between the different programs that exist, but the Stockholm program will be used as a basic example. In order to evaluate different models and to give alternatives to the Stockholm model, two actions were done: A structured questionnaire was sent out to managers of bicycle-sharing programs, and five different cities answered it. In addition, the internet pages of 164 programs were studied (see annex 2). Additionally, a case study was done in a typical Brazilian median city, to evaluate the local awareness of bicycle transport and sharing programs. A structured questionnaire was handed out to the local population (38 respondents, see the calculation of this number below), and a semi-structured interview was conducted with the local transport authority.

The different sources of data help to identify the state-of-art in bicycle-sharing programs. This will lead to a conclusion about best practices, which will be the framework for the proposal of a model best suited for the context of a Brazilian median city. The thesis comprises the use of these various analytical tools in a systemic analysis approach. The method is more thoroughly discussed in the case study protocol in the annex 1.

This study uses two different types of questionnaires. One questionnaire was for the local population of the Brazilian city chosen for this research. The other one was for the users of the bicycle-sharing program in Stockholm. The size of the samples is based in the following formula: (COSTA NETO, 2002)

If X is the number of bicycle users in the population of a size N
P = X/N is the proportion of users in the population
f is the number of bicycle users in a sample n
p' = f/n is the proportion of users in the sample

Therefore, f depends on the sample. Its probability distribution is binomial, with average
E(f) = np
And variance V(f) = np(1-p)

In the case of np > 5 and n(1-p) > 5 we can do an approximation of the Binomial by the Normal.

If we consider the population infinite (N>20n), we have the following equation to determine the size of the sample:

$n = [(z_{\alpha/2} / e_0)^2] * p' * (1-p')$
where:
$1-\alpha$ = confidence level (usually 95%, but is reasonable 90%)
$z_{\alpha/2}$ is so that $P(Z>z_{\alpha/2}) = \alpha/2$
Z is a random variable with a Reduced Normal Distribution, which means that:
E(Z) = 0 and V(Z) = 1

e_0 is the margin of admissible error.

We have that p'(1-p') is the expression for a parabola that the maximum point is 0.5
Therefore:
$n_{max} = [(z_{\alpha/2} / e_0)^2] * 0{,}25$

We consider that:
$e_0 = 13\%$
$1-\alpha = 90\%$ therefore $z_{\alpha/2} = z_{5\%} = 1.65$ (from a table)
We have that:
$n = [(1.65/0.13)^2] * 0.25 = 38$

Therefore, the sample should be of 38 people to be interviewed in both Stockholm and in the Brazilian city, considering a margin of error of 13% and a confidence level of 90%.

If we consider
$p' < 0.20$ (less than 20% of the population uses bicycle)
n = 38
$1-\alpha = 90\%$, $z_{\alpha/2} = z_{5\%} = 1.65$
We have:
$e_0 = z_{\alpha/2} * (p' * (1-p') / n)^{1/2}$

$e_0 = 1.65 * (0.2 * 0.8) / 38)^{1/2}$
$e_0 = 0.107 = 10.7\%$

With the sample size of 38 people, the acceptable confidence level is 90% and the error margin is 10,7%.

Chapter 1: Background and theoretical framework

This chapter introduces some of the literature concerning sustainable transportation, the use of bicycles, a comparison of different urban modes of transport, integration of different urban modes of transport, bicycle transportation and social inclusion, examples of bicycle transportation around the world and the bicycle context in Brazil and in Stockholm, Sweden. This will give a framework for the collected data and the analysis.

Sustainable transportation

Nowadays sustainable development is an important concept in almost all areas of society. The modern society is using more than the capacity of the Earth in order to provide the resources that the humans need to survive. In other words, the society is not sustainable because of the massive consumption of resources and energy. One of the first descriptions of sustainable development is that from the United Nation's Brundtland Report:

> Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (BRUNDTLAND, 1987).

Two main factors can influence the efforts to reach sustainable development, and these are changes of human behavior, i.e. to decrease consumption and change habit, and the development of new sustainable technology, which can handle the environmental problems.

Based on the UN definition of sustainable development, a description of sustainable transportation would be a mode of transport to supply the need of moving in the present without compromising the future. The transportation cannot endanger public healthy or the ecosystems, and have to use fewer resources than the capacity of regeneration of available resources (MINISTÉRIO DAS CIDADES, 2004). In this context, the bicycles play an important role. This mode of transportation can replace parts of the personal motorized modes of transportation based in private cars and motorcycles. In addition, a decrease of the dependence on cars, through a development of public transport and non-motorized modes of transports, might also bring changes in related employment relations, with the construction of bicycle infrastructure, the use of bicycles as taxi or for goods transportation, etc. In Uganda for example, there are about 200,000 bicycle taxis, the so called "boda bodas", giving employment to previously unemployed youth (UNEP, 2008).

However, structural changes are necessary to increase bicycle usage. One important factor is the infrastructure for the bicycles, both in the form of safe bicycle ways, paths and routes, and in the form of safe parking facilities. The cultural barriers against bicycle use, which exists mainly in developing countries, must be also addressed. Bicycle-sharing and rental schemas can help reaching these goals by introducing a new element in the city transportation system. The role of the technology is fundamental in this process of developing sustainable transportation:

> Environmentally Sustainable Transport can only be met if mobility patterns radically change and future technological development is much greater than in the past (Geurs and Wee, 2000).

In the transportation field, many new technologies can contribute to a more sustainable transportation. However, in the case of commuter transport in cities, part of the solution can be the bicycle, that is a relatively old technology. The use of bicycle can be related to the two factors, the change of habits and new technology, that can improve sustainability as mentioned above. People need to change their habits in order to use bicycles instead cars. In addition, the bicycle goes through a continuous improvement process for example with its construction, weight, purposes, etc. Today bicycles can be folded and carried inside a public transport (see figure 1); they can be specially made to carry goods or passenger (see figures 2 and 3).

Figure 1: Electric folding bicycle (Available at www.epluselectricbike.com)

Figure 2: A modern rickshaw in Stockholm (Available at www.ecocab.se)

Figure 3: An example of cargo bicycle (Available at http://blog.ta.org.br/page/3)

The role of bicycles

The most manifested mode of transportation in modern cities is private cars. The planning and construction of societal functions, such as hospitals, schools, shopping centers, etc, are often based on how a car can reach it and park close to it. However, considering the short history of the car, it is easy to understand why it for example causes so many traffic problems. The cities were historically not built for so many cars. The city centers and old parts of towns are made for pedestrians and horse carts or other slow speed, small vehicle (see figure 4 below).

Figure 4: Traffic in the Stockholm's city center in the past (Author's photo reproduction from a poster about the renovation of the north bridge, Stockholm)

However, in less than a century, the cars took over the streets (see figure 5 below). The car pollutes, consumes a lot of energy and resources to its production and use, and increases the risk of accidents.

Figure 5: Traffic in modern days (FABERLUDENS, 2009)

The bicycle, on the other hand, do not pollute, use only the energy of the user and is good for his or her health. The technology of the bicycle is as old as the cars and the first bicycle models came in the same period of the first car models (see figure 6 below for one example).

Figure 6: Pennyfarthing 1883 (Author's Photo from the Tekniska Museet, Stockholm, 22 sep. 2009)

The bicycle is a safer vehicle compared to the car. The majority of accidents related to bicycles occur because the user has to share the city streets with the car. Nevertheless, many cities have worked to improve the safety for the bicycle users. The streets have become more bicycle and pedestrian friendly. An additional result of this is that the streets are friendlier to the more fragile citizens: the children, the elderly, the handicapped or disable. It is rather easy to improve the infrastructure for safer bicycle traffic; good examples are ramps in the sidewalks and stairs, cycle paths or cycle lanes and safe places to park the bicycles. It is important that the planning of the city encourage the use of bicycles. There are five main aspects of planning to improve the infrastructure for this mode of transport: safety, direct/fast route, coherence, comfort and attractiveness (BICICLETA BRASIL, 2007). The infrastructure will attracts more cyclists the safer, faster, more direct, more comfortable, more continuous and coherent way it can offer.

The authorities are becoming more aware of the role bicycles can have in a city transportation system. The Velo-city conference held in Brussels in May 2009 is the largest conference on bicycle transportation in the world, and it attracted the main stakeholders in this area. Some questions discussed at this conference show the level of the current debate: (VELO-CITY, 2009)

- Are there limits to cycle use?
- How far can go the bicycle policy?
- What are the initiatives concerning cycling to school?
- Can long distance cycle routes add value to daily use?
- Is investing in cycle routes justified?
- What are the necessary changes in traffic legislation towards bicycle safety?
- What services can be offered in bicycle stations?
- What is the best model for the integration between bicycle and public transport?
- How can these two means of transport cooperate with each other?
- Should bicycles be segregated or share the spaces with the motorized traffic?
- What are the economic values of cycling, in a cost-benefit analysis approach?

Bicycle-sharing programs were discussed in a sub-plenary session at the conference. Questions that arise in this session are: (VELO-CITY, 2009)

- Are the public bicycles a temporary hype or a new urban transport means?
- Are the programs useful in cities with already a high level in use of bicycles?
- Is a completely integrated transportation system feasible (one chip card or mobile phone for the public bicycle, public transport, car sharing, congestion charge, etc)?

Comparing different urban modes of transport

If the use of cars, buses and bicycles are compared, as three modes of urban transportation, the car is by far the one that occupies more space (see figure 7 below).

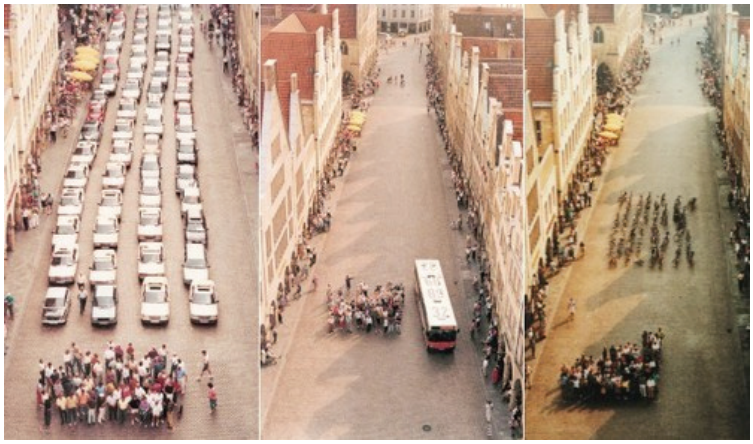

Figure 7: Space occupied by 54 persons and their respective mode of transport – cars, bus and bicycles (CLASSE, 2009)

As seen in figure 8 below, only trains are more efficient than non-motorized traffic if compared the number of people transported per lane of traffic per hour.

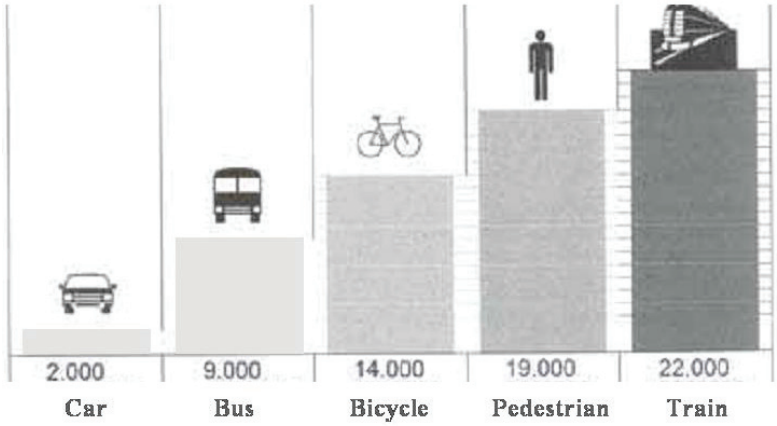

Figure 8: Number of people that travel in a traffic lane per hour with different modes (SÃO PAULO, 2007)

This should persuade city planners to redirect their efforts to other modes than cars. To encourage and work for an increased use of bicycles is the less expensive alternative compared to the construction of the large infrastructure that public transportation demands. In many cities, the only necessary improvement is to include cycle routes in the general plan of the transportation system.

Cycle routes

A cycle route is a route from point A to B that is planned for bicycle usage. It can include special designed infrastructure such as bicycle lanes, bicycle paths, signalization of the route, parking facilities, etc. Some cycle routes have maps that show the best alternatives for cycling. The most important aspect to consider when planning cycle routes are traffic crossings, because on this is where most bicycle accidents happen. Two keywords for the planning of a cycle route are safety and comfort (BICICLETA BRASIL, 2007). Since a bicycle is such a fragile vehicle, compared to a car, a bus or a truck, safety must be the main concern.

Figure 9 below shows how the speed and the volume of traffic determine the choice of bicycle facility. In places where there is low traffic volume, with a speed that do not reach more than 30 km/h, bicyclists can share the road with motor traffic. Only the volume in this case can be an impediment, when it reaches too high levels. In zones with higher volume and/or speed, some kind of separation is necessary. For an intermediate zone of speed and volume, the use of bicycle lane is enough to keep the cyclists safe. The bicycle lane is the first level of separation, and is a lane painted in the pavement of the road that separates the motorized traffic from the non-motorized. However, in some cases, the bicycle lane can be not enough, and fully segregated facilities are necessary. They are called bicycle paths, which are segregate paths from the motorized traffic, used when the traffic speed and volume are over 65 Km/h or 600 vehicles per hour (HUNT & ABRAHAM, 2007 and SCOTTISH EXECUTIVE, 2004).

Additionally, an investigation in Edmonton, Canada, with local cyclists, shows the influence of different factors in the use of bicycles, and conclude that time spent in shared roads are more onerous than time spent in bicycle lanes or paths (HUNT & ABRAHAM, 2007).

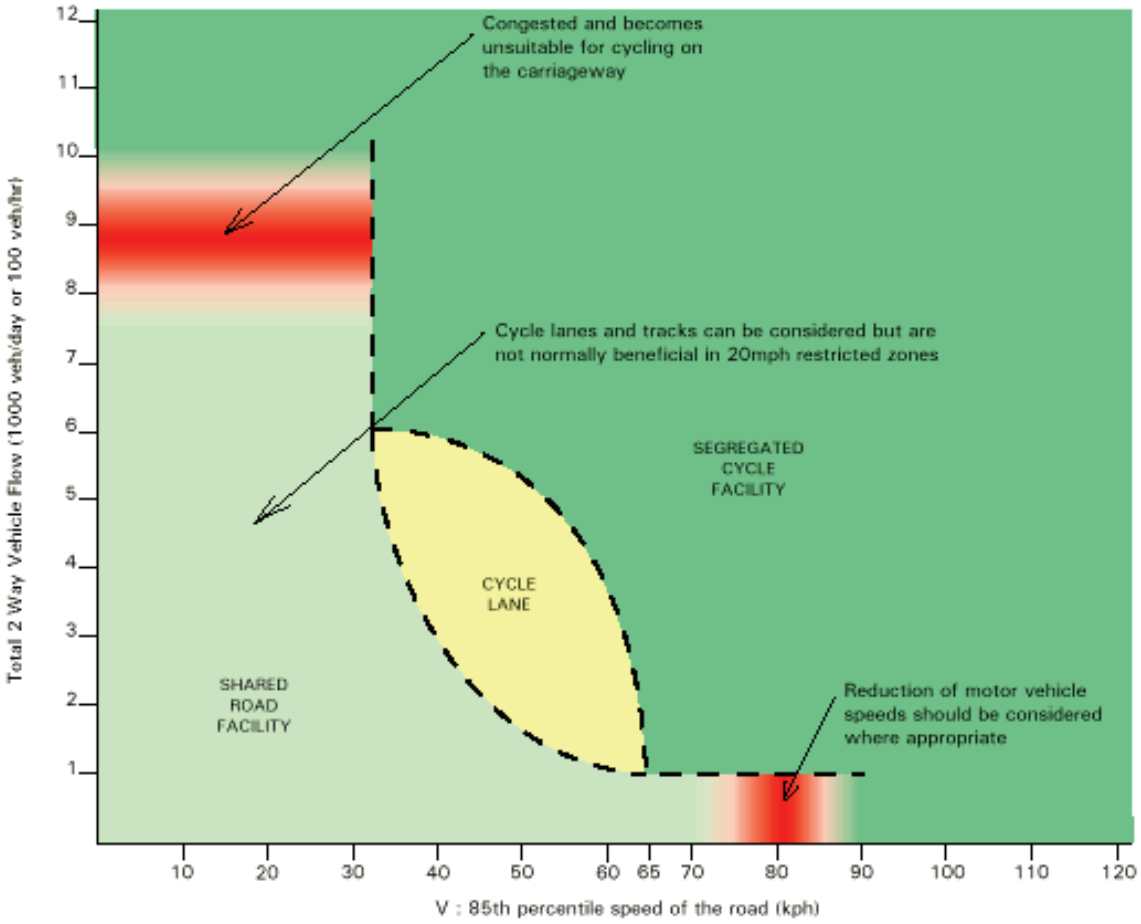

Figure 9: Traffic volume versus speed determines the choice of bicycle facility (SCOTTISH EXECUTIVE, 2004)

Bicycle transportation and social inclusion

The bicycle can play an important role in the social inclusion in the developing world. It is a cheap vehicle, more affordable than the car and most often even cheaper than public transportation. However, in many places the bicycle is considered a vehicle only for the poor people. As soon as someone has a better financial situation, he or she changes transportation mode to public transport or an individual motorized vehicle. According to the Interface for Cycling Expertise:

> Non-motorized transport (NMT) plays a dominant role as an affordable, but sometimes unpleasant and dangerous, main mode of transport in some of the very poor countries. The consequence is that it is frequently associated with poverty, low-tech and not innovative, as something that countries aim to develop out of. It is beginning to play an increasing role, albeit usually as a convenient and non-polluting local distribution mode in multi-modal

> systems, in a number of high income industrialized countries such the Netherlands. (I-CE, 2000)

The low status of the bicycle in developing countries makes the level of public investment in necessary infrastructure very low, which influences the use of the bicycle. However, in order to improve the situation countries must introduce new policies, investments, educational campaigns, etc, but also try to make the bicycle a transportation option to all social classes. An environmentally sustainable transport scenario must according to Geurs and Wee (2000) create the same economic opportunities no matter what mode of transport you use.

> Mobility is related to wealth: higher income groups have a higher level of car ownership, travel further, use their cars more often and as a result have a higher level of access to economic opportunities. (…) In the Environmentally Sustainable Transport scenario the accessibility differences between the car on the one hand and bicycle, walking and public transport on the other will be much lower: more opportunities will be readily accessible by walking and cycling, thus increasing people's choice of mode options (Geurs and Wee, 2000).

Integration of the use of bicycles with other modes of transport

The geographical characteristics of the city and the health condition of the user limit the possible range of the bicycle. Depending on these factors, and considering an average speed of 15 Km/h, a range of 7.5 Km or a trip of 30 minutes is a good commuter distance inside cities (BICICLETA BRASIL, 2007). In metropolis, like São Paulo for example, this would not be enough to cover the necessary distance to work or study for most people. Therefore, it is necessary to integrate the use of bicycle with other modes of transportation. There are many different ways of doing this, for example, trains, subways and bus terminals can have specially designated park facilities for bicycles. Buses can have special racks to carry bicycles. Trains and subways can allow passengers to carry bicycles, in special wagons and/or during special hours (avoiding rush hours).

São Paulo and Rio de Janeiro, the two largest cities in Brazil, permit the transport of bicycles in special wagons (the first and/or the last wagon of each train), but only in weekends and holidays (BICICLETA BRASIL, 2007). In São Paulo it is also possible to bring the bicycle in the subway after 20:30 in weekdays. In some cities in the USA, buses have a special rack to carry up to two bicycles (see figure 10 below).

Figure 10: Bicycle rack in a bus in the San Francisco region (USA) (Author's photo)

Another initiative to integrate the use of cars and bicycles recently started in São Paulo by a car insurance company. This company offer bicycles to its clients in stations located inside parking lots of a parking lot chain around the city. A client can park the car in one of those garages, and take one available bicycle and a helmet (up to 2 bicycles per client) and it is possible to return the bicycle at any other station (PORTO SEGURO, 2008). This project was expanded to subway stations, through a partnership with the State authority, and there it is not only offered to the insurance company clients, but to everyone who have joined the bicycle program. It is a first attempt of a bicycle-sharing program in São Paulo. São Paulo has a bad traffic situation and it can become a starting point for a cultural change. Since the user of this program are people with a better economical situation, they can influence the society to do not look to the bicycle only as a vehicle used by poor people, but as an alternative vehicle that have many advantages compared to a car.

Bicycle transportation around the world

The use of bicycle as a mode of transport has different levels of acceptance and of investment in different countries. Some countries like Germany and Netherlands have a large bicycle infrastructure and the bicycle use is part of the everyday life for all social classes. In less developed countries, the bicycle might be of outmost important in the low-income classes of the population, but have a negative status among the whole population, and therefore less investment in infrastructure. This section presents some examples of the use of bicycle around the world:

- The figure 11 below, about a school rickshaw in India, had provoked an interesting debate in a Brazilian webpage about bicycle utilization (AUTOZINE, 2009). Some argued that this is a degrading way of bringing kids to school, while others argue that was a creative, sustainable and remarkable way of using technology to overcome an economical need.

Figure 11: School bicycle bus in India (AUTOZINE, 2009)

- Bogotá, the Colombian capital, it is one of the cities in the developing world with many initiatives to increase bicycle use. After improving the bicycle structure to 350 Km, the city is now preparing a bicycle share schema that will be integrated with the public transportation system (BIKE-SHARING, 2008). The example of Bogotá shows that is possible to give incentives to alternative modes of transports even in developing countries.

- In some southern European countries, such as Portugal, the bicycle culture is still underdeveloped. A local master thesis argues that is possible to use bicycles as the only mode of transportation for commuting in Lisbon, and to prove his theory the author used only his bicycle for 100 days. In the case of Lisbon, the city is famous for her seven hills, which make her habitants think that is impossible to use bicycles to commute there. However, that was not a barrier to the author, since most of the urban part of the city is located in plateaus. The result shows that it is important to change some paradigms to make people more open to bicycles. (SANTOS, 2008).

- In the UK the non-governamental organization SUSTRANS is in charge of promoting bicycle and walking alternatives. The organization coordinates The UK National Cycle Network, a cycle route that passes within the reach of half of the population in the country, and it promotes several other projects related with sustainable transportation. One initiative to encourage children to cycle to school. The SUSTRANS receives funding from many institutions and individuals, and it works with its own staff and volunteers (SUSTRANS, 2007).

- The North Sea Cycle Route is a touristic cycle route, and it covers all countries around the North Sea, in northern Europe. It was developed by the European Commission and North Sea Program. The route links the already existing structure in each country with each other in order to create a continuous path that allows a trip by bicycle around the North Sea (NSCR, 2007).

- In Stockholm, the neighborhood Hammarby Sjöstad was planned to be a model concerning all aspects around sustainability. The whole area encourages the use of sustainable modes of transport instead of private cars, for example, the easy access to public transportation, the bicycle and pedestrian friendly streets and the incentive of a car-sharing schema (HAMMARBY, 2009). Figure 12 shows bicycles, baby strollers and a

motorized wheelchair on the Hammarby ferryboat, a free boat that crossed the lake from Hammarby Sjöstad and goes to the city centre.

Figure 12: Bicycles, baby karts and wheelchairs crossing the ferry to Hammarby Sjöstad (Author's photo)

- In Trondheim, Norway, a bicycle lift helps the cyclists to cycle up a ramp. After paying the fee the cyclist places his feet in a small plate that pushes him up (see figures 13 and 14 below).

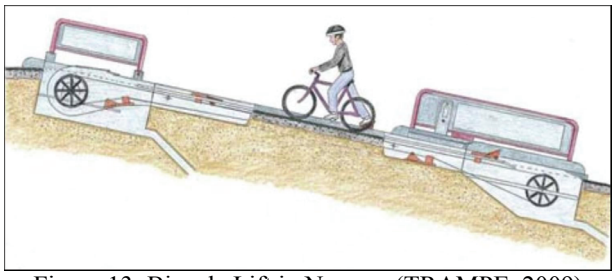

Figure 13: Bicycle Lift in Norway (TRAMPE, 2009)

Figure 14: Bicycle Lift in Norway (TRAMPE, 2009)

- In some bicycle sharing programs in Italy, the system gets the necessary energy from solar panels installed over the bicycle stations, (see figure 15 below). In some cases, the stations have recharge points for electrical bikes that are part of the rental program.

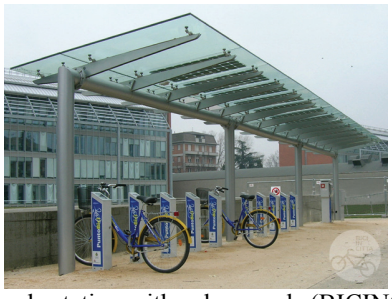

Figure 15: Bicycle station with solar panels (BICINCITTA, 2009)

These examples from around the world show that with political interest and creativity it is possible to increase the use of bicycles and make it easier and safer. This study focus on the use of bicycles in Brazilian cities, and therefore the next section discusses the Brazilian situation in more depth.

The Brazilian context

Any mode of transportation that is not a car has a negative image in people's mind in Brazil. It is high status to own a car and it is the goal of the average Brazilian. Someone who uses bicycle or public transportation is seen as someone who does not have the money to buy a car. This common view, or cultural trait, dates back to the 50's, when building roads were synonymous with progress. Washington Luís, a former Brazilian president from the twenties used to say, "To govern is to build roads". During this period, buses replaced the passenger trains, trams were phased-out, and car industry was built up. This process is comparable to the development of the car structure in the USA, but with a difference, Brazil is a developing country with a huge lack of infrastructure. For example, there are not enough roads.

Many things have happened since the 50´s, for example the oil crisis and the climate debate, which have changed the way sustainability is looked upon today. Brazil can build its necessary infrastructure using the new knowledge and the new models for sustainable development. And this includes the infrastructure related to bicycle transportation.

The bicycle is a vehicle that was neglected by the Brazilian's public investments. Even with a high number of cyclists there is no public investment, which causes many accidents. The number of hospitalized cyclists in São Paulo State in the four first months of 2009 reached 1,140, and the number raised with 23.6% compared to the same period in 2008 (YAHOO, 2009).

In Brazil, it is not only policies or infrastructure that must change however; the culture that favors cars must also change. Then people might start to use bicycles as a mode of individual transportation instead of using cars or motorcycles.

Brazilian cities lacks a bicycle plan. Despite some small and localized initiatives, the Brazilian bicycle infrastructure is still small compared to a bicycle friendly country like Germany. Even in Colombia, a neighbouring country, the capital Bogotá has a much further developed infrastructure.

One example that shows the situation is Brazilian cities is in Santos, in São Paulo State. It is a touristic city, and has the biggest port of Latin America. It has a mainly flat geography that incentives the use of bicycles, and even with a low level of bicycle structure (only 12.9 Km), 15% of the trips is Santos region are made by bicycle (STM, 2008). It shows the potential of bicycle utilization in Brazil, since even with a small bicycle infrastructure, there is already a high percentage of bicycle use.

Bicycle infrastructure in Brazil

The total length of the Brazilian bicycle infrastructure is only about 2,505 km, which is almost nothing if compared with for example the Netherlandsthat has 16,000 km of cycle-routes on roads and more than 18,000 km in cities (BICICLETA BRASIL, 2007). However, Brazil is one of the countries with the largest bicycleproduction and consumtion in the world. Table 1 below

shows production and consumption of bicycles in the world.China, in the top, produces 66% of the bicycles in the world and India 10%. Brazil is the third largest bicycle producer in the world, with 5.5% of the world's total production. (ABRACICLO, 2007)

Country	2007 Production	2007 Consumption
China	80,7	27,6
India	11,9	11,6
Brazil	5,5	5,5
Taiwan	4,1	0,4
Germany	3,2	4,3
Italy	2,6	1,6
Japan	2,1	11,2
Vietnam	1,8	0,3
France	1,5	3,3
The Netherlands	1	1,3
England	0,5	2,4
EUA	0,4	19,6
Others	7	33,2
Total	122,3	122,3

Table 1: World production and consumption of bicycles per country (in millions of units) (ABRACICLO, 2007)

In the end of 2005 there were about 60 million bicycles in Brazil and this is the the sixth largest number in the World, after China, India, USA, Japan and Germany (BICICLETA BRASIL, 2007).

The new Brazilian traffic legislation from 1997 has a special section on non-motorized transport, which has largely improved the policy situation concerning bicycles in the country. Here are some examples of important points in the new Brazilian Traffic Legislation (DENATRAN, 1997): "Its illegal to drive a car closer than 1.5 meters from a bicycle" (Article 201); "When signalized, the bicycles can share the sidewalk with pedestrians" (Art. 59); "In urban or rural roads, where there is no bicycle facilities the bicycle have preference over motorized vehicles" (Art. 58).

As showed, the problem in Brazil is not about the recognition of the bicycle as an important alternative mode of transportation in the government or the lack of legislation. The problem is to transform this into action in real life, to create bicycle infrastructure and to encourage incentives, training and information on bicycle usage. The change needs also to spread to the lower spheres of governance and to cover both structural and cultural levels. The view of bicycle use in Brazil can be summarized through four points (BICICLETA BRASIL, 2007):

- Leisure object;
- Kid's toy;
- Professional sports competition object;
- Transportation mode for the low-income population.

In other words, the bicycle as a mode of transport has a low status and it is still neglected in the projects and policies in the majority of Brazilian cities. It also influences the actions of the urban planner:

> Generally speaking, the culture of the Brazilian urban planner still gives priority to the car, and it is justified using the idea of the right to come and go. But this right belongs to the person, not to his vehicle. (Bicicleta Brasil, 2007, author's translation)

Apart from pedestrians, the modal share in Brazil is still predominantly motorized. Only 3% of the trips are by bicycle according to the Brazilian Association of Public Transports (ANTP, 2007). The following table shows the complete division:

Mode	%
Pedestrian	35
Car	28
City Bus	24
Intercity Bus	5
Bicycle	3
Metro	3
Motorcycle	2

Table 2: The modal division in Brazil (ANTP, 2007)

When the modal share is analyzed according to the size of the city, it is possible to notice an increase of non-motorized modes of transportation in smaller cities. Figure 16 below compares Brazilian cities with a population of 60.000 until cities with a population of one million or more.

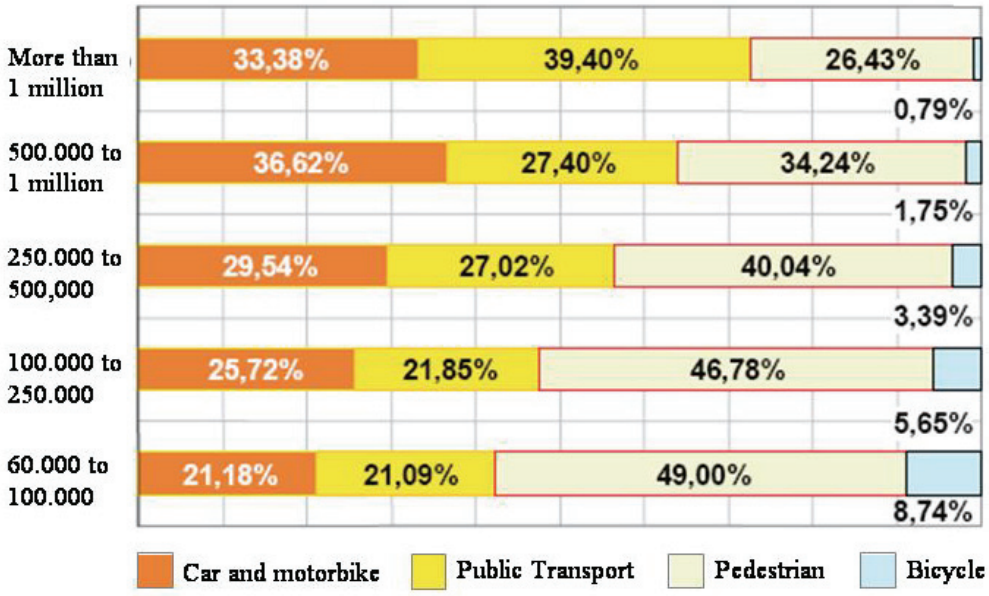

Figure 16: The modal share in different Brazilian cities (BIANCO, 2003)

The table above shows that the modal share is directly proportional to the size of the city: larger cities have more motorized traffic, while smaller cities have more non-motorized traffic. Therefore, it is probably easier to increase bicycle use in smaller cities.

In some cases, the share of bicycles can depend on geographical circumstances. The city Santos, in São Paulo State, is a good example. Santos is a touristic city, and it has the largest port of Latin America. The city is comparably flat which promote the use of bicycles, and consequently about 15% of the trips in the Santos region are by bicycle (STM, 2008). However,

even though this rather large use of bicycle in everyday transport, the bicycle infrastructure only measures up to 12.9 km. This shows that even with almost no effort there is already a high percentage of bicycle use in the city. Small improvements could save lives and maybe encourage more people to use bicycles.

Table 3 below shows the result of a study with cyclists from four Brazilian cities (Lorena/SP, Piracicaba/SP, Santo André/SP and Florianópolis/SC). It shows the main problems the cyclists face every day. There are many answers concerning the lack of infrastructure (cycle paths, illumination, signalization, bad road surface), and some that exemplify the lack of acceptance of bicycle as a mode of transport (conflicts with other modes of transport and lack of respect from drivers).

Problems for the cyclists	%
Intense motorized traffic	27
Potholes and bad road surface	21.2
Conflict with public transportation	11.4
Lack of cycle path	8,1
Conflict with trucks	6
Other	5.1
Conflict with cars	4.2
Lack of safety	3.1
Bad street illumination	3
Lack of respect from drivers to cyclists	2.6
Lack of order in cross roads	2.1
Conflict with pedestrian	1.7
Conflict in entrance/exit of garage	0.9
Lack of signalization	0.3
Lack of shoulder lane in road	0.1
Without problems	3.2
Total	100

Table 3: Problems mentioned by Brazilian cyclists (in Lorena/SP, Piracicaba/SP, Santo André/SP and Florianópolis/SC) (BICICLETA BRASIL, 2007)

In Brazil, there is a perception that the bicycle is a mode of transport only for poor people. Table 3 above, clearly illustrates the inferiority of bicycle users in the everyday traffic situation in Brazil. To change this perception could help reducing the social gap that exists in Brazil.

Bicycle transportation in Stockholm, Sweden

Stockholm is the capital city of Sweden, with 795,163 inhabitants (1,949,516 in the Stockholm County). The population density is 4,230 inhabitants/km^2. Stockholm is spread on an area of 188 km^2, and 40% of this area is green zones (USK, 2008). The city is built on 14 islands surrounded by many parks and natural areas, which makes the city very pleasant to cycle. The cycling infrastructure is growing; it has now approximately 760 km of bicycle routes, including shared ways with pedestrians, bicycle lanes and segregated bicycle paths. Another important feature of the traffic infrastructure in Stockholm is that 100,000 km of the roads has a maximum speed of 30 km/h, which makes possible for bicycles to share the roads with cars. (STOCKHOLM, 2008)

The bicycle plan of Stockholm inner city is showed in the figure 17 below:

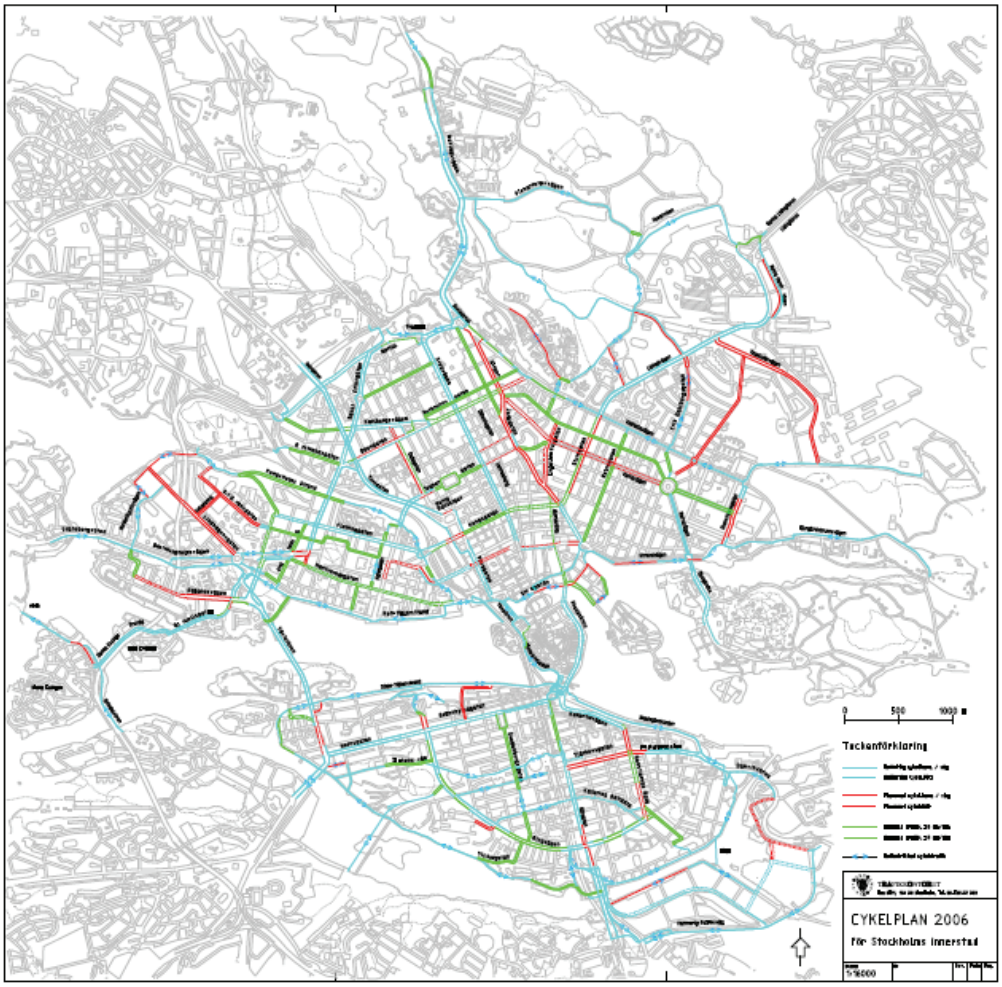

Figure 17: The Bicycle Plan of Stockholm inner city (STOCKHOLM, 2009)

The city was awarded the title European Green Capital, for the year 2010. Stockholm was chosen because its commitment in several areas of sustainability, including the measures towards sustainable transportation. Even though the bicycle infrastructure in Stockholm is not as developed as in many other European cities, Stockholm has been improving its bicycle system in the past years. The goal of the city council is to be a fossil fuel free city by 2050. Moreover, by the year 2015 the greenhouse gas emissions should be reduced to 3 tons CO2e per person (STOCKHOLM, 2008). The present numbers in the city are shown in figure 18 below:

Figure 18: GHG emissions per person in Stockholm (STOCKHOLM, 2008)

The measures adopted by the city in order to reduce the emissions in the transportation area include (STOCKHOLM, 2008):

- Congestion taxes for cars passing through the city center in daytime;
- Supporting vehicle efficiency and alternative fuels (Green car fleet);
- Logistic Centers outside the city to reduce the number of trucks;
- Promoting traveling with public transport, which runs on renewable fuels;
- Environmental zones that restricts the use of old diesel trucks;
- Increasing the use of bicycles.

With these measures, the transportation emissions are reducing, as showed in figure 19 below:

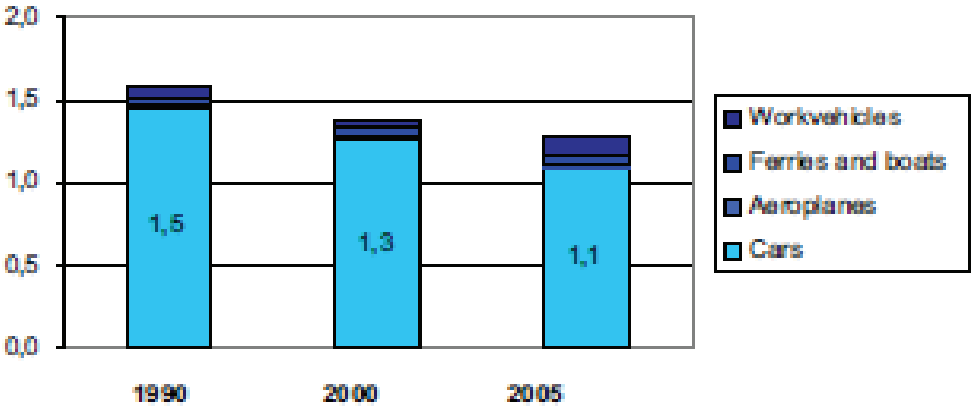

Figure 19: Transportation emissions in Stockholm – CO2e per capita (STOCKHOLM, 2008)

In the latest counting of Stockholm's modal share in 2006, 8% of the trips to the inner city in the morning peak hour were made by bicycle (see figure 20 and 21 below). Approximately 80 percent of all commuting trips in Stockholm are less than 10 km, a distance suitable for bicycles.

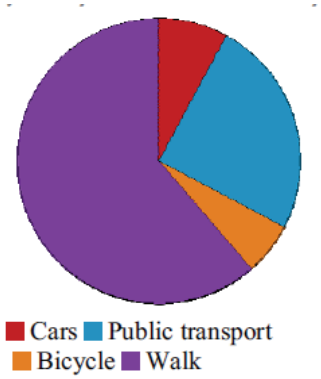

Figure 20: Proportion of trips in the inner city by mode (STOCKHOLM, 2008)

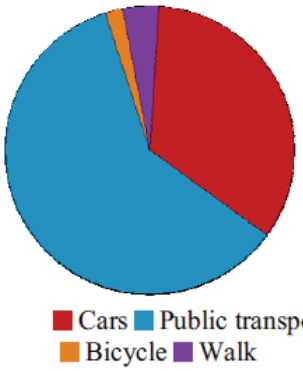

Figure 21: Proportion of trips to the city by mode (STOCKHOLM, 2008)

Commuting by bicycle also brings health benefits to the population. The Swedish School of Sports and Health Sciences (GIH) has a research program called PACS - Physical Active Commuting in Greater Stockholm, which studies the benefits of commuting with non-motorized modes of transport. This program shows that most of the commuters that use bicycles meet the physical activity recommendations of the World Health Organization (STIGELL & SCHANTZ, 2006).

To promote integration with other modes of transportation, the city of Stockholm plan to have bicycle-parking facilities in the stations of the new Citybanan, a tunnel in the inner city for commuter trains planned to be finished in 2017. There are plans to build more than 2,000 new bicycle-parking facilities, near the subway or commuter train stations (DN, 2009). The city has also a bicycle-sharing program, in cooperation with the private advertising company Clear Channel (more about this in chapter two).

The Stockholm bicycle program has a budget of approximately 150 million Euros for the period 2005-2020. It should cover investments to build new and improve existing bicycle infrastructure (STOCKHOLM, 2008). The efforts of the city have already been successful and the number of cyclists in the city has increased in the last years (see figure 22 below):

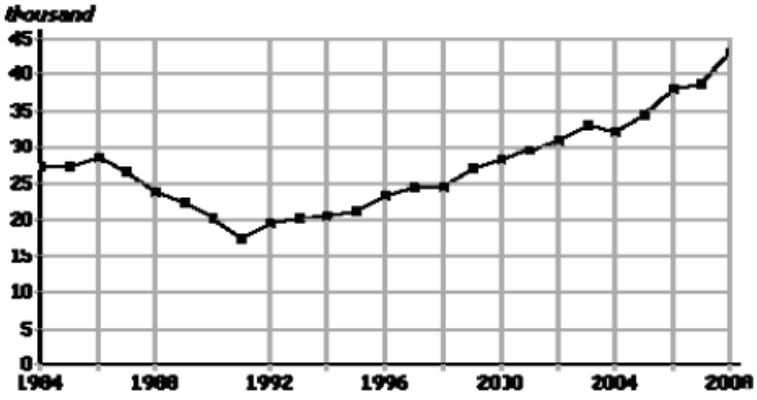

Figure 22: Cyclists in the inner city of Stockholm (STOCKHOLM, 2008)

Chapter 2: Analysis of types of Bicycle-sharing Programs

Bicycle-sharing programs are an increasing trend worldwide. Many cities around the world have implemented projects where local commuters as well as tourists can hire a bicycle in one station, use it for a period and return it in any other station around the city. (Annex 2 presents a list of approximately 165 cities with a bicycle-sharing program.) In many cases, the bicycle-sharing program is integrated with other modes of transport; the bicycle stations might for example be located near public transportation stations. The existing bicycle-sharing systems have a wide variation of names, for example: (CITYRYDE, 2009)

- Community Bicycle Programs
- Bike Library
- Public Use Bicycles
- Public Bicycle Systems
- Bike Coops
- Bicycle Collectives
- Check-out Bikes
- Public Bike
- Decentralized On Demand Bicycle Rental Systems

The bicycle-sharing programs are also based on different business models. City Ryde (2009) divided the revenue models in five categories:

- Municipality Funded
- Self-Funded
- Advertising Contract Based
- Flat Fee Based – season ticket (it's a pricing structure that charges a single fixed fee for the service, regardless of usage)
- Private/Public Partnership

Clear Channel and J.C.Decaux are two private companies in charge of many bicycle-sharing programs in Europe. These companies have a contract with the municipality, and they offer the bicycle-sharing program in exchange for the advertising spaces in the bicycle stations and on the bicycles. In some cases, the companies also pay a certain amount of the profit to the municipality. Other major companies in this field are Bicincittà, Next Bike, OY Bike, CEMUSA, ITCL (Instituto Tecnológico de Castilla y León) and DB (Deutsche Bahn).

A bicycle-sharing program that drew much attention in the media was the Vélib program that was launched in Paris in 2007. As a first step, Paris doubled the amount of cycle ways in the city as a part of the Paris Mobility Plan. After these improvements of the infrastructure, the Vélib program was introduced with 20,000 bicycles in stations around the city and 78,000 users per day. There are studies that show a reduction of pollution and traffic because of this initiative (ITDP, 2007). However, 7,800 bicycles has disappeared and 11,600 has been vandalized since the start of the program. The company responsible for the program, J.C. Decaux, repairs 1,500 bicycles per day, and they claim that it is not economic sustainable (LE PARISIEN, 2009). These high levels of vandalism risk compromising the entire program (MOK, 2009).

Vandalism and theft, as well as other aspects of bicycle sharing are analyzed in this chapter in order to find the most suitable model to be implemented in a Brazilian median city. The chapter

starts with an analysis of the bicycle-sharing program in Stockholm – The Stockholm City Bike. The material used in this analysis is based on interviews with key stakeholders and users of the program. Then, an analysis of other programs around the world is made in order to provide alternatives to the Stockholm model. Finally, a case study analyzes the context in the Brazilian median city Guaratinguetá. These different parts lead to the conclusion and a proposal for a bicycle-sharing program suitable for Brazilian median cities.

The Stockholm bicycle-sharing program

The bicycle-sharing program in Stockholm is a typical private bicycle-sharing initiative. It is owned by one of the main companies in the area of outdoor advertising in the world, Clear Channel. In a press release on the website of Clear Channel, the Vice Mayor of Stockholm talks about the program in positive terms:

> The Stockholm City Bikes program is a strong complement to our public transit system and for many people the quickest mode of transport in the city centre […] Additionally, it is beneficial for health and the environment. We are very pleased that the city of Stockholm and Clear Channel Outdoor can offer the citizens of Stockholm a well-functioning bike system. (CLEAR CHANNEL, 2009)

To be able to use bicycles in the program, the user has to buy a 3-day pass or a season pass. The system uses electronic cards to unlock the bicycles and the user has a maximum of 3 hours before the bicycle has to be returned to a station. The localization of the stations is showed in figure 23 below:

Figure 23: The stations of the Stockholm bicycle-sharing program (CITY BIKES, 2009)

The bicycles

The bicycle used in the Stockholm program is a model with small wheels, and a saddle that can be adjusted but not removed by the user (see figure 24 below). The size of the bicycle is not suitable for a child, since the handlebar is not adjustable. A French couple that was interviewed in this study complained with the system because their 8 years old son could not use the bicycles.

Figure 24: The bicycle of the Stockholm's program (CITY BIKES, 2009)

The handlebar has a kind of basket that can carry a package or a small backpack. The reason for not having a regular or closed basket is to avoid it to become a garbage bin. The bicycles are equipped with foot brakes in the back wheel and a frontal hand brake. There are three gears in all bicycles, enough for a city environment. The frontal- and backlights works automatically when it is dark and the bicycle is moving. The bicycles do not come with a locker, and Clear Channel does not recommended users to lock the bicycles in other places than the stations.

The structure of the program

A person must be at least 18 years old to use the program. If a bicycle is stolen or vandalized the user must pay a fee of 3000 sek, but if he or she have an paid for an insurance called self-risk reduction, the price drops to 800 sek.

The staff uses a car with a special trolley to reallocate the bicycles between the stations (see figures 25 and 26 below).

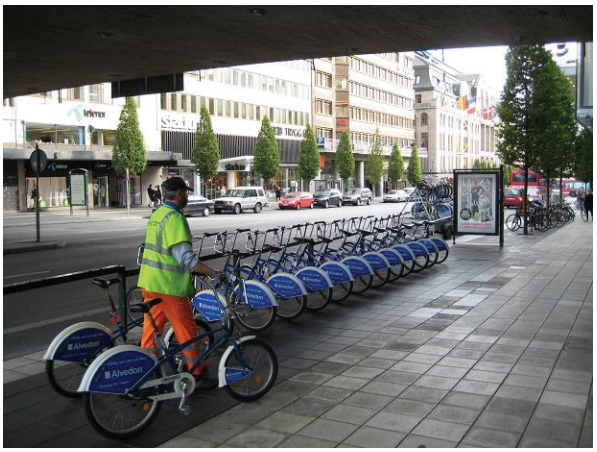

Figure 25: Maintenance staff of the Stockholm bicycle-sharing program (Author's photo)

Figure 26: The service car of the Stockholm bicycle-sharing program (Author's photo)

The stations have different sizes, with place for 6 to 30 bicycles. The screen where to unlock the bicycles is built in the same structure used as advertising space. The design of the stations is shown in the figures 27 and 28 below:

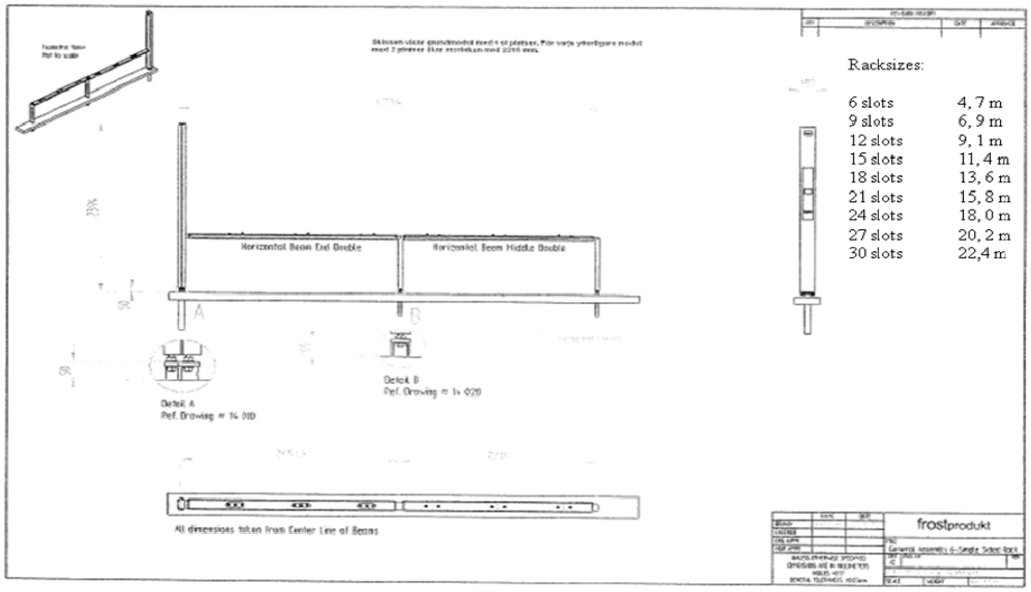

Figure 27: The design of the bicycle stations in Stockholm (SUNDMAN, 2009)

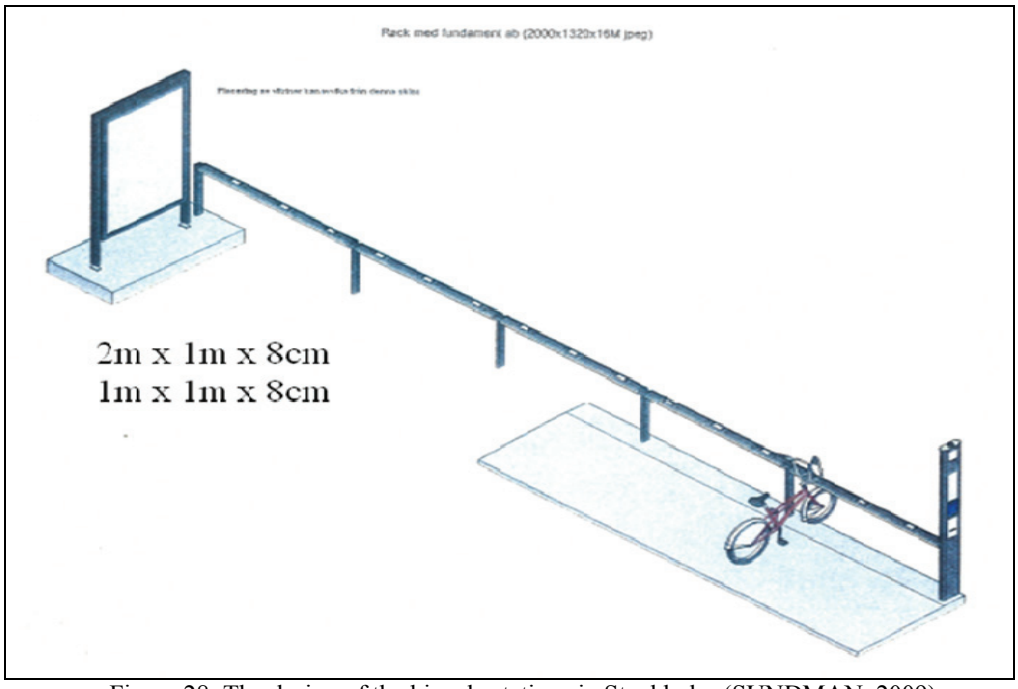

Figure 28: The design of the bicycle stations in Stockholm (SUNDMAN, 2009)

View of the project manager at Clear Channel

Johan Sundman (johan.sundman@clearchannel.se) is the project manager for the bicycle-sharing program at Clear Channel in Stockholm. At the interview, which was made at the Clear Channel offices, he showed the same presentation he made to the City Council of Tel Aviv (SUNDMAN, 2009). After this presentation, he showed a station with bicycles and explained the project and the particularities of the bicycles in loco (The model of this semi-structured interview can be found in the annex 1).

The primary function of Clear Channel is outdoor advertising. To be able to have spaces in cities like Stockholm, with very restrictive rules about street advertising, they offer different services to the panels of advertising, like public toilets, bus shelters and shared bicycles.

In the opinion of Sundman there is an increasing demand by cities on bicycle sharing and other services related to bicycles. Clear Channel has total control of the bicycle-sharing system in Stockholm. The company only has to report the figures of the program to the Stockholm municipality. Sundman argues for automatic services in bicycle-sharing programs, which, in his opinion, makes it more flexible and reduces the problem with stolen bicycles.

The preliminary figures of Clear Channel show that the bicycle-sharing program in Stockholm will increase the number of users from 15 thousand in 2008 to 20 - 25 thousand in 2009. The group that increases the most is tourists, and according to Sundman this group is interesting for Clear Channel since the price paid for a 3-days pass is only half the amount of a season card. However, it is important to increase the number of season users as well, because this is what matters most for the municipality. In this situation is clear that there are two different points of view, one from the private company, which wants more profit, and another from the

municipality, that wants more commuters by bicycle. This is an important point to take in consideration in the choice of the model of the program (public or private).

In Sundman's opinion, there are two ways of financing the implementation of a bicycle-sharing system: advertising or public funding. The main income of the Stockholm program is the advertising. The user fee covers only the administration, the issue of cards and the registration but the main operational cost are the staff, which is not covered by the users fee.

When showing the system, Sundman explains that each bicycle has an electronic identifier. There is a sensor in the stations, which reads this identifier, and the information is transmitted to the staff via mobile communication. Every station is connected through 3rd generation mobile communication, which is better than the previous GSM-system according to Sundman. This system helps the staff in the service car to know in each station it is necessary reallocate bicycles.

Clear Channel saw that it was necessary to change the bicycle components after the first year of the program when 300 bicycles had disappeared. On the old bicycles, it was easy to break the locker that was located in the handlebar. In the last year, after the changes in the structure of the system, only 10 to 20 bicycles have been stolen. Sundman argues that is important to have an age-limit on 18 year in order to use the program. The user is responsible for the bicycle and has to pay a fee if it is stolen.

The implementation of the program in Stockholm has been delayed. A main barrier for establishing the bicycle-sharing program in Stockholm was to settle the stations. Sundman explains it like this:

> Compared with Barcelona, where the program was a municipal initiative that builds all stations at the same time, with no advertising, in Stockholm it is necessary to build the stations one by one with authorization from different levels, even going to court sometimes. It is a much longer process.

A problem that Sundman see in the everyday maintenance of the stations is if they are full. In the case of a full station, the user cannot return the bicycle and might miss a train, bus or a meeting. Sundman also suggests that the service car should be an open truck, because it is easier to maneuver and not have a trailer to carry the bicycles. According to him, it is also better to start a program in the city center and expand it to other areas afterwards.

According to Sundman, the points learned by Clear Channel from the experience with bicycle sharing in Norway and the two first years of the program in Stockholm are: (SUNDMAN, 2009)

- Easy access: easy to borrow, easy to return the bicycle;
- Light bicycle: the bicycle must have low weight and be easy to use;
- Air filled tyres: Solid tyres makes the bicycle hard to use;
- Self explaining interactive screen on the bicycle racks;
- No basket: the basket become a wastepaper bin;
- No dynamo, it increases resistance;
- Simple and reliable: quality before cutting edge technology;
- Internet is the key: selling cards and giving information;
- Large racks means more flexibility (but more racks are better than fewer);
- Short distances between the racks increases popularity (300 to 500 meters if possible);
- 1 : 1 ratio in number of racks between the central city and other areas (used in the proposal on chapter 3);
- Opening hours and what days of the week the system will be open and any other restrictions should be decided from start;
- Find the places before starting to build;

- Start the system when enough racks are built;
- The cards must be cheap – everybody must be able to afford to buy cards;
- Available (easy to find racks);

View of the responsible for the program in the Stockholm municipality

The responsible for the sharing program in the Stockholm municipality is Håkan Carlbom, (hakan.carlbom@tk.stockholm.se). He has been working in the municipal traffic department since 1991. The interview with him took place in the traffic department (The plan of the semi-structured interview can be found in the annex 1).

The general view of Carlbom about bicycle transportation in Stockholm is positive. He says that the city has been improving the infrastructure for bicycles, and the number of cyclists has grown from 10,000 in 1991 to 150,000 nowadays. The bicycle-sharing program in Stockholm started in April 2008. It was implemented because of an initiative of the municipality that was trying to implement the program since 1998, but every time that the political power changed the project was cancelled. The project is an agreement between the city and Clear Channel, and the municipality did not use any money to implement the project. Only the last season, the city has paid the Clear Channel and this was in order for the stations to be kept open until late hours. The contract with Clear Channel goes until 2014, and can be renewed until 2017.

Carlbom agree with Sundman about the difficulties to settle a station in Stockholm. There are many necessary permissions and the municipality is not receptive to advertising in the streets. Another problem is to connect the electricity to the station. In some cases is necessary to dig very long to make this connection.

Even though Clear Channel controls the system, Carlbom says that the municipality controls the rental prices. Nevertheless, the advertising of the program is the responsibility of Clear Channel. He is satisfied with the bicycle-sharing program, and thinks that the role of bicycles in transportation systems of cities will increase.

View of the users

To get the views of the users are of outmost importance in order to get a complete idea of the program. For this purpose, a questionnaire was handed out to 38 users of the bicycle-sharing system in Stockholm. (The questionnaire can be found in annex 1)

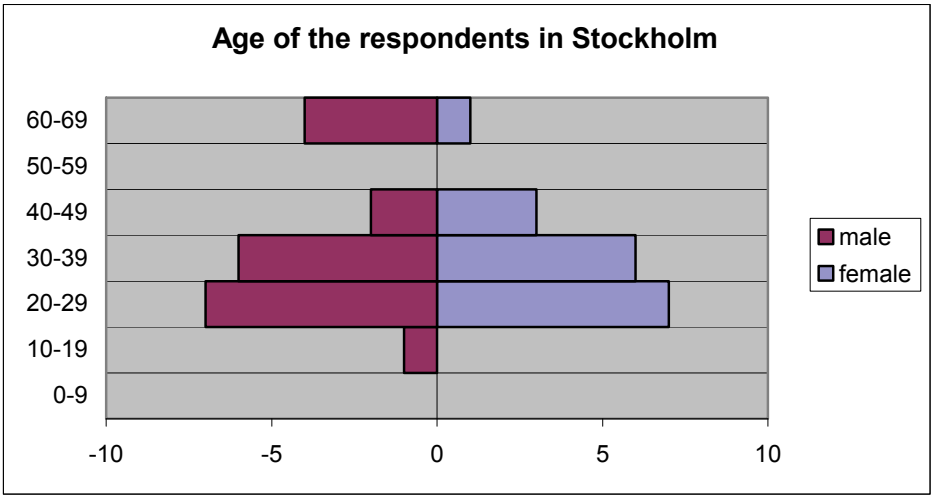

Figure 29: Age of the respondents in Stockholm

The majority of the respondents, both among men and women, are between 20 and 39 years old. There are an interesting subgroup of males between 60 and 69 years old, but which cannot be accounted for in this thesis.

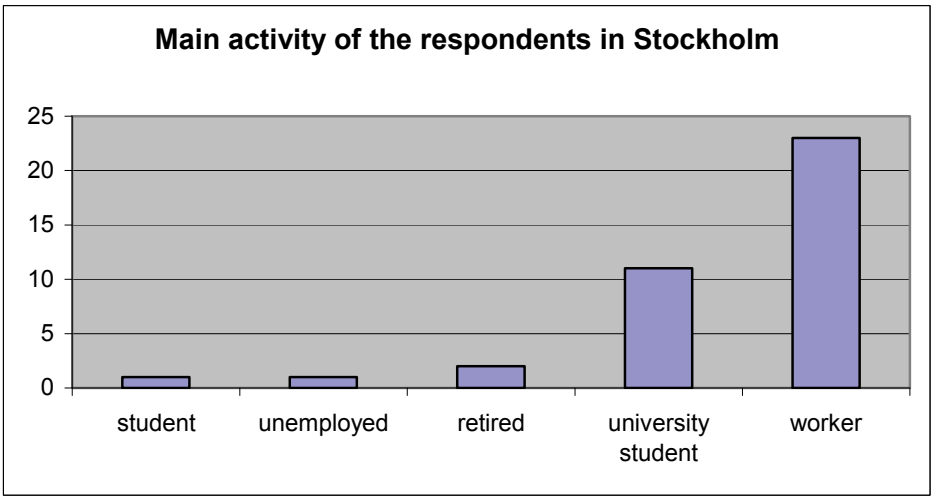

Figure 30: Main activity of the respondents

The users are mainly workers (have an employment) and university students (both that lives in Stockholm or are here on vacation).

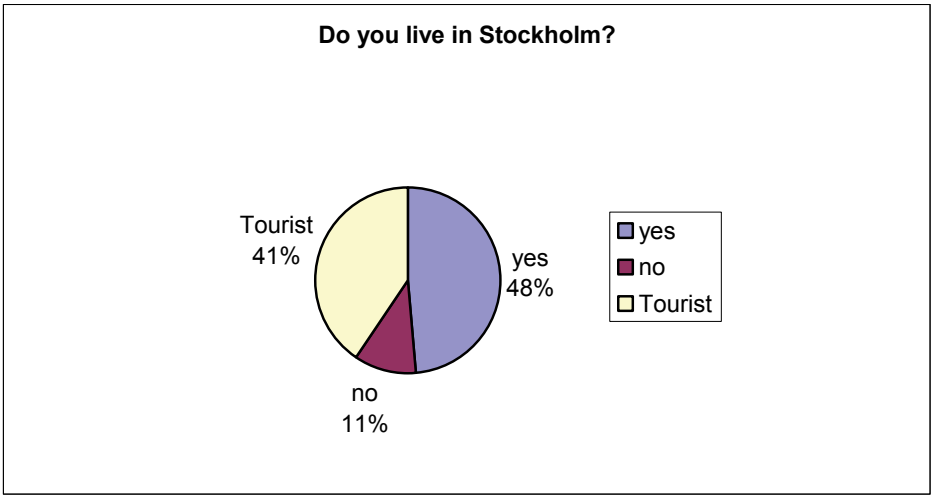

Figure 31: Place of living

There as many users that live in Stockholm, as there are tourists or persons who do not live in the city that use the bicycles, which would support the idea the bicycle sharing is attractive for people that are visiting the city for shorter periods.

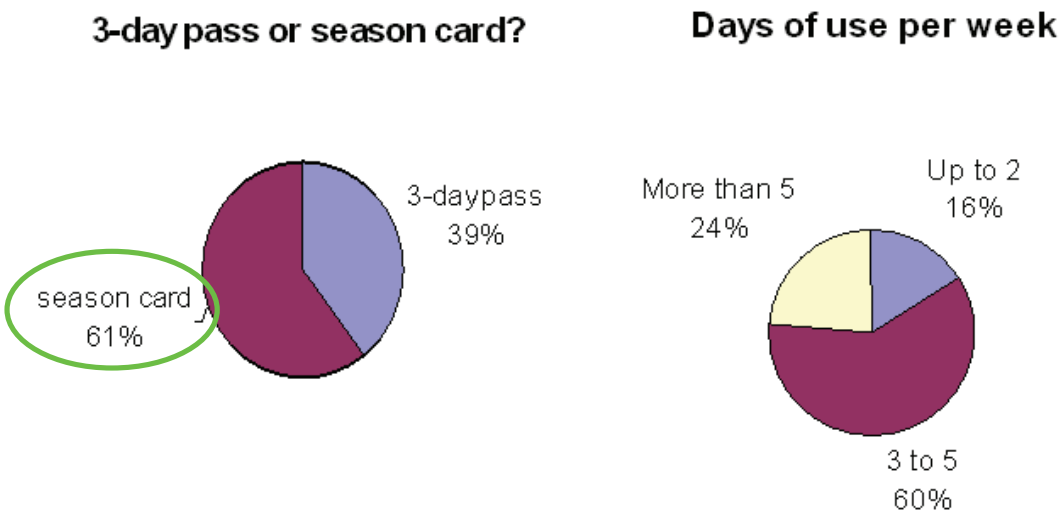

Figure 32: Type of card and use per week

There majority of the users have a season card, and almost two third of the respondents use the system between three and five days per week. This means that the people who are part of the program use it regularly, something also suggested in Figure 29, which shows that a majority of the users commutes with the bicycles.

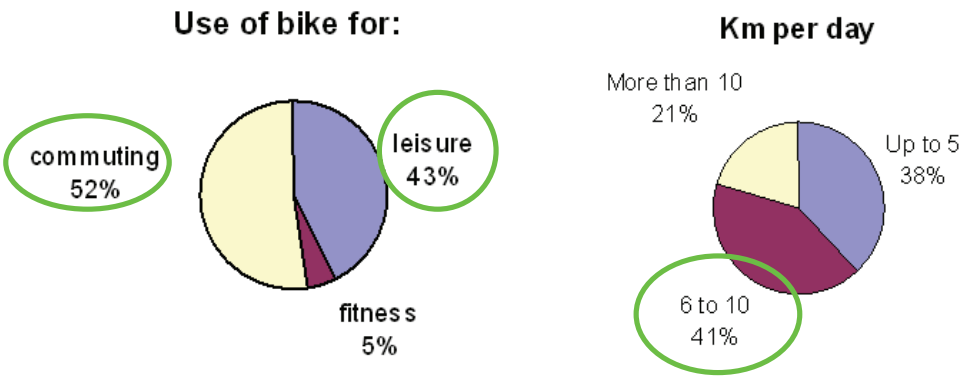

Figure 33: Reason of usage of the bicycle and distance per day

The balance between commuting and use for leisure is the same as the division of local users and tourists, which might suggest that the local users use the bicycle for commuting. The majority of the trips made with the bicycles are from six km or longer. In other words, the respondents do not only use the bicycles regularly they also use them for long distances.

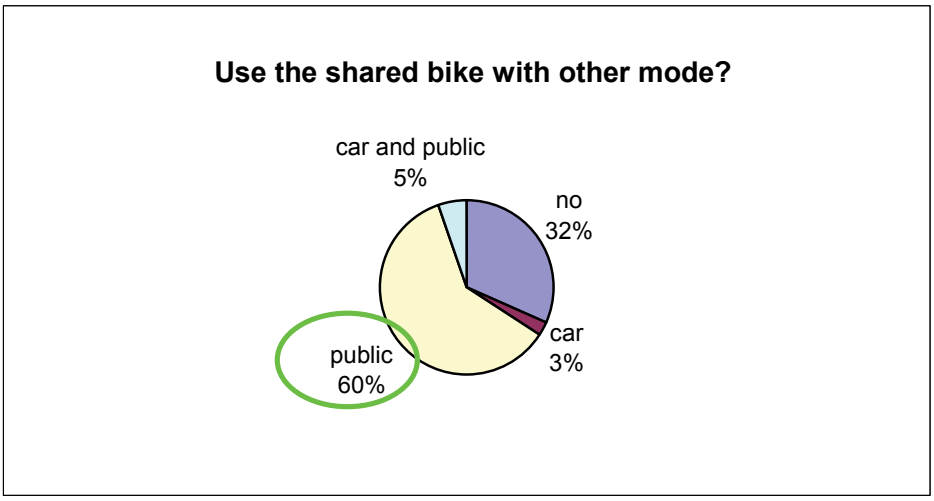

Figure 34: Use of the bicycles together with other mode of transport

The Stockholm bicycle-sharing program has a high level of integration with the public transport system, but only a surprisingly small share uses the bicycle with car. The reason for this might be that the system is built close to subway stations and other public transportation hubs.

Based on all the graphics presented above, we can picture the typical user of the bicycle-sharing program in Stockholm. This typical user is a person who lives and works in Stockholm and who has a season card. This person uses the bicycle for commuting between 3 to 5 days per week, six to ten km per day and often together with public transport.

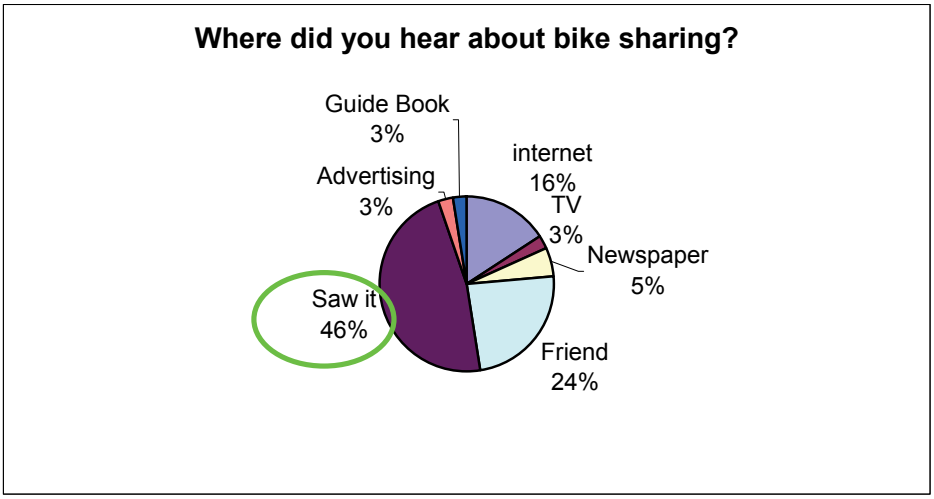

Figure 35: Source of information about the sharing program

One of the main sources of information about the bicycle-sharing program is the stations and the bicycles themselves. These factors are what drive the attention of possible users. For this reason, it is important for the stations and bicycles to be visible and attractive.

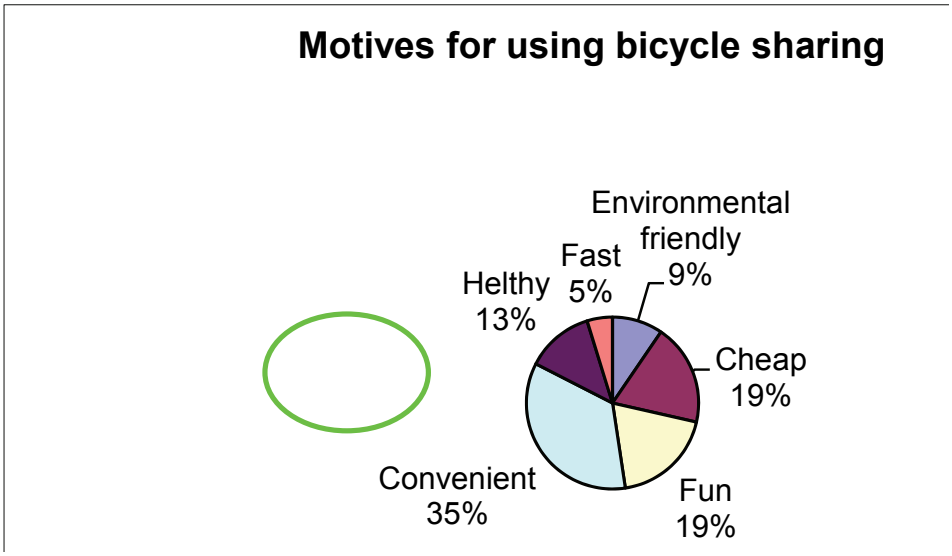

Figure 36: Motives to use the bicycle

The convenience of the bicycle-sharing program is the main motive for using it, but many also point to the fact that it fun and cheap to use. Comparably few use bicycle sharing because of a concern for the environment, which might be influenced by the fact that the majority of the group use public transport that is also a environmentally friendly mode of transport.

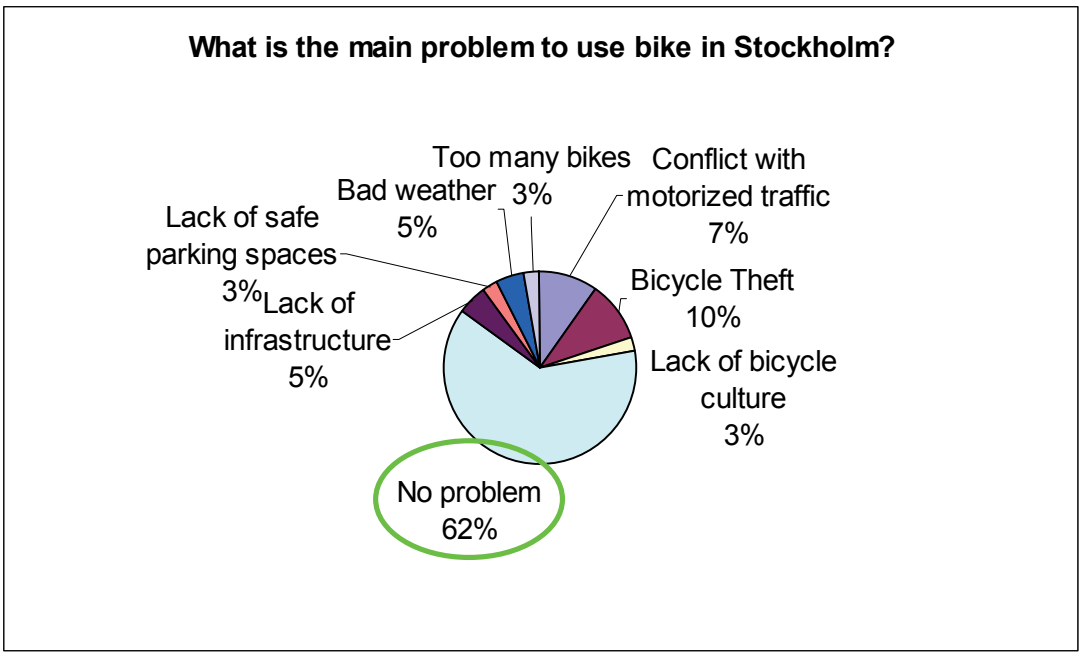

Figure 37: Problems to use bicycle in Stockholm

A majority of the respondents saw no problem with using bicycle in Stockholm. One of ten argued that there is a problem with bicycle thefts and about the same amount of people meant that there is a conflict between bicycle users and the motorized traffic. It is interesting to compare this result to the Brazilian study where only 3 percent of the respondents had no problems with using bicycles in their city and one third of the respondents complained about the heavy traffic. About one third of the respondents in Brazil complained about the infrastructure and the quality of this. Of the users of the Stockholm program, on the other hand, only 5 percent see a problem with a lack of infrastructure.

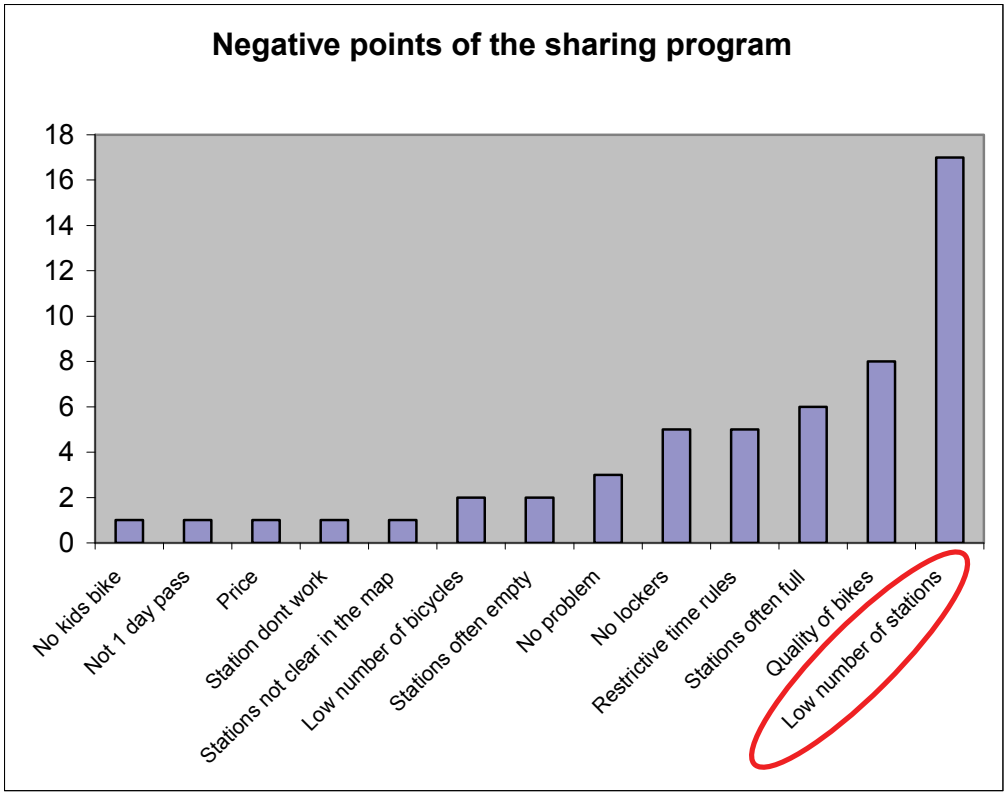

Figure 38: Negative points of the bicycle-sharing program

Half of the respondents are of the opinion that there are too few stations in the Stockholm program. Most of the existing stations are concentrated in the city center. According to the project manager at Clear Channel this is also one of the main barriers for the enlargement of the program, it is a long process to build and put more stations into service.

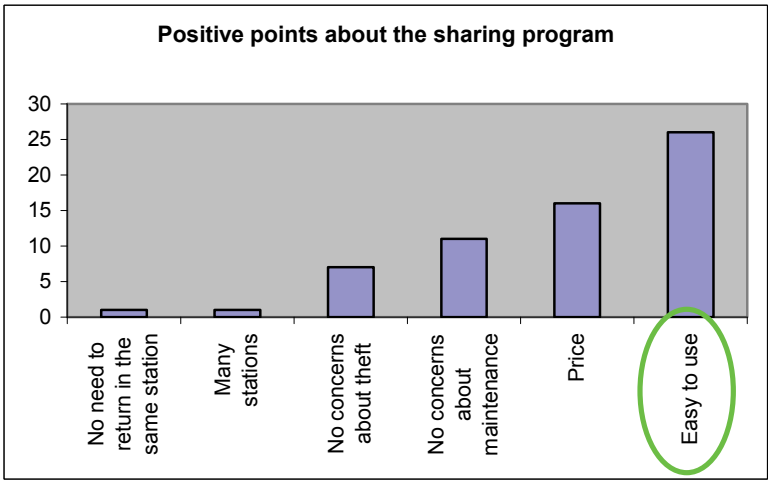

Figure 39: Positive points of the bicycle-sharing program

It is the simplicity and the price of the program that mentioned as the two most important positive points of the Stockholm program. Put together; “easy to use”, “price”, “no concern about

maintenance" and "no concern about theft", one can interpret that the convenience of not having to feel the responsibility that comes with using a private bicycle is what makes people appreciate the shared bicycles.

Bicycle-sharing programs around the world

There are nowadays more than 160 different cities with some kind of bicycle-sharing program. (Please see annex 2 for a list of these cities). Within the framework of this study, a questionnaire was sent via email to these cities in order to obtain a more differentiated picture of possible bicycle-sharing models. Five of these cities answered the questionnaire, which is enough to provide a complementary view to the Stockholm model. The cities that answered the questionnaire are Dijon (France), Milano (Italy), Vienna (Austria), Rio de Janeiro (Brazil) and Castelo (Spain). The respondents are managers or responsible for the bicycle-sharing program in their cities, and three of five respondents use the bicycle frequently to commute.

Here are some highlights from their answers:

- The results show that one of the programs is a public-private partnership, one is a public program and three are private. The public program, in the city of Castelo, is the only one completely free of charge. Otherwise, it seems like the trend is that the programs are private or that they are run by a private company as in the Stockholm case and in three of these other cities.

- The only program that presented figures in the questionnaire was the one in Rio de Janeiro and there the user fees cover between 50 and 70% of the operational costs. In Stockholm the users' fee only covers the administration, the issue of cards and the registration. All programs have advertising in the stations and/or in the bicycles as an important part of its income.

- The program in Dijon has 16.000 users in a population of 151.000 habitants, a rate of 10.6%. This is the size of the Brazilian city where the case study was performed, see below. The program in Dijon and the high rate of users there might be used as a model for the potential of a program in a city of this size.

- Four cities of five mention the lack of structure as the main barrier to bicycle utilization in the city. Rio de Janeiro also points to a cultural barrier and the lack of political interest, which supports the former discussion on problems with bicycle use in Brazil.

- All cities point that the importance of bicycle of the transportation in the city will be higher in the future. Two cities situate the bicycle-sharing program as having medium importance in the transportation system and two as having high importance.

From this, one can say that the bicycle-sharing programs can be of importance in order to increase the use of bicycles in a city, which all our respondents, from Stockholm and other cities, argues is the current trend. There is a lack of infrastructure in many cities and in Brazil there is a

cultural barrier and a lack of political interest. In order for the system not to become too expensive, it is common to allow for advertising on the bicycles and the stations. The most common business model is that a private company runs the bicycle-sharing program and this seems to work fine in these cities.

The bicycle-sharing programs in Brazil

There are only a few initiatives of bicycle-sharing programs in Brazil. The only bicycle-sharing programs in use are the "Use Bike" program in São Paulo and the program "Samba" in Rio de Janeiro and Blumenau. These programs are small compared to the dimension of the cities. The program SAMBA is based on a private program, as many programs in European cities, with stations without surveillance and where the user unlock of the bicycle by mobile phone. The program in São Paulo started as an initiative of an insurance company and is now a partnership between this company, the state government and a car parking company. The idea of this program is that a car driver can park his car and take a bicycle, in any of the parking lots connected to the program. There are also bicycle stations in metro stations for those who use this mode of transport. The bicycle stations are not automatic, and every station has staff (PORTO SEGURO, 2008).

Brasilia, the capital of Brazil, is currently developing a private bicycle-sharing program. The company that will be in charge of the service has been chosen. The program in Brasilia will be similar to the Stockholm program where the municipal lay out the work with the program on a private company. The company will have a contract to build and operate the program for five years, with the possibility of prolonging for five more years. Is the use of advertising spaces on the stations is included in the deal. The program, that is called "Mobicicleta", will include 50 stations, many of them close to metro stations (STDF, 2009).

The value of income that is foreseen for the program in Brasilia is R$ 10,609,080, or 4,050,000 Euros in five years. Of this the company in charge must pay at least 6% of the income, or R$ 636,544, that corresponds to approximately 240,000 Euros to the municipality. The company will have all the implementation costs of the program, which should comprise the stations, the special bicycles, four vehicles for handling the system, a website, an operation centre, etc. In this program, the bicycle will be unlocked by mobile phone and the first hour will be free of charge. The bicycle sharing is part of a larger program called Pedala-DF, which goal is to build 600 km of cycle-paths and cycle-lanes. Nowadays the size of the cycle network is 42 km (STDF, 2009).

The case study in a Brazilian median city

Brazil is a developing country with continental dimensions. It has many social problems and a huge lack of infrastructure, but a strong economy. For many decades, its transportation investments were only directed towards motorized traffic, while bicycles remained a vehicle for the poorest social classes. The intensive car and truck traffic in Brazilian cities became a large problem, and this is where the bicycles can play an important roll.

The focus of this study is to develop a proposal of a bicycle-sharing program for Brazilian median cities. The choice of a median city was made because bicycle as a way of transport can be

developed more in smaller cities where there is already a higher use of bicycles, and also because half of the population in Brazil live in cities with less than 100.000 habitants.

The table below shows the population in the 14 largest Brazilian cities:

City	Population
São Paulo – SP	10.886.518
Rio de Janeiro – RJ	6.093.472
Salvador – BA	2.892.625
Brasilia – DF	2.455.903
Fortaleza – CE	2.431.415
Belo Horizonte – MG	2.412.937
Curitiba – PR	1.797.408
Manaus – AM	1.646.602
Recife – PE	1.533.580
Porto Alegre – RS	1.420.667
Belém – PA	1.408.847
Goiania – GO	1.244.645
Guarulhos – SP	1.236.192
Campinas – SP	1.039.297

Table 4: Brazilian Cities with more than 1 million inhabitants – Source: IBGE 2007

More detailed, the population is divided as follows: (Source: IBGE, 2007)

- 14 cities with more than 1 million inhabitants (pop. 38,500,108, or 20.93% of the total)
- 22 cities from 500,000 to 1 million inhabitants (15,308,624, or 8.32% of the total)
- 217 between 100,000 and 500,000 inhabitants (44,828,145, or 24.36% of the total)
- 2,710 between 10,000 and 100,000 inhabitants (71,846,113, or 39.05% of the total)
- 2,601 Until 10,000 inhabitants (13,506,721, or 7.34% of the total)
- total 5,564 cities, with a population of 183,989,711 inhabitants

Almost half of the Brazilian population (46.39%) lives in cities with less than 100,000 inhabitants, and 53.61% lives in cities with more than 100,000. In other words, a city with a population of 100,000 is in the median of Brazilian cities, and it is the city size chosen for the analysis in this study. The city chosen is Guaratinguetá, with a population of 107,895 inhabitants (Source: IBGE, 2007).

From the table 5 below it is possible to estimate the percentage of the population in Guaratinguetá that uses private motorized vehicles for its transport. The sum of cars, trucks, pickups, motorcycle and moped gives us the number of 36,701 motorized vehicles in Guaratinguetá, or 0.34 motorized vehicles per habitant.

Vehicle	Number of registered units
Cars	25,589
Trucks	880
Tractor truck	80
Pickup	1,963
Micro-buses	194

Motorcycle	7,781
Moped	488
Buses	225
Bicycle	not registered – no official figures

Table 5: The different modes of transportation in Guaratinguetá
(Sources: DENATRAN – 2007; IBGE, 2008)

Guaratinguetá

Guaratinguetá is a typical Brazilian median city, with a population around 107,000 habitants. It is located in between São Paulo and Rio de Janeiro, in a valley. Its geography is partially flat, with some hills spread around the city. The following sections will study the possibility of a bicycle-sharing program to be adapted in this city. In order to understand the situation and the needs of the city concerning bicycles, an interview was conducted with the responsible for transportation system in the municipal. A questionnaire was also handed out to 38 persons living in the city and which are considered potential users of the program.

View of the trafic director in Guaratinguetá

The interview with the traffic director of Guaratinguetá, Pedro Guilherme Lyra de Carvalho Bruno, took place in the traffic department of the city (The model for the semi-structured interview can be found in the annex 1). Carvalho is aware of the importance of bicycles in the transportation system. He talked about sustainability and accessibility, two words that according to him are strongly related with transportation.

He compared the bicycle transportation in Guaratinguetá with a neighbor city, Lorena. According to him Lorena has more bicycle traffic because the flat topography of that city. He said that Guaratinguetá is building some bicycle lanes in some peripheral parts of the city. However, to increase the use of bicycles among the upper social classes and change the perception of bicycles as a vehicle for poor people, it is necessary to increase the bicycle infrastructure in the central areas of the city.

Carvalho is aware of the problems with car traffic in the city center, where the streets are narrow and not planned for motorized traffic. There is a problem of parking spaces and a large bus traffic in weekends because the religious tourism. However, his view on bicycle users is that it is a person from low-income classes. These problems are exactly the problems addressed in this project to develop a bicycle-sharing program for a city like this one.

Carvalho mentions the difficulties to change the mentality concerning transportation in Brazil. As an example, there are complaints when the municipality installs bus stops or bicycle parking racks near houses or shops. Many people want to remove it because it would become an obstacle for the clients to get inside their shops.

He recognizes that the bicycle-sharing program can be a good alternative to the transportation system of the city, but he thinks that it would be difficult to encourage the inhabitants to park the car outside the city center to take a bicycle instead. He says that it is important to promote bicycle transportation but he is aware of the lack of infrastructure for bicycle users. In his opinion, it is important to work with the children to change the mentality

against bicycle transportation, and he mention an educational program of the traffic department in the schools, to educate children about traffic.

View of the local population

The questionnaire was handed out to a sample of 38 people. The choice of the respondents followed a random pattern, which avoids bias in the result. The survey was made in July 2009 in the central square of Guaratinguetá, in different hours of the day, during weekdays. The results are showed in the following figures.

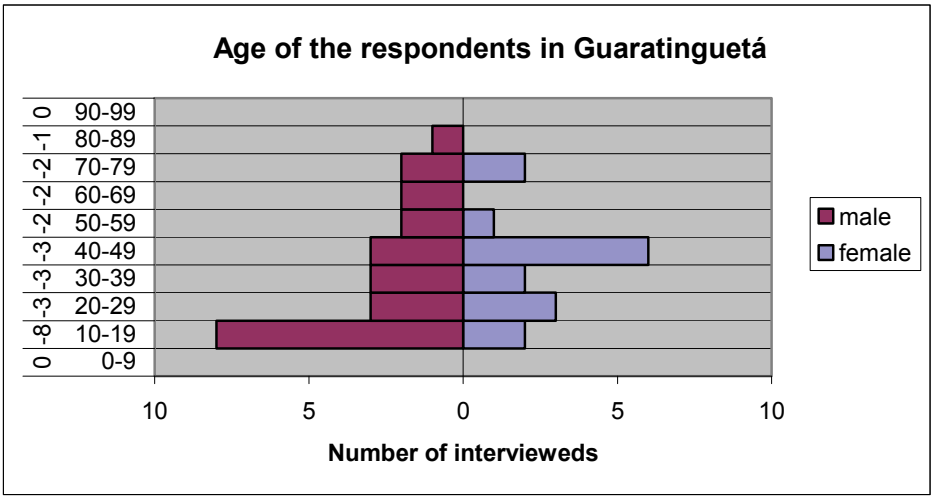

Figure 40: Age and gender of respondents

Of the respondents, 24 were male and 16 female. The two largest groups are among young males (10 to 19 years old) and middle-aged females (40-49 years old).

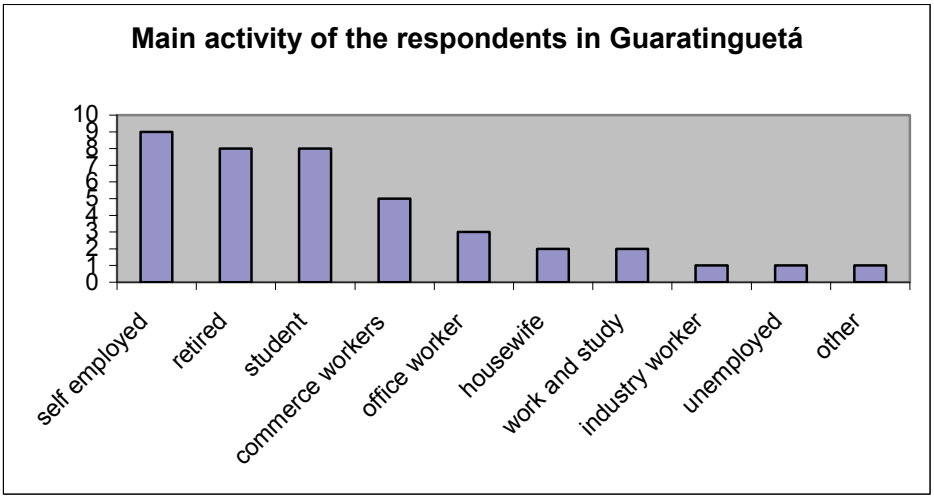

Figure 41: Main activities

A high number of self-employed and retired people were answering the questionnaire. The number of students is also significant. This means that the group is slightly different from the one in the Stockholm case study but similar enough to compare the two.

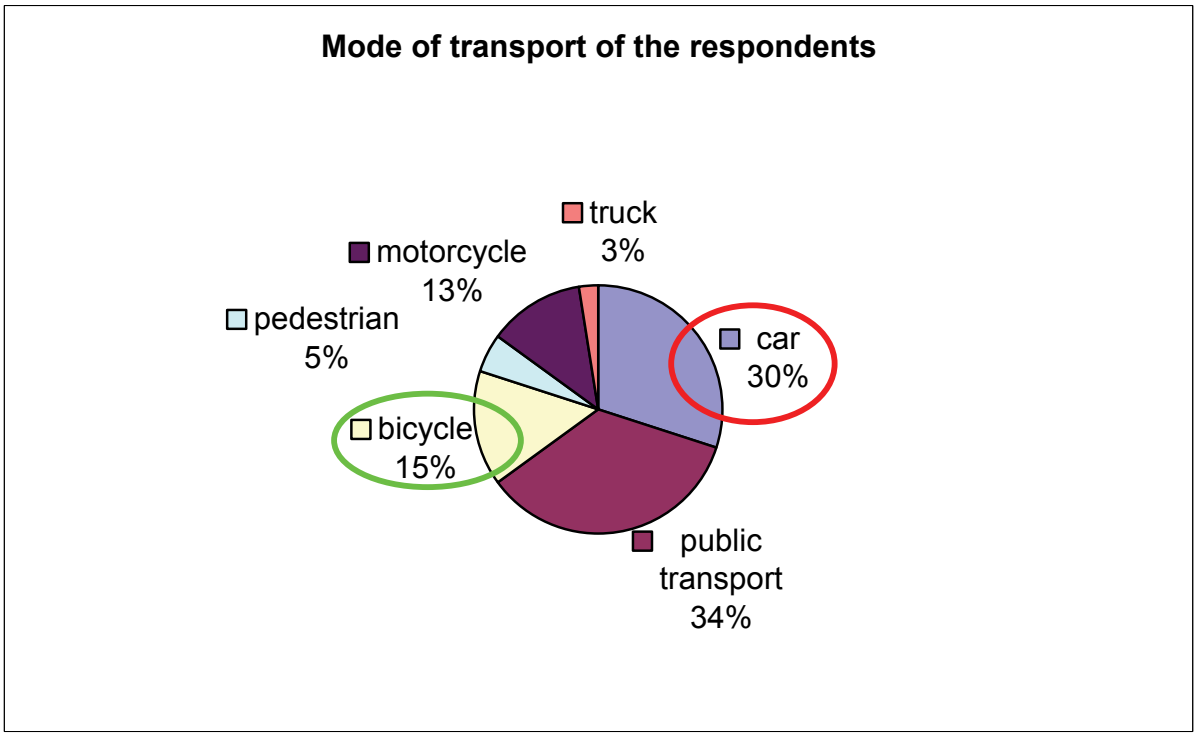

Figure 42: Modes of transport

Notice that the share of respondents who uses bicycle is already 15%, a good number (compared to the 8% in Stockholm, for example). The high number of car users (30%) and the motorcycle users (13%) are the targets to the bicycle-sharing program.

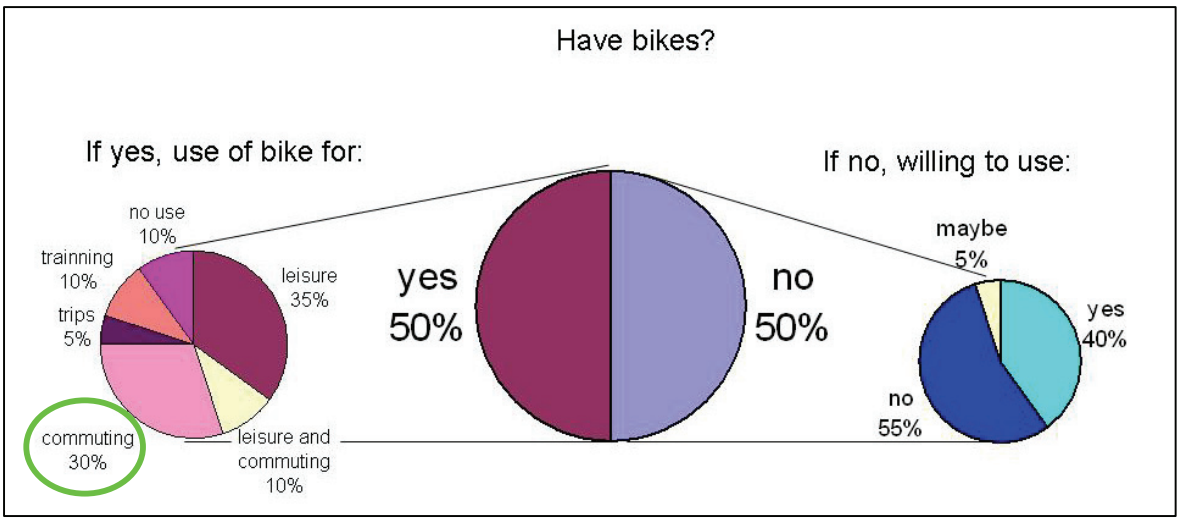

Figure 43: Ownership of bicycles, use and willing to use

Half of the respondents have a bicycle, and of these, 30% use it to commute. About 55% of the respondents do not have bicycles and this is the group most interesting target for the bicycle-sharing program.

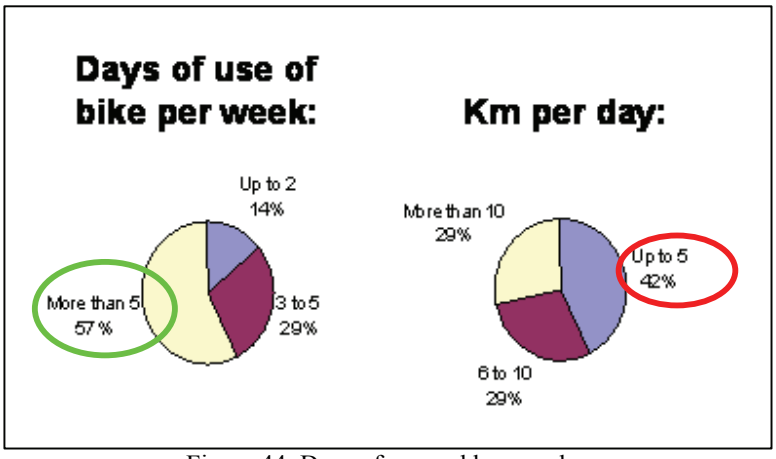

Figure 44: Days of use and km per day

The respondents that use a bicycle use it intensively, 57% use bicycle more than 5 days a week. This also supports the fact that many use the bicycle for commuting.

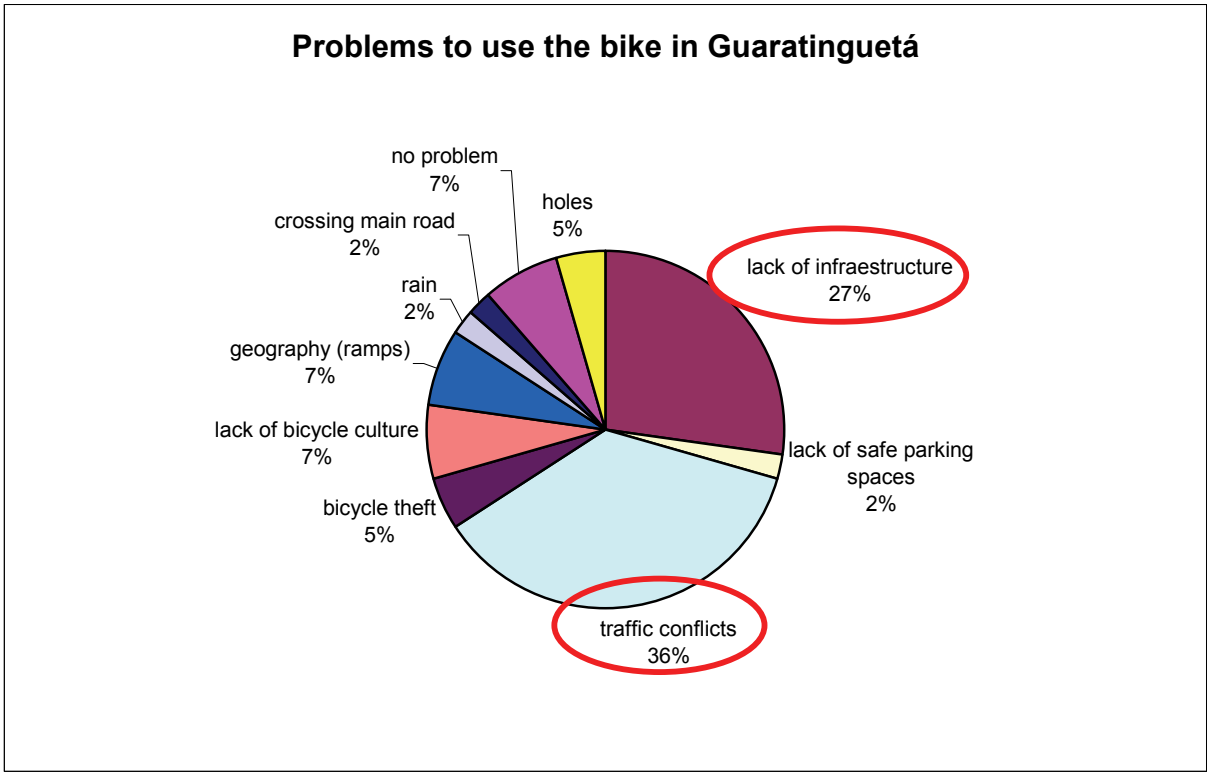

Figure 45: Problems to use bicycles

The main problems to the respondents are conflicts with the motorized traffic and the lack of infrastructure. These results are similar to that in the research made in Florianópolis (Bicicleta Brasil, 2007). In the case of Guaratinguetá, the problem with lack of infrastructure is even higher. The numbers are very different compared to the Swedish questionnaire where about 60% had no problems using the bicycle.

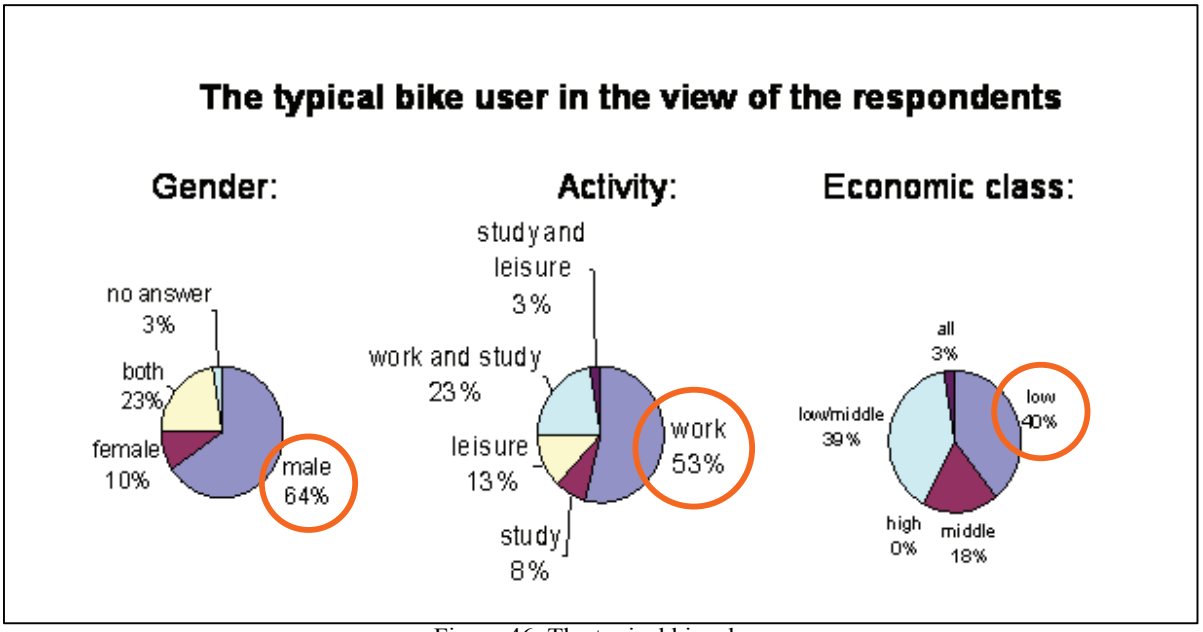

Figure 46: The typical bicycle user

This question shows the perception of the respondents on who is the typical bicycle user in Guaratinguetá and according to this it is a male, from the lower class who is working. This stereotype is very strong and has a strong impact on the use of bicycles in Brazilian cities.

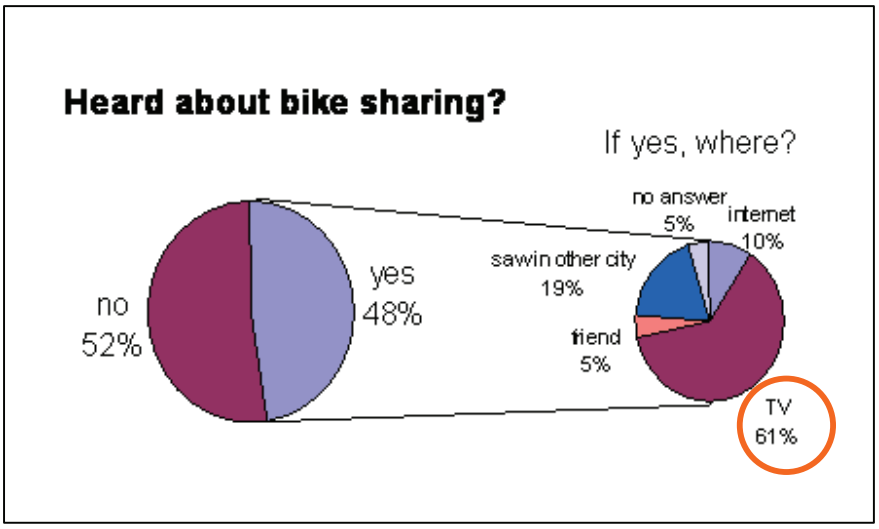

Figure 47: Knowledge about bicycle sharing

This graphic shows the influence of the television among the population in Brazil. This shows that any campaign to increase the bicycle use should be on television, if possible.

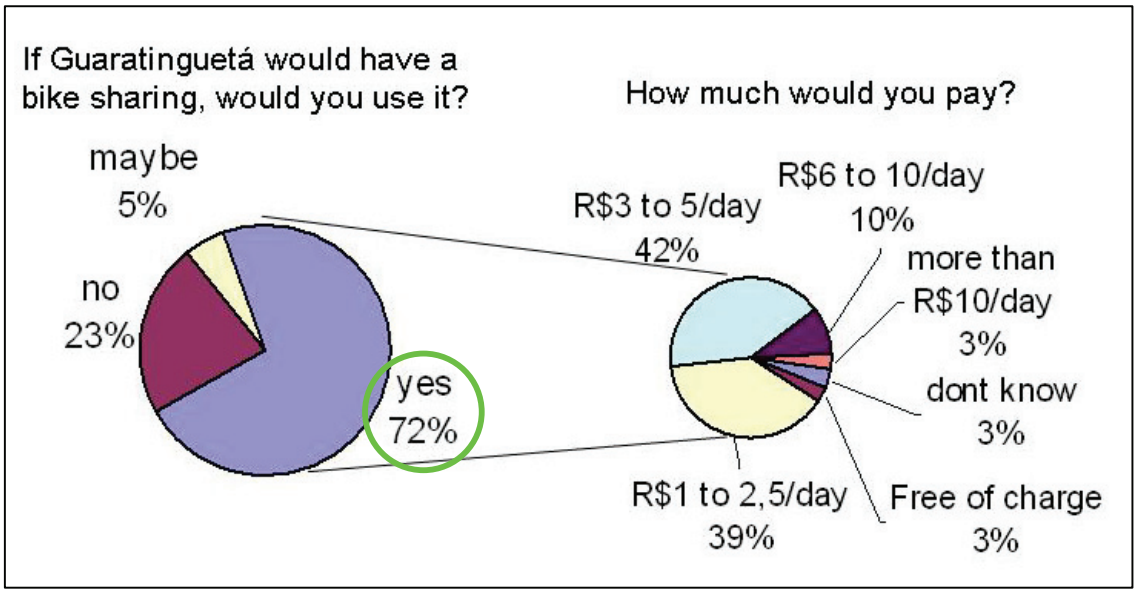

Figure 48: Willing to use bicycle sharing

The willingness to use bicycles in a bicycle-sharing program is very high, 72%. Among the majority of respondents who would or maybe would use the program, the price suggested is between one and five reais. One bus trip costs 2.2 reais. The price in the proposed model must therefore be less than 4.4 reais for a day of use, which correspond to a return trip by bus. The price will be discussed in chapter 3 below.

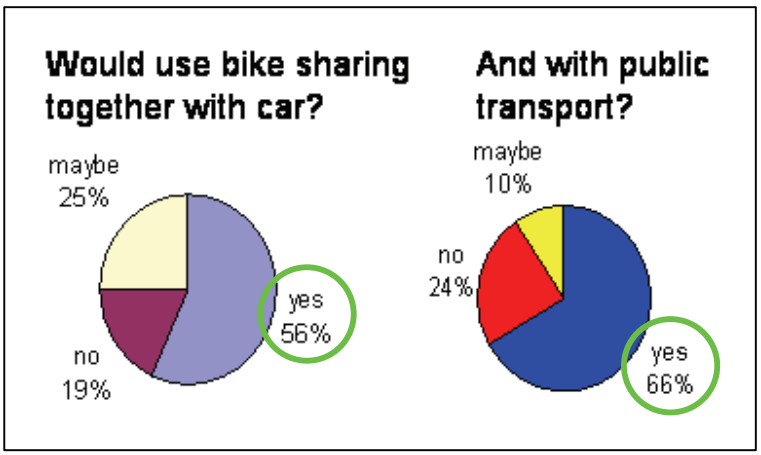

Figure 49: intermodal transport

The willingness to use the bicycle sharing is good among the users of cars, and even higher among the users of collective traffic. These numbers show the potential of a bicycle-sharing program in this city. It also suggests that even car users, which are looked upon as people reluctant to these types of changes by the municipal, might be interested in trying a new type of transportation mode.

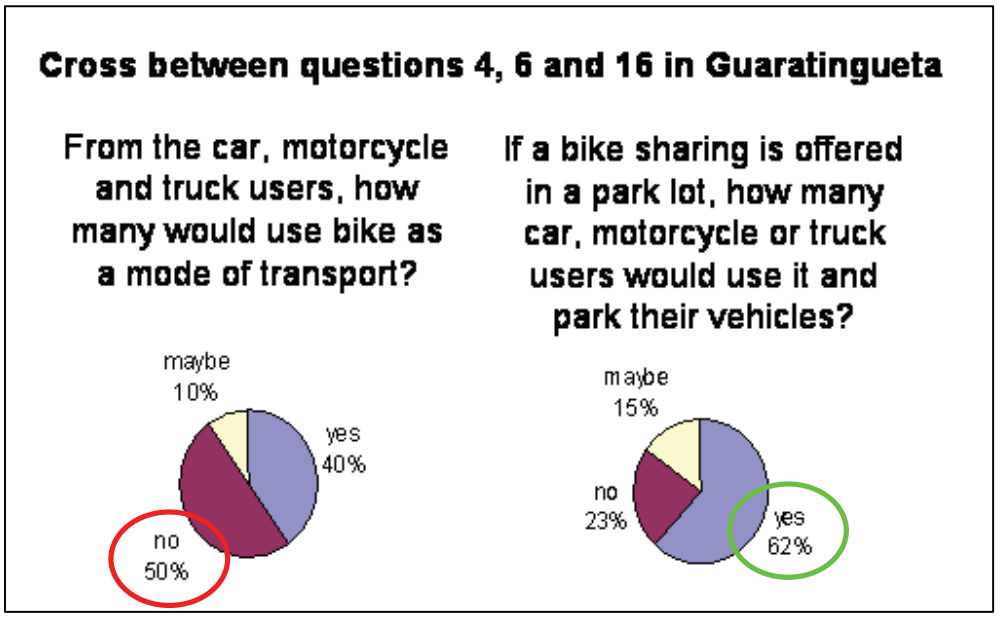

Figure 50: Resistance to use bicycles and willing to use bicycle sharing

When crossing the results of the questions 4, 6 and 16, we can notice that there is a resistance to use a bicycle as a mode of transport among the users of motorized vehicles. However, if bicycle sharing is offered the willing to use bicycles increases up to 77%, and the resistance drops from 50% to only 23%. The bicycles in a sharing program can therefore be one solution to change the paradigm against bicycles.

Chapter 3: Proposal of a bicycle-sharing program for Brazilian median cities

The situation is not favorable to bicycle transportation in most of the Brazilian cities, which has been described above. It can be described as a vicious circle, where the low status of bicycle transportation stops the investment in new bicycle facilities, and the non-existence of these facilities impedes the growing of the bicycle use. The bicycle sharing can be an exogenous element to help changing this paradigm. The introduction of such program in locations where the bicycle is looked upon as a vehicle for the poor can act as a cultural driving force. If the upper social classes use the bicycles, it will increase the pressure on the local authority to develop more bicycle infrastructure. It can create a virtuous circle that will lead to a necessary shift from individual motorized vehicles to bicycles. The result of the questionnaire with the population in Guaratinguetá shows that even the car users see the positive sides and are open for a bicycle-sharing program.

The actual political scenario in Brazil is favorable to the implementation of projects that decreases green house gases emissions, traffic congestions and the use of non-renewable energy sources. One example is the National Policy of Sustainable Urban Mobility, a project that was implemented in November 2004 by the Brazilian government (PNMUS, 2007). The aim with the project is to encourage a more sustainable transportation. This program has a specific budget for projects concerning non-motorized transport (including bicycles). Therefore, it would be important to analyze the economic appraisal of the proposal of a bicycle-sharing project and the possibility of using funds as for example from this governmental program in the implementation of the program.

Model proposed

The model is designed for Guaratinguetá, in São Paulo State, Brazil, since this is the city chosen for analysis.

First, it is necessary to decide the number of stations and bicycles needed, and stipulate the standard length of a trip. The next diagram shows the flux of internal trips in this city (see figure 51 below). The main traffic is between the following zones:

- Pedregulho and City Center
- Jardim do Vale and City Center
- Santa Rita (Frei Galvão Hospital) and City Center
- Vila Paraíba and Nova Guará and City Center
- Campo do Galvão and City Center

Since the main traffic flows are between the City Center and the areas around it, the stations will be divided in two groups: the central stations and the stations in areas called “dormitories”, where the habitants live. As also suggested by Sundman from the Stockholm program, it is better to start a new program from the city center and to have a one to one ratio between central and peripheral areas.

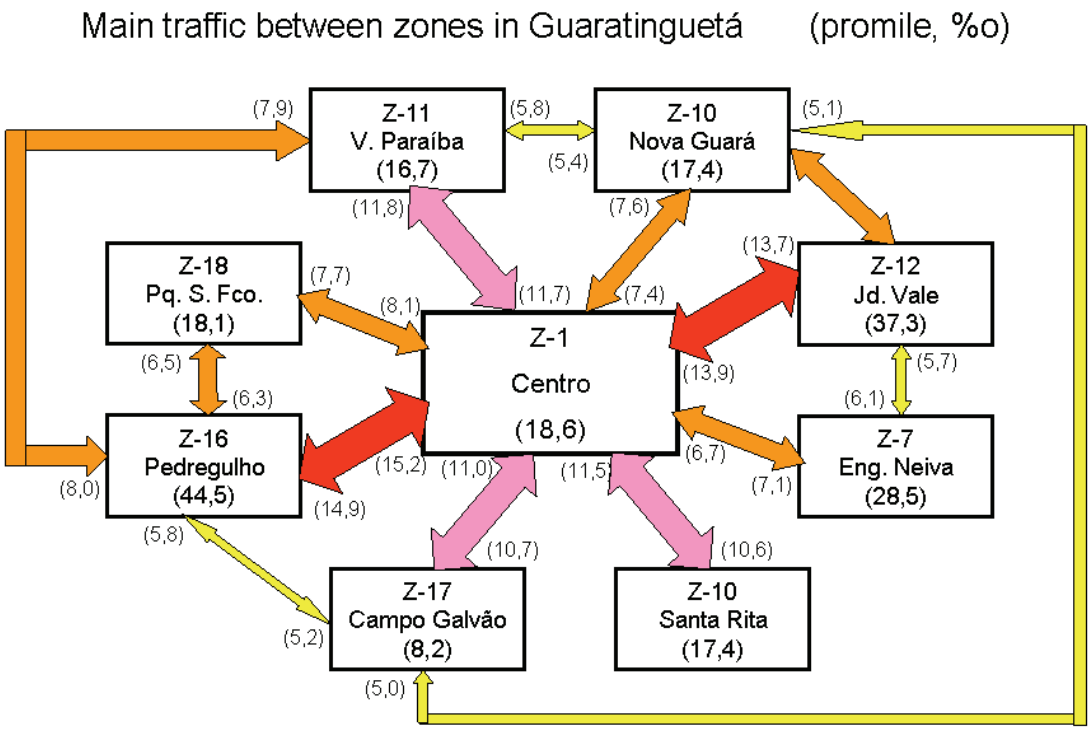

Figure 51: Traffic between zones in Guaratinguetá (BATISTA JR and SENNE, 2006)

To be able to offer bicycles in areas where the main traffic are located, this proposal suggests the use of eight stations, four in “dormitory” areas and four in central areas. These numbers are based on the index of stations in Stockholm (see calculation of the number of stations below). The map below (figure 52) shows the localization of the stations.

Number of stations

To calculate the number of stations we have as parameters two other programs, in Stockholm and the proposed program in Brasilia:

Stockholm index: 66 stations / population = 0.00008 stations per habitant
Brasilia index: 50 stations / population = 0.00002 stations per habitant

- Using Brasilia´s index: 0.00002 x 100,000 = 2 stations
- Using Stockholm´s index: 0.00008 x 100,000 = **8 stations**

The index used in Stockholm was chosen for this proposal because the index in Brasilia would suggest an unrealistically low number of stations. According to the Stockholm index, the number of stations for the program is eight.

Localization of the stations

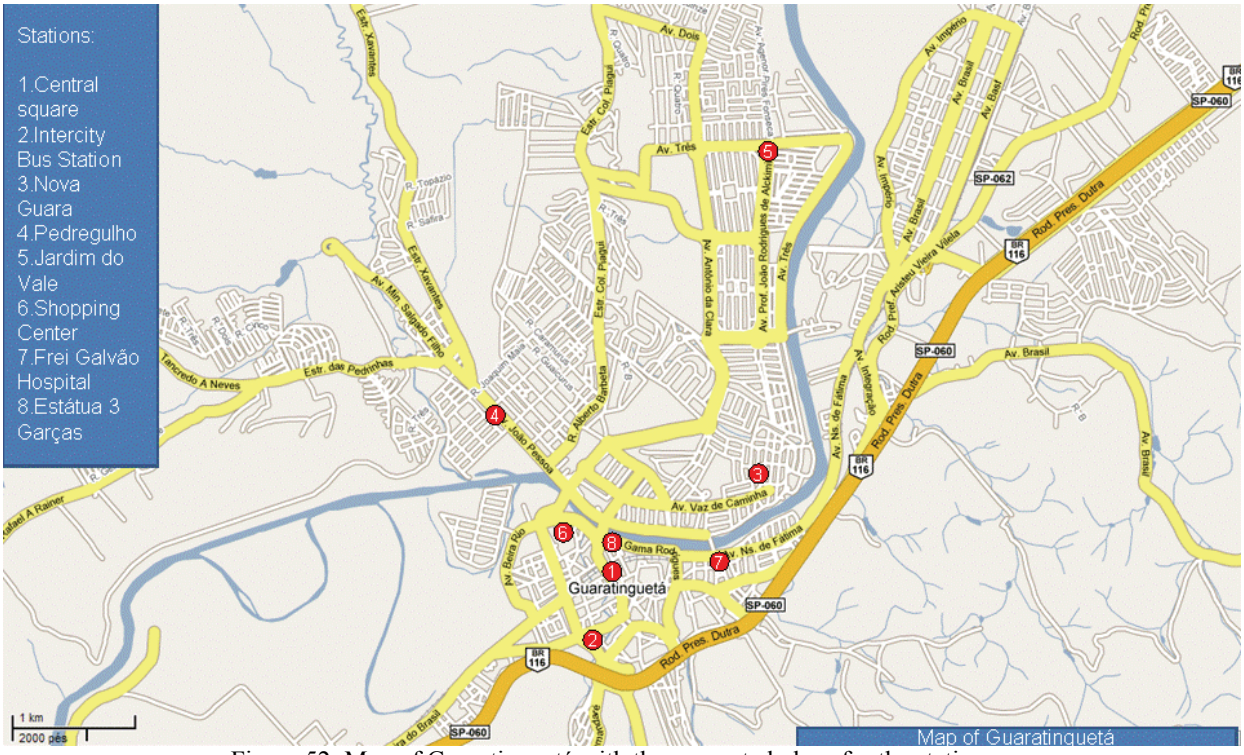

Figure 52: Map of Guaratinguetá with the suggested place for the stations

The stations number 3, 4 and 5 are mainly located in "dormitory" regions, the regions where most of the trips in the morning peak time will start. The station number 2 is considered dormitory as well because it is located in the inter-municipal bus station. The station 1, 6, 7 and 8 are central, and are the stations that receive the traffic from the peripheral "dormitory" stations. The reason behind the placement of the stations is related to the objective of the project, which is to make the shared bicycles available to car users. The city center of Guaratinguetá has a problem with traffic, with narrow and old streets. The bicycles should persuade the car drivers to leave their cars home or park it outside the city center, and take a bicycle instead.

The standard trip

The costs of the service to the users should be cheap but not free (all that is free is seen as having a low value in the Brazilian culture). The distance of a standard trip is considered to be up to 6 km, which is the distance between the most distant station to the city center (Jardim do Vale station, number 5). This distance can be cycled in half an hour therefore a standard trip for this project will be half an hour. The fee to be paid by the users will charge periods of 30 minutes. The total amount to be charged should follow a gradually increased overhead, according to the follow schema:

- First ½ hour = standard fee
- 30 to 60 minutes = standard fee + 10%

- 1 hour to 1 ½ hour = standard fee + 20%
- 1 ½ hour to 2 hours = standard fee + 40%
- 2 hours to 2 ½ hours = standard fee + 60%
- 2 ½ hours to 3 hours = standard fee + 80%
- 3 hours or more = standard fee + 100% (charged every ½ hour)

Number of bicycles

To calculate the number of bicycles we also used as parameters the Stockholm program and the proposed program in Brasilia:

Brasilia: 2.5MM inhabitants and 50 stations x 15 bicycles per station (average) = 750 bicycles = 0.0003 bicycle per habitant
Stockholm: 800,000 inhabitants and 800 bicycles = 0.001 bicycle per habitant

- Using Brasilia's index we have: 0.0003 x 100,000 = 30 bicycles
- Using Stockholm's index we have: 0.001 x 100,000 = **100 bicycles**

Again, the Stockholm index will be considered more appropriate for this proposal. The number of bicycles in this proposal is therefore 100 bicycles. The number of stations is eight and 12.5 is the average of bicycles per station. However, 20 bicycles should be placed in each "dormitory" station during the night and 5 on each central station. There will be more bicycles available in the "dormitory" areas during the peak morning time, because this is when people go to the center. As Sundman, at Clear Channel pointed out, it is important to plan the amount of bicycles according to the probable use.

Type of station

In this proposal, each station will have a staff to take care of the bicycles and attend the users. The stations will be locked during the night. This can prevent vandalism and theft. The stations should be built with local expertise. One example is from the program in São Paulo (see figure 53 below). The option for the proposal is the adoption of second hand adapted containers as stations.

Figure 53: The station in São Paulo

Model of bicycle

The bicycle should be an 18 gears standard adult bicycle, which is the common model in the Brazilian market. One of the goals of the proposed program is to bring changes in the local population perception on bicycle usage, is important to encourage children to use the bicycles. Therefore, a number of bicycles in the program should be for kids. Additionally, the adult bicycles should have a seat for baby as an option.

Characteristics of the system

The stations will not handle money. The users have to go to a place in the municipality to do the registration in the program, to leave a deposit as a guarantee in case of the bicycle disappears, and to buy the smart card necessary to use the system.

The system uses a validator, the same as used in buses (see figure 54 below). The validator reads the smart card of the user and debits the price of one trip. The standard suggested trip is ½ hour, to incentive the user not to keep the bicycle longer than necessary.

Figure 54: Ticket validator (available at FLEXUS, 2009)

Financial appraisal

Following is an example of a financial appraisal to the proposed bicycle-sharing program. All values are covered, such as the implementation of the project, the monthly costs, the income from advertising, and the calculation of the user fees.

Implementation costs (Capital Expenditure)

- Used container = 3,000 reais + 2,000 reais for adaptation, illumination, etc = 5,000 reais, times 8 stations = **40,000 reais**
- Validator for the smart card: 3,000 reais times 8 = **24,000 reais**
- 2 machines for recharges of the smart cards: **6,000 reais**
- Radio Communication between stations and manager (the same model as Nextel): 170 reais x 9 (8 stations + manager) = **1,530 reais**
- Air pump / air compressor = 500 reais x 8 = **4,000 reais**
- Tool kit for bicycle = 200 reais x 8 = **1,600 reais**
- Laptop to the manager = **1,200 reais**
- Extra (table, chair, illumination, lockers, etc) - An extra amount of 300 reais per station for general surplus times 8 stations = **2,400 reais**

- Price of a bicycle in Brazil: 18 gears standard adult bicycle: 200 reais = x 100 bicycles = **20,000 reais**

- 100 lockers x 10 reais = **1,000 reais**

- Support Vehicle:

  1 electrical vehicle to go around and help the stations: 57,500 reais
  Or
  Price of the cheapest new hybrid (gasoline/ethanol) vehicle in Brazil:
  22,560 reais
  Or
  Price of a new motorcycle:
  6,000 reais

- Price of a trailer to carry bicycles: 2,000 reais

- **Total motorcycle + trailer: 8,000 reais**

Total (Considering the cheapest option for the staff's vehicle): **109,730 reais**

Figure 55: A cheap option to the staff's vehicle (available at RODOMOTOS, 2009)

Monthly expenses (Operational Expenditure)

- Staff
  Minimum wage in Brazil: 465 reais
  2 shifts (morning and afternoon) = **16 employees** (half period: 1st period from 7am to 1pm, 2nd period from 1pm to 7pm)
- 16 x 465 = 7,440 reais per month plus 100% tax = **14,880 reais/month*13,3 (13 salaries and additional for vacation) = 197,904 reais/year**

- General Manager: 1,000 reais per month plus 100% tax =**2,000 reais/month *13,3 (13 salaries and additional for vacation) = 26,600 reais/year**

- General expenses: (electricity, cleaning, etc): 50 reais x 8 = **400 reais/month**
- Bicycle maintenance: 20 reais per bicycle x 100 = **2,000 reais/month**
- Communication: 84 reais per month x 9 (including manager) = **756 reais/month**
- Fuel: 2,000 Km per month, 10 Km/l = 200 liters, 1.5 reais/liter x 200 = **300 reais/month**
- Maintenance of support vehicle: **100 reais/month**

Total for Monthly expenses = 20,436 reais / month or 267,176 reais/year

Advertising income

The stations and the bicycles should have advertising spaces, which can bring an additional income to the project. In the case of Stockholm, it is the main income of the project but all programs contacted have advertising as a mean of income. In a Brazilian median city, the price of local advertising is the following:

- The average price of a big outdoor publicity per month is 1,800 reais;
- The price for a small outdoor is around 500 reais /month.

The stations could have a big billboard over its roof, and two small plates on its sides. The total income per station could then be 1,800 + 500 + 500 reais = 2,800 reais per station
Times 8 stations = **22,400 reais / month**

Additionally the bicycles can also have places for advertising.

Number of trips per month

If 80 trips are made per day from the "origin" station to the city center, plus 80 trips for return we have a total of 160 trips + 32 trips during the day in the "origin" station + 32 trips in the central station:
Total 232 trips per day
times 20 days (only considering business days) = 4640 trips

The system can work also on Saturdays, with 40 trips in the "origin" stations and 40 in the central station: 80 trips per Saturday x 4 Saturdays per month = 320 trips

Total: 4,640 + 320 = **4,960 trips per month**

Summary of the financial appraisal

Assumptions	
System	
Stations Qty	8
Central Stations	4
Peripheral Stations	4
Bike Qty	100
Financial	
TMA	20%
Equity/(Equity+Debt)	50%
Debt Interest Rate (BNDES)	8%
Period (years)	5

Table 6: Assumptions for the calculation

Notes:
- TMA stands for "Taxa Mínima de Atratividade", or Minimum attractiveness rate. It is the rate the investor wants over its own capital, to do the business. It is high in this case because it is a new concept, which means high risks.
- Equity stands for own capital, and Debt for loans. The relation between the Equity and the total capital, Equity / (Equity + Debt), is called capital structure. In this project it is possible to think in Debt around 90% from a governmental organization as the Brazilian Development Bank (BNDES) or the World Bank, and 10% of Equity.

Income (R$ x $10^{3)}$

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Income	**316,6**	**317,0**	**317,5**	**318,0**	**318,5**	**319,0**	**319,5**	**320,0**	**320,5**	**321,0**
Bike Rental	47,8	48,2	48,7	49,2	49,7	50,2	50,7	51,2	51,7	52,2
Advertising	268,8	268,8	268,8	268,8	268,8	268,8	268,8	268,8	268,8	268,8

Advertising		
Large Billboard	1	1,8
Small Plate	2	0,5
Total		**22,4**

Bike Rental Price	R$ 0,80
Annual Growth	1%

O/D working days

Station	1	2	3	4	5	6	7	8	Total
1	0	5	5	5	5	3	3	3	**29**
2	5	0	3	3	3	5	5	5	**29**
3	5	3	0	3	3	5	5	5	**29**
4	5	3	3	0	3	5	5	5	**29**
5	5	3	3	3	0	5	5	5	**29**
6	3	5	5	5	5	0	3	3	**29**
7	3	5	5	5	5	3	0	3	**29**
8	3	5	5	5	5	3	3	0	**29**
Total	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**232**

Working days per month 20 Total 4640

O/D weekend **Total 4960**

Station	1	2	3	4	5	6	7	8	Total
1	0	3	3	3	3	0	0	0	**12**
2	3	0	0	0	0	2	2	3	**10**
3	3	0	0	0	0	2	2	3	**10**
4	3	0	0	0	0	2	2	3	**10**
5	3	0	0	0	0	2	2	3	**10**
6	0	2	2	2	2	0	0	0	**8**
7	0	2	2	2	2	0	0	0	**8**
8	0	3	3	3	3	0	0	0	**12**
Total	**12**	**10**	**10**	**10**	**10**	**8**	**8**	**12**	**80**

Weekend days per month 4 Total 320

Table 7: Incomes of the project

Note: The bicycle rental price equal to 0.80 reais is the necessary value to make the Net Present Value equal to zero (see the cash flow, table 10 below). All values above this make the cash flow positive and all values below this make it negative.

Capital Expenditure (R$ x 10^{3})										
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Capital expenditure	(109,7)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Container (used)	24,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Adaptation (ilumination, etc.)	16,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Validator for the smart card	24,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Machines for recharges of the smart cards	6,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Radio Communication between stations and manager	1,5	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Air pump / air compressor	4,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Tool kit for bicycle	1,6	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Laptop to the manager	1,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Extra (table, chair, illumination, lockers, etc)	2,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
18 Gears standard adult bike	20,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Lockers	1,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Vehicle to go around and help the stations	8,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Table 8: Capital Expenditure for the project (all capital to be expend in the first year for the implementation)

Operational Expenditure (R$ x 10^{3})											
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Operational Expenditure		(267,2)	(267,2)	(267,2)	(267,2)	(267,2)	(267,2)	(267,2)	(267,2)	(267,2)	(267,2)
Labour		224,5	224,5	224,5	224,5	224,5	224,5	224,5	224,5	224,5	224,5
General Expenses	0,05	4,8	4,8	4,8	4,8	4,8	4,8	4,8	4,8	4,8	4,8
Bike maintenance	0,02	24,0	24,0	24,0	24,0	24,0	24,0	24,0	24,0	24,0	24,0
Communication	0,08	9,1	9,1	9,1	9,1	9,1	9,1	9,1	9,1	9,1	9,1
Ethanol		3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6
Maintenance of support vehicle	0,10	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
Staff											
Minimum wage in Brazil	0,465										
Shifts	2										
Stations	8										
Tax	100%										
Total	**14,88**										
General Manager											
Wage	1										
Shifts	1										
Tax	100%										
Total	**2**										
Ethanol											
Km per month	2000										
Consumption (km/l)	10										
Ethanol Price (R$/l)	1,5										
Total	**0,3**										
Rent											
Variable cost per rent	0,40	(maintenance cost per rent)									

Table 9: Operational Expenditure for the project, in a yearly basis

CASH FLOW (R$ x $10^{3)}$						
Statment of Income		**2010**	**2011**	**2012**	**2013**	**2014**
Gross Revenue		**316,6**	**317,0**	**317,5**	**318,0**	**318,5**
Bicycle Rental		47,8	48,2	48,7	49,2	49,7
Propaganda		268,8	268,8	268,8	268,8	268,8
Deductions from Gross		**(15,8)**	**(15,9)**	**(15,9)**	**(15,9)**	**(15,9)**
ISSQN (Municipal Tax)	5%	(15,8)	(15,9)	(15,9)	(15,9)	(15,9)
Net Revenue		**300,7**	**301,2**	**301,6**	**302,1**	**302,6**
cost of Services		**(248,5)**	**(248,5)**	**(248,5)**	**(248,5)**	**(248,5)**
Variable Costs		(24,0)	(24,0)	(24,0)	(24,0)	(24,0)
Fixed costs		(224,5)	(224,5)	(224,5)	(224,5)	(224,5)
Gross Profit		**52,2**	**52,7**	**53,1**	**53,6**	**54,1**
Operational Expenditure		**(18,7)**	**(46,1)**	**(46,1)**	**(46,1)**	**(46,1)**
General and administrative		(18,7)	(18,7)	(18,7)	(18,7)	(18,7)
Depreciation and amortization	25%	0,0	(27,4)	(27,4)	(27,4)	(27,4)
Other revenue/Expenditure		**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
operating profit		**33,5**	**6,6**	**7,0**	**7,5**	**8,0**
IRPJ (Income Tax)	25%	**(8,4)**	**(1,6)**	**(1,8)**	**(1,9)**	**(2,0)**
CSLL (Tax over profit)	9%	**(3,0)**	**(0,6)**	**(0,6)**	**(0,7)**	**(0,7)**
Net Profit		**22,1**	**4,3**	**4,6**	**4,9**	**5,3**
Return Depreciation		0	27	27	27	27
TOTAL Investiment		(110)	0	0	0	0
Change in Working Capital		20	0	0	0	(20)
Free cash flow to the business		**(108)**	**32**	**32**	**32**	**53**
Loan taked		55	0	0	0	0
Interest payment	8%	0	(4)	(3)	(2)	(1)
Loan´s tax benefit		0	1	1	1	0
Loan Amortization		0	(12)	(13)	(14)	(15)
Free cash flow to the investor		**(53)**	**17**	**17**	**17**	**37**
Net Present Value (R$ x 10^3)		**0**				

Table 10: Cash Flow of the project

The cash flow considers all the premises, incomes, the operational expenditure and the capital expenditure. The minimum value to be charged as user's fee is 0.80 reais, for the project reaches its balance (no negative value). An increase in the value of the user fee will be as profit for the company that is operating the system.
Therefore, these are the numbers for the project:

- Implementation costs (Capital Expenditure): 109,730 reais
- Monthly expenses (Operational Expenditure): 20,436 reais / month
- Income with Advertising: 22,400 reais / month
- Income with user's fee: 4,960 trips per month x 0.80 per trip = 3,968 reais / month

Conclusion

The proposal drawn up from this analysis is a simple and inexpensive in comparison with other bicycle-sharing programs or other proposals. This the most important points of this proposal since it make bicycle sharing accessible to local governments with a tight budget. The proposal is about old technology, i.e. the bicycle, and a simple idea: to make bicycle available to the population in public places. This proposal is not based on the latest technologies, such as online and automatic stations, bicycle with microchips, etc, as it is in most of the European programs. However, the simplicity is not a negative point of this proposal. Making the program simple and cheap increases the chance of its success. Moreover, using staff in the stations instead of making it automatic creates many job opportunities, and can offer services such air pumps, reparation of holes in the tires, etc. The staff also helps to avoid the possible problems of vandalism and theft.

The bicycle-sharing program proposed can help to change the low status connected to the use of bicycles as a mode of transport. One of the goals of the program is that users of motorized modes of transport can instead use the bicycles. To help achieve this goal, educational and promotional campaigns should focus on the benefits of using bicycles. Another goal is to promote the use of bicycles by children since this is important for a more long term change of attitudes.

The bicycle-sharing program could also be of importance for tourism. Guaratinguetá is a city with religious tourism and ecotourism and the shared bicycles can be used for touristic trips. It is also possible to imagine a guide bringing the tourists by bicycle to different sites. The exploration of tourism using the shared bicycles can of interest if the municipality decides that a private company should organize the program.

This proposal will be presented to municipalities in Brazil. If the proposal would become reality it would be interesting to study the result, in order to improve the proposal. An interesting point of future study is to measure how many of the bicycle trips are made by persons who would formerly have used a car.

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Internet Links

Brazilian bicycle associations and bicycle forums:
http://www.pedalabrasil.com
http://www.escoladebicicleta.com.br/
http://uniaodeciclistas.org.br/
http://www.paradavital.org.br/
http://www.bicicletada.org
http://www.apocalipsemotorizado.net
http://www.bicicletalivre.unb.br
http://ctsbrasil.org/node/171
http://portal1.antp.net/site/Eventos/FichaTec.aspx?AspXPage=g%5F978765F1B31349698BAD3316A8B1F2B2:%2540Title%3DSMNNCTCCLVR090618

Cycling in Stockholm:
http://www.stockholm.se/cykling

Interface for cycling expertise: http://www.cycling.nl/

Bicycle network in Latin America: http://www.sustranlac.org/

Cycling Academic Network:
http://www.vvr.ctw.utwente.nl/en/PhD%20-%20students/PhD%20projects/CAN/index.html

Niches – sustainable transport: http://www.niches-transport.org/

PACS (Project on Physical Active Commuting in Greater Stockholm):
http://www.gih.se/templates/ihsNormalPage.aspx?id=1361

Active transport (in portuguese): http://www.ta.org.br/site/index.htm

Folding electrical bicycle:
http://www.epluselectricbike.com/TidalForce_M750_x2pt0_Electric_Bike_Features.asp

2010 Sustainable Transport Award: http://itdp.org/index.php/sustainable_transport_award/

Bicycle sharing in Internet social networks:
http://wiki.couchsurfing.com/en/Milan#Milan_CS_bike_sharing_project
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Annex 1 - Case Study Protocol

A) Identification of the following concepts:

Bicycle sharing, sustainable transportation, multi-modal transportation system

B) Sources:

1) Stockholm Bicycle-sharing program manager (semi-structured interviews *in loco*);
2) Managers from other cities with bicycle sharing (structured questionnaire via *e-mail*);
3) Users of the Stockholm Bicycle-sharing program (structured questionnaire *in loco*);
4) Questionnaire with the population of a Brazilian city (structured questionnaire *in loco*);
5) Interview with the local transport authority of a Brazilian city (semi-structured interviews *in loco*);

The interview with the managers of the program in Stockholm (item 1) will be compared with the results from the questionnaire with managers of programs in other cities (item 2) and the interview with the local authority of the Brazilian city (item 5).
The questionnaire with the users of the Stockholm program (item 3) will be compared with the questionnaire with the population of a Brazilian city (item 4).

C) Interviews and questionnaires:

1) **Interview schema for the semi-structured interview with the Stockholm Bicycle-sharing program manager (interviews *in loco*):**

Identification questions:
Name:_____
Age:_____
Main Duties (Function):_____

General questions

What is your opinion about the role of bicycles in the transportation systems of cities?
-What are the biggest barriers to bicycle use in Stockholm?

Can the bicycle-sharing program be considered successful?
-How is the present impact of the program in the local transportation system?

How is the expected impact of the bicycle-sharing program in the future?
-Is there a plan for increasing the program?

What are the 3 most important purposes of the bicycle-sharing program in Stockholm?

Do you commute by bicycle?

Financial and contract questions

What was the cost to establish the bicycle-sharing program?

A previous study about the financial-economical feasibility of the project was made?

Is the bicycle-sharing program in Stockholm economically sustainable?

How is the program financially structured?

-What are the sources of income of the program? (User's fees, advertising in bicycles, advertising in stations, sponsorship, public investment, etc)

- What was the investment from the city of Stockholm in the program?

-Do the user's fees cover the operational costs?

How are the main terms of the contract with the Clear Channel? (Advertising, Share of the revenue, Responsibility for the maintenance, etc)

How the Program works

What is the number of stolen/vandalized bicycles per month?

What is the influence/control of Clear Channel on the program?

-Can they decide where to put the stations, for instance?

What are the figures of the program? Employees, Trips per month, Users, etc.
-800 bicycles
-66 stations

How is the bicycle-sharing program advertising to the public?

How is the bicycle-sharing program integrated with other modes of transport?

Thank you very much!

2) **Structured questionnaire to the manager of programs in other cities:**

Royal Institute of Technology – KTH

Stockholm – Sweden

Research about Bicycle-Sharing Programs

Dear sir/ms,

We kindly ask you to answer the following questionnaire about the bicycle-sharing program in your city. This is part of a master degree research in the Royal Institute of Technology – KTH, about the role of bicycles in the transportation systems of cities.

It will take approximately 3 minutes and you can answer directly in the body of this email, or you can use the word document attached if you prefer.

Thank you very much for your participation!

Kind regards,

Edgard Antunes Dias Batista - eadb@kth.se

Sustainable Technology Program - Royal Institute of Technology - KTH

Name and country of your city:_____

You duties/function in the municipality or bicycle-sharing program:_____

Which is the business model of the bicycle-sharing program?

( ) Public-Private Partnership
( ) Public
( ) Private
( ) Other (Please specify): _____

Do the user's fees cover the operational costs?

( ) The program is free of charge
( ) Less than 10%
( ) Between 10% and 50%
( ) Between 50% and 75%
( ) Between 75% and 100%
( ) More than 100% (the program is profitable)

Is there any other source of income?

( ) Advertising in the bicycles
( ) Advertising in the bicycle stations
( ) Other (Please specify): _____

What is the figures of the bicycle-sharing program in your city?
Number of bicycles:
Number of stations:
Employees:
Trips per month:
Others:_____

What is the approximated number of stolen/vandalized bicycles per month? _____

How is the bicycle-sharing program advertised to the population?
( ) Internet - Webpage (Please give us the address):_____
( ) Radio
( ) TV
( ) Newspaper
( ) Specialized publication
( ) Other (Please specify): _____

How is the bicycle infrastructure in your city?
( ) Bicycle lane (shared with motorized traffic) (If possible, specify how many Km):_____
( ) Bicycle path (segregated from motorized traffic) Km:_____
( ) Bicycle/pedestrian lane (shared sidewalk) Km:_____
( ) Cycle Route (planned route containing one of more items from above) Km:_____
( ) Assisted bicycle-parking facilities – Approximately how many:
( ) Unassisted bicycle parking facilities - Approximately how many:
( ) Other (Please specify): _____

What is the approximated transportation modal share in your city?
Bicycle:_____%
Cars:_____%
Public transport:_____%
Pedestrian:_____%
Others: _____% (Please specify):_____

Please chose one or more barriers to the bicycle utilization in your city?
( ) Cultural
( ) Economical
( ) Lack of structure
( ) Lack of political interest
( ) Lack of interest of the population
( ) Other (Please specify): _____
What is the importance of the bicycle-sharing program in the transportation system of your city?

( ) No importance
( ) Low importance
( ) Medium importance
( ) High importance
( ) Fundamental

What is your opinion about the importance of bicycle in the future of the transportation in your city?

( ) Lower importance than today
( ) The same importance than today
( ) Higher importance than today

Do you commute by bicycle?

( ) never
( ) eventually
( ) frequently
( ) always

Please attach all relevant information available about the bicycle-sharing program and the non-motorized transportation in your city.

Use the space below for your considerations if necessary:

Thank you very much!

Edgard Antunes Dias Batista - eadb@kth.se

Royal Institute of Technology - KTH - www.kth.se

3) **Structured questionnaire for the Interviews with the users of the Stockholm Bicycle-sharing program (questionnaires *in loco*):**

Sampling method: random
Criteria: All users that pick the bicycles in the station between a determined time

Royal Institute of Technology – KTH

Stockholm – Sweden

Research about Bicycle-Sharing Programs

Dear sir/ms,

We kindly ask you to answer the following questionnaire about the bicycle transportation and bicycle sharing. This is part of a master degree research in the Royal Institute of Technology – KTH. It will take approximately 1 minute.

Thank you very much for your participation!

Kind regards,

Edgard Antunes Dias Batista - eadb@kth.se

Sustainable Technology Program - Royal Institute of Technology - KTH

Your age: _____

Gender: ( ) Male ( ) Female

Your main activity: _____

Do you live in Stockholm? ( ) Yes ( ) No ( ) Tourist

Do you have a 3 days pass or season card?
( ) 3 days pass ( ) season card

How many days per week do you use the shared bicycle?
( ) one ( ) two ( ) three ( ) four ( ) five ( ) six ( ) seven

What are the purposes for your use of the shared bicycle?
( ) leisure

( ) commuting
( ) shopping
( ) travel
( ) fitness
( ) other (please specify): _____

If you commute using the shared bicycle what is the distance per day? _____ Km

Do you use the shared bicycle together with other mode of transport?
( ) no
( ) car
( ) public transport
( ) other (please specify): _____

Do you have your own bicycle?
( ) Yes ( ) No

Where did you hear about the bicycle sharing?
( ) internet
( ) TV
( ) Radio
( ) Newspaper
( ) Magazine
( ) Friend
( ) Other (Please specify): _____

What are the underlying motives for your use of the bicycle sharing?
( ) Is environmental friendly
( ) Is cheap
( ) Is fun
( ) Is convenient
( ) Is healthy
( ) other (please specify): _____

What is the main problem to use bicycles in Stockholm?
( ) Lack of infrastructure
( ) Lack of safe parking spaces
( ) Danger because of the motorized traffic
( ) Bicycle theft
( ) Lack of bicycle culture
( ) Other (Please specify):_____

What are the main negative points of the sharing program?
( ) Price
( ) Restrictive time rules (max. 3 hours per use)
( ) Low number of bicycles
( ) Low number of stations

( ) Stations often full (no space to return a bicycle)
( ) Stations often empty (no bicycles)
( ) Quality of bicycles
( ) Other (Please specify): _____

What are the main positive points of the sharing program?
( ) Price
( ) No concerns about maintenance
( ) No concerns about theft
( ) Easy to use
( ) Other (Please specify): _____

Thank you very much for your participation!

4) **Semi-Structured questionnaire with local population of a Brazilian city:**

Sampling method: random
Criteria: Pedestrians crossing a determined place in the central square of the city

Royal Institute of Technology – KTH

Stockholm – Sweden

Research about Bicycle-Sharing Programs

Dear sir/ms,

We kindly ask you to answer the following questionnaire about the bicycle transportation and bicycle sharing. This is part of a master degree research in the Royal Institute of Technology – KTH, Sweden. It will take approximately 1 minute.

Thank you very much for your participation!

Kind regards,

Edgard Antunes Dias Batista - eadb@kth.se

Sustainable Technology Program - Royal Institute of Technology - KTH

Your age:_____

Gender: ( ) Male ( ) Female

Your main activity: _____

What are you main mode of transport?
( ) car
( ) Public transport
( ) Bicycle
( ) Walking
( ) Other (Please specify): _____

Do you have bicycle?
( ) Yes ( ) No

If no, would you like to use bicycles?
( ) Yes ( ) No ( ) Maybe

If yes:

For what purposes do you use bicycle?
( ) leisure
( ) commuting
( ) shopping
( ) travel
( ) fitness
( ) other (please specify): _____

If you commute by bicycle, what is the distance per day? _____ Km

How many days per week you use a bicycle?
( ) one ( ) two ( ) three ( ) four ( ) five ( ) six ( ) seven

What are the problems to use a bicycle in your city?
( ) Lack of bicycle paths, lanes, etc
( ) Lack of parking space
( ) Traffic safety (conflict with motorized traffic)
( ) Theft of the bicycle
( ) Lack of bicycle culture
( ) other (please specify): _____

How would you describe the typical bicycle user in your city?
Gender:_____
Age:_____
Activity:_____
Economic class:_____
Reason:_____

Have you heard about bicycle sharing?
( ) Yes ( ) No

If yes, from where did you hear about bicycle sharing?
( ) internet
( ) TV
( ) Radio
( ) Newspaper
( ) Magazine
( ) Other (Please specify): _____

If there was a bicycle-sharing program in your city, would you use it?
( ) Yes ( ) No ( ) Maybe

How much would you be willing to pay to have the service of bicycle sharing?
( ) will use if free of charge
( ) up to _____

If a sharing bicycle is offered in parking stations, would you park your car and use it to avoid the traffic congestion in the centre of the city?
( ) Yes ( ) No ( ) Maybe

If a sharing bicycle is offered near bus stations and other public areas, would you use it in order to avoid the traffic congestion in the centre of the city?
( ) Yes ( ) No ( ) Maybe

Thank you very much for your participation!

(Obs. This questionnaire was translated to Portuguese)

5) **Interview schema for the semi-structured interview with the local transport authority of a Brazilian city:**

Identification questions:
Name:_____
Age:_____
Main Duties (Function):_____

General questions

What is your opinion about the role of bicycles in the transportation system in your city?

How would you describe the typical bicycle user in your city?

What are the biggest barriers to bicycle use in your city?

Do you think that the bicycle use in your city will increase in the future?

Do you use bicycle?

Questions about the city

What is the transport modal share in your city?

What is the structure for bicycle transportation in your city? (cycle lanes, paths, parking facilities, etc)

Is there a plan for increasing the structure for bicycle use?

Questions about bicycle sharing

Do you know about bicycle-sharing programs?

What type of bicycle sharing will be more suitable to your city?

Could a bicycle-sharing program help to decrease the congestion in the city center?

Could a bicycle-sharing program be integrated with other modes of transport? (e.g. available in car parking or public transportation stations)

(Obs. This interview was be translated to Portuguese)

Annex 2 – Cities with bicycle-sharing programs (Based on list available at bike-sharing.blogspot.com)

City	Country	Name of the Program	Website
Aarhus	Denmark	Aarhus Bycykel	http://www.aarhusbycykel.dk/
Aix-en-Provence	France	V'Hello	http://www.vhello.fr/
Alba	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Alcalá de Guadaira (Sevilla)	Spain	ITCL	www.itcl.es
Algeciras (Cádiz)	Spain	ITCL	www.itcl.es
Almeria	Spain	ITCL	www.itcl.es
Alpignano	Italy	Biciincomune	http://www.biciincomune.com/
Amiens	France	Velam	http://www.velam.amiens.fr/
Aschaffenburg	Germany	Next Bike	http://nextbike.de
Asti	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Auckland	New Zealand	Goodgear	http://nextbike.co.nz/
Avilés (Asturias)	Spain	ITCL	www.itcl.es
Bad Kreuznach	Germany	Next Bike	http://nextbike.de
Barcelona	Spain	Bicing	http://www.bicing.com/home/home.php
Bari	Italy	Bari in bici	http://www.bicincitta.com/default.asp
Bassano del Grappa	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Beijing	China	Beijing Bicycle Rental Company	http://www.bjbr.cn/wd/wd.htm
Bergamo	Italy	LaBiGi	http://www.bicincitta.com/default.asp
Berlin	Germany	Call a Bike	http://www.callabike-interaktiv.de
Berlin	Germany	Next Bike	http://nextbike.de
Besançon	France	Velocité	http://www.velocite.besancon.fr/
Bielefeld	Germany	Next Bike	http://nextbike.de
Biella	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Borgomanero	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Bra	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Bregenzerwald	Austria	Next Bike	http://nextbike.de
Brescia	Italy	Bicimia	http://www.bicincitta.com/default.asp
Brisbane	Australia	Cyclocity	
Brussels	Belgium	Cyclocity	
Bucareste	Romania	Cicloteque	http://www.maimultverde.ro/cicloteque
Bukit Batok	Singapore	TownBike	http://www.townbike.com.sg/
Burgos	Spain	Bicibur	http://bicibur.es/
Cádiz	Spain	ITCL	www.itcl.es
Caen	France	V'eol	http://www.veol.caen.fr/
Cameri	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Castellón	Spain	bici-CAS	http://www.bicicas.es/
Catarroja (Valencia)	Spain	ITCL	www.itcl.es
Ceutí (Murcia)	Spain	ITCL	www.itcl.es
Chalon-sur-Saône	France	Réflex	
Changwon	South Korea	Nubija	http://116.122.37.231/english/english.htm
Cheltenham	England	OYBike	http://www.oybike.com/oybike/cms.nsf/Home
Chivasso	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Coburg	Germany	Next Bike	http://nextbike.de
Collegno	Italy	Biciincomune	http://www.biciincomune.com/

Cologne	Germany	Call a Bike	www.callabike-interaktiv.de
Cologne	Germany	Next Bike	http://nextbike.de
Copenhagen	Denmark	Bycyklen	http://www.bycyklen.dk/
Córdoba	Spain	ITCL	www.itcl.es
Cospudener See	Germany	Next Bike	http://nextbike.de
Cottbus	Germany	Next Bike	http://nextbike.de
Cuneo	Italy	Bicincittà	http://www.comune.cuneo.it/ambiente/mobilita/biciclette/bicincitta_cosa.html
del Raspeig (Alicante)	Spain	ITCL	www.itcl.es
Denia (Alicante)	Spain	ITCL	www.itcl.es
Dijon	France	Velodi	http://www.velodi.fr/
Dos Hermanas (Sevilla)	Spain	ITCL	www.itcl.es
Drammen	Norway	Drammen Bysykkel	http://www.adshel.no/index2.html
Dresden	Germany	Next Bike	http://nextbike.de
Druento	Italy	Biciincomune	http://www.biciincomune.com/
Dublin	Ireland	Hourbike	https://www.hourbike.com/hourbike/
Düsseldorf	Germany	Next Bike	http://nextbike.de
del Raspeig (Alicante)	Spain	ITCL	www.itcl.es
Eisenstadt	Austria	Next Bike	http://nextbike.de
Erfurt	Germany	Next Bike	http://nextbike.de
Erlangen	Germany	Next Bike	http://nextbike.de
Farnborough	England	OYBike	http://oybike.com/
Fossano	Italy	Bicincittà	http://www.bicincitta.com/citta_v3.asp?id=13
Frankfurt / Main	Germany	Next Bike	http://nextbike.de
Frankfurt / Main	Germany	Call a Bike	http://www.callabike-interaktiv.de
Friedrichshafen	Germany	Next Bike	http://nextbike.de
Fürth	Germany	Next Bike	http://nextbike.de
Genova	Italy	Mobike	http://www.bicincitta.com/default.asp
Gijón	Spain	Gijón-Bike	
Granollers	Spain	Ambicia't	http://www.granollers.cat/AjGra/AjGra-Page-tPageDetalle_assetid-1222154084539_1089800628496.html
Grugliasco	Italy	Biciincomune	http://www.biciincomune.com/
Guastalla	Italy	PedalaRE	http://www.bicincitta.com/default.asp
Halle	Germany	Next Bike	http://nextbike.de
Hamburg	Germany		www.stadtradhamburg.de
Hamburg	Germany	Next Bike	http://nextbike.de
Hannover	Germany	Next Bike	http://nextbike.de
Helsinki	Finland	Citybikes	
Huelva	Spain	ITCL	www.itcl.es
Jerez de la Frontera (Cádiz)	Spain	ITCL	www.itcl.es
Karlsruhe	Germany	Call a Bike	http://www.callabike-interaktiv.de
Karlsruhe	Germany	Next Bike	http://nextbike.de
Koblenz	Germany	Next Bike	http://nextbike.de
Konya	Turkey		http://www.todayszaman.com/tz-web/detaylar.do?load=detay&link=163856
Krakow	Poland	BikeOne	http://www.bikeone.pl/
La Spezia	Italy	Speziainbici	http://www.mobpark.it/
Lausanne-Morges	Switzerland	Bicincittà	http://www.bicincitta.com/default.asp
Leipzig	Germany	Next Bike	http://nextbike.de

León	Spain	ITCL	www.itcl.es
Logroño	Spain	ITCL	www.itcl.es
London	England	OYBike	http://www.oybike.com/
Los Alcázares (Murcia)	Spain	ITCL	www.itcl.es
Lübeck	Germany	Next Bike	http://nextbike.de
Luxembourg	Luxembourg	Vel'oh	http://www.veloh.lu/
Lyon	France	Vélo'v	http://www.velov.grandlyon.com/
Magdeburg	Germany	Next Bike	http://nextbike.de
Málaga	Spain	ITCL	www.itcl.es
Marseille	France	Le vélo	http://www.levelo-mpm.fr/
Milan	Italy	BikeMi	http://www.bikemi.com/
Montpellier	France	Vélomagg'	http://www.montpellier-agglo.com/tam/page.php?id_rubrique=273
Mörbisch	Austria	Next Bike	http://nextbike.de
Mulhouse	France	Velocite	http://www.velocite.mulhouse.fr/
Munich	Germany	Call a Bike	http://www.callabike-interaktiv.de
Munich	Germany	Next Bike	http://nextbike.de
Nancy	France	velostanlib	http://www.velostanlib.fr/
Nantes	France	Bicloo	http://www.bicloo.nantesmetropole.fr/
Neusiedler See	Austria	Next Bike	http://nextbike.de
Nichelino	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Novara	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Novi Ligure	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Nürnberg	Germany	Next Bike	http://nextbike.de
Offenbach am Main	Germany	Next Bike	http://nextbike.de
Orense	Spain	ITCL	www.itcl.es
Orléans	France	Véló+	https://www.agglo-veloplus.fr/
Oslo	Norway	Oslo Bysykkel	http://www.adshel.no/index2.html
Pamplona	Spain	NBICI	http://www.bicincitta.com/default.asp
Parco molentargius	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Paris	France	Vélib'	http://www.velib.paris.fr/
Parma	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Perpignan	France	BIP!	http://www.bip-perpignan.fr/
Pinerolo	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Pistoia	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Plasencia (Cáceres)	Spain	ITCL	www.itcl.es
Ponferrada (León)	Spain	ITCL	www.itcl.es
Prague	Czech Republic	Yello	http://vipre.homeport.info/
Prato	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Reading	England	OYBike	http://oybike.com/oybike/cms.nsf/Home
Reggio Emilia	Italy	PedalaRE	http://www.bicincitta.com/default.asp
Rennes	France	Vélo à la Carte	http://veloalacarte.free.fr/index2.html
Rio de Janeiro	Brazil	Samba	http://www.zae.com.br/zaerio/home.asp
Rivoli	Italy	Biciincomune	http://www.biciincomune.com/
Roma	Italy	ATAC-BIKESHARING	http://www.atacbikesharing.com/
Rouen	France	cy'clic	http://cyclic.rouen.fr/
San Sebastian	Spain	Bicincitta'	
San Vicente	Spain	ITCL	www.itcl.es
Santiago de Compostela	Spain	Combici	

Santiago	Chile	b'easy	http://www.bicicletaspublicas.cl/
São Paulo	Brazil	Use Bike	http://www.portoseguro.com.br/navitacontent_/userFiles/File/hotsite_usebike/
Savigliano	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Schio	Italy	BiciSchio	http://www.bicincitta.com/default.asp
Settimo Torinese	Italy	Bicincittà	http://www.bicincitta.com/default.asp
Sevilla	Spain	Sevici	http://www.sevici.es/
Siracusa	Italy	GOBIKE	http://www.bicincitta.com/default.asp
Southampton	England	OYBike	http://oybike.com/
St. Andrä	Austria	Next Bike	http://nextbike.de
Stockholm	Sweden	Stockholm City Bikes	http://www.stockholmcitybikes.se/index.html
Stuttgart	Germany	Call a Bike	http://www.callabike-interaktiv.de
Tauranga	New Zealand	Goodgear	http://goodgear.co.nz/
Terni	Italy	Bicincittà	http://www.bicincitta.com/default.asp
The Netherlands (nationwide)	Netherlands	OV-fiets	http://www.ov-fiets.nl/
Toronto	Canada	BikeShare	http://communitybicyclenetwork.org/?q=bikeshare
Toulouse	France		
Trondheim	Norway	Trondheim Bysykkel	http://www.adshel.no/index2.html
Tübingen	Germany	Next Bike	http://nextbike.de
Udine	Italy	UDINebike	www.comune.udine.it/udinebike
Vannes	France	Vélocéa	
Varese	Italy	GIMME BIKE	http://www.bicincitta.com/default.asp
Venaria Reale	Italy	Biciincomune	http://www.biciincomune.com/
Vienna	Austria	citybike	http://www.citybikewien.at/
Washington	USA	SmartBike DC	http://smartbikedc.com/default.asp
Wien	Austria	Next Bike	http://nextbike.de
Zaragoza	Spain	Bizi	http://www.bizizaragoza.com/home/home.php?TU5fTE9DQUxJWkFDSU9ORVM=&MQ==&ZW4=

Annex 3 - Questionnaires to other cities with Bicycle-sharing Programs

1) RE: Research about Bicycle-sharing Programs - KTH

Terça-feira, 11 de Agosto de 2009 4:29
De: "MULET Ronan" <RMULET@ClearChannel.fr>
Para: "Edgard Dias Batista" <eadb@kth.se>
A mensagem contém anexos
Presskit_doc sept 2007 english.pdf (2465 KB), Clear Channel France - Histoire du vélo en libre service_light.pdf (807 KB)

Dear Edgard,

I answer you below for one of the 4 system we've got in France.
It is following the example of Dijon : www.velodi.fr

Regards

Ronan MULET

Operations Project Manager
SmartBike Southern Europe

CLEAR CHANNEL OUTDOOR
2 avenue des Monts Gaultier BP 507
35230 NOYAL CHATILLON SUR SEICHE - FRANCE

Tél : +33 (0)2.99.05.26.66 / GSM : +33 (0)6.09.54.24.21
Fax : +33 (0)2.99.05.16.40
E-mail : rmulet@clearchannel.fr
www.clearchannel.fr/site/smartbike
www.smartbike.com

De : Edgard Dias Batista [mailto:eadb@kth.se]
Envoyé : jeudi 16 juillet 2009 10:25
À : MULET Ronan
Objet : Research about Bicycle-sharing Programs - KTH

Royal Institute of Technology – KTH

Stockholm – Sweden

Research about Bicycle-sharing Programs - KTH

Dear sir/ms,

We kindly ask you to answer the following questionnaire about the bicycle-sharing program in your city. This is part of a master degree research in the Royal Institute of Technology – KTH, about the role of bicycles in the transportation systems of cities.

It will take approximately 3 minutes and you can answer directly in the body of this email, or you can use the word document attached if you prefer.

Thank you very much for your participation!

Kind regards,

Edgard Antunes Dias Batista - eadb@kth.se

Sustainable Technology Program - Royal Institute of Technology - KTH

Name of your city and country:

You duties/function in the municipality or bicycle-sharing program:

Which is the business model of the bicycle-sharing program?

( ) Public-Private Partnership
( ) Public
(x) Private
( ) Other (Please specify):

Do the user's fees cover the operational costs?

( ) The program is free of charge
( ) Less than 10%
( ) Between 10% and 50%
( ) Between 50% and 75%
( ) Between 75% and 100%
( ) More than 100% (the program is profitable)

No answer, it's a prgram with advertising (bus shelters, ...) for 15 years with the "Grand Dijon"

Is there any other source of income?

( ) Advertising in the bicycles
( ) Advertising in the bicycle stations
(x) Other (Please specify): only in outdoor

What is the figures of the bicycle-sharing program in your city?
Number of bicycles: 400
Number of stations: 40
Employees: 5
Trips per month: 500 to 2500 **per day**
Others:

What is the approximated number of stolen/vandalized bicycles per month?

_____ .....

How is the bicycle-sharing program advertised to the population?
(x) Internet - Webpage (Please give us the address):
(x) Radio
(x) TV
(x) Newspaper
(x) Specialized publication
(x) Other (Please specify): Clear Channel billboards, local public relations, show

How is the bicycle infrastructure in your city?
(x) Bicycle lane (shared with motorized traffic) (If possible, specify how many Km): 153 km
(x) Bicycle path (segregated from motorized traffic) Km:
(x) Bicycle/pedestrian lane (shared sidewalk) Km:
(x) Cycle Route (planned route containing one of more items from above) Km:
(x) Assisted bicycle-parking facilities - Approximately how many:
(x) Unassisted bicycle parking facilities - Approximately how many:
( ) Other (Please specify):

What is the approximated transportation modal share in your city?
Bicycle:_____%
Cars:_____%
Public transport:_____%
Pedestrian:_____%
Others: _____% (Please specify): I don't know

Please chose one or more barriers to the bicycle utilization in your city?
( ) Cultural
( ) Economical
(x) Lack of structure : more bike station could be better for public bike uses
( ) Lack of political interest
( ) Lack of interest of the population
( ) Other (Please specify):

What is the importance of the bicycle-sharing program in the transportation system of your city?

( ) No importance
( ) Low importance
( ) Medium importance
(x) High importance 16 000 subscribers for 151 200 inhabitants
( ) Fundamental

What is your opinion about the importance of bicycle in the future of the transportation in your city?

( ) Lower importance than today
( ) The same importance than today
(x) Higher importance than today

Do you commute by bicycle?

( ) never
( ) eventually
(x) frequently
( ) always

Please attach all relevant information available about the bicycle-sharing program and the non-motorized transportation in your city.

Use the space below for your considerations if necessary:

You can find attached some presentations of our system

2) I: Research about Bicycle-sharing Programs - KTH

Quinta-feira, 30 de Julho de 2009 12:23
De: "Info Bikemi" <info@bikemi.it>
Para: eadb@kth.se

Dear Edgard,

please find here below our answers in red.
At disposal,

Best ragards.

BikeMi staff

Da: Edgard Dias Batista [mailto:eadb@kth.se]
Inviato: martedì 14 luglio 2009 17.59
A: Info Bikemi
Oggetto: Research about Bicycle-sharing Programs - KTH

Royal Institute of Technology – KTH

Stockholm – Sweden

Research about Bicycle-sharing Programs - KTH

Dear sir/ms,

We kindly ask you to answer the following questionnaire about the bicycle-sharing program in your city. This is part of a master degree research in the Royal Institute of Technology – KTH, about the role of bicycles in the transportation systems of cities.

It will take approximately 3 minutes and you can answer directly in the body of this email, or you can use the word document attached if you prefer.

Thank you very much for your participation!

Kind regards,

Edgard Antunes Dias Batista - eadb@kth.se

Sustainable Technology Program - Royal Institute of Technology - KTH

Name of your city and country: Milan, Italy

You duties/function in the municipality or bicycle-sharing program: P.A. to the project manager

Which is the business model of the bicycle-sharing program?

(X) Public-Private Partnership
( ) Public
( ) Private
( ) Other (Please specify):

Do the user's fees cover the operational costs?

( ) The program is free of charge
( ) Less than 10%
( ) Between 10% and 50%
( ) Between 50% and 75%
( ) Between 75% and 100%
( ) More than 100% (the program is profitable)

Is there any other source of income?

( ) Advertising in the bicycles
( ) Advertising in the bicycle stations
(X) Other (Please specify): Advertising installations

What is the figures of the bicycle-sharing program in your city?
Number of bicycles: 1400
Number of stations: 103
Employees:
Trips per month:
Others:

What is the approximated number of stolen/vandalized bicycles per month?

_____ / _____

How is the bicycle-sharing program advertised to the population?
(X) Internet - Webpage (Please give us the address): www.bikemi.it
( ) Radio
( ) TV
( ) Newspaper
( ) Specialized publication
(X) Other (Please specify): outdoor advertising installations

How is the bicycle infrastructure in your city?
( ) Bicycle lane (shared with motorized traffic) (If possible, specify how many Km):
(X) Bicycle path (segregated from motorized traffic) Km: 70
( ) Bicycle/pedestrian lane (shared sidewalk) Km:
( ) Cycle Route (planned route containing one of more items from above) Km:
( ) Assisted bicycle-parking facilities - Approximately how many:
( ) Unassisted bicycle parking facilities - Approximately how many:
( ) Other (Please specify):

What is the approximated transportation modal share in your city?
Bicycle:_____%
Cars:_____%
Public transport:_____%
Pedestrian:_____%
Others: _____% (Please specify):

Please chose one or more barriers to the bicycle utilization in your city?
( ) Cultural
( ) Economical
(X) Lack of structure
( ) Lack of political interest
( ) Lack of interest of the population
( ) Other (Please specify):

What is the importance of the bicycle-sharing program in the transportation system of your city?

( ) No importance
( ) Low importance
( ) Medium importance
(X) High importance
( ) Fundamental

What is your opinion about the importance of bicycle in the future of the transportation in your city?

( ) Lower importance than today
( ) The same importance than today
(X) Higher importance than today

Do you commute by bicycle?

( ) never
(X) eventually
( ) frequently
( ) always

3) AW: Research about Bicycle-sharing Programs - KTH

Segunda-feira, 27 de Julho de 2009 8:57
De: "Citybike Mail" <office@citybikewien.at>
Para: "Edgard Dias Batista" <eadb@kth.se>

Dear Edgard Antunes Dias Batista!

Attached you'll find our answers. Please note that some questions were deliberately left unanswered.

With kind regards
Matthias Wegscheider

Matthias Wegscheider
Citybike Wien Team
Citybike Wien
Postfach 124 • 1031 Wien
Telefon **(+43 1) 79 5 97-758** • Fax **(+43 1) 79 5 97-28**
email **kontakt@citybikewien.at** • **www.citybikewien.at**

Von: Edgard Dias Batista [mailto:eadb@kth.se]
Gesendet: Donnerstag, 16. Juli 2009 11:36
An: Citybike Mail
Betreff: Research about Bicycle-sharing Programs - KTH

Name of your city and country:

Vienna, Austria

You duties/function in the municipality or bicycle-sharing program:

Backoffice, customer relation, project development

Which is the business model of the bicycle-sharing program?

( ) Public-Private Partnership
( ) Public
(X) Private
( ) Other (Please specify):

Do the user's fees cover the operational costs?

( ) The program is free of charge
( ) Less than 10%
( ) Between 10% and 50%
( ) Between 50% and 75%
( ) Between 75% and 100%
( ) More than 100% (the program is profitable)

Is there any other source of income?

(X) Advertising in the bicycles
( ) Advertising in the bicycle stations
( ) Other (Please specify):

What is the figures of the bicycle-sharing program in your city?
Number of bicycles: capacity for up to 1251, number of bikes on street varies with season
Number of stations: 61
Employees: 8
Trips per month: up to 50.000 in the summer, 30.000 on a whole year average
Others:

What is the approximated number of stolen/vandalized bicycles per month?

0,1_____

How is the bicycle-sharing program advertised to the population?
(X) Internet - Webpage (Please give us the address): www.citybikewien.at
( ) Radio
( ) TV
( ) Newspaper
( ) Specialized publication
(X) Other (Please specify): street furniture

How is the bicycle infrastructure in your city?
(X) Bicycle lane (shared with motorized traffic) (If possible, specify how many Km):
(X) Bicycle path (segregated from motorized traffic) Km:
(X) Bicycle/pedestrian lane (shared sidewalk) Km:
(X) Cycle Route (planned route containing one of more items from above) Km: 1000
( ) Assisted bicycle-parking facilities - Approximately how many:
(X) Unassisted bicycle parking facilities - Approximately how many:
( ) Other (Please specify):

What is the approximated transportation modal share in your city?
Bicycle:_6____%
Cars:_____%
Public transport:_____%
Pedestrian:_____%
Others: _____% (Please specify):

Please chose one or more barriers to the bicycle utilization in your city?
( ) Cultural
( ) Economical
( ) Lack of structure
( ) Lack of political interest
( ) Lack of interest of the population
( ) Other (Please specify):

What is the importance of the bicycle-sharing program in the transportation system of your city?

( ) No importance
( ) Low importance
( ) Medium importance
( ) High importance
( ) Fundamental

What is your opinion about the importance of bicycle in the future of the transportation in your city?

( ) Lower importance than today
( ) The same importance than today
(X) Higher importance than today

Do you commute by bicycle?

( ) never
( ) eventually
(X) frequently
( ) always

Please attach all relevant information available about the bicycle-sharing program and the non-motorized transportation in your city.

4)Pesquisa Sobre Programas de Compartilhamento de Bicicletas - KTH

Quarta-feira, 22 de Julho de 2009 16:46
De: "Onélio" <onelio@mobilicidade.com.br>
Para: eadb@kth.se
Cc: "angelo Leite" <angelo@serttel.com.br>
A mensagem contém anexos
Vanderlei_Martins_ENEAC_2009_V2final.pdf (940 KB), FOLDER SAMBA - Mobilicidade - Ingles.pdf (1365 KB)
Prezado Sr. Edgard,

Em tempo, Agradecemos o contato e interesse pelo SAMBA - Rio. Estou anexando uma apresentação de nosso sistema e um artigo sobre bicicletas públicas a ser apresentado no II Encontro Nacional de

Ergonomia do Ambiente Construído. Creio que, em conjunto com o questionário abaixo, serão suficientes para o entendimento do nosso sistema de bicicletas públicas.

Sou ciclista urbano à vários anos, com dedaladas em cidades européias ainda antes do "boom" das bicicletas públicas, sou professor e pesquisador em TI para mobilidade em ambientes urbanos. Tenho vasta bibliografia sobre "bikeability". Morei em Montreal (Canadá) e tive a oportunidade de estudar uma intervenção muito interessante na zona portuária da cidade onde o foco foi: walkability e bikeability...A fonte principal de recursos para este projeto de revitalização foi o órgão da saúde de Québec, cujo argumento foi a promoção da qualidade de vida, o bem estar social e o cárater de saúde pública que revestia o projeto.

Estou à disposição para maiores informações.

Onélio.

Royal Institute of Technology – KTH

Stockholm – Sweden

Pesquisa Sobre Programas de Compartilhamento de Bicicletas - KTH

Caro(a),

Pedimos a gentileza de preencher o questionário a seguir sobre o programa de compartilhamento de bicicletas na sua cidade. Este questionário é parte de uma pesquisa de mestrado realizado no Instituto Real de Tecnologia da Suécia – KTH, sobre o papel das bicicletas no sistema de transporte das cidades. O preenchimento do questionário leva em torno de 3 minutos e você pode responder diretamente no corpo deste e-mail, ou no documento anexo se você preferir.

Muito obrigado pela participação!

Edgard Antunes Dias Batista - eadb@kth.se

Sustainable Technology Program - Royal Institute of Technology - KTH

Nome da sua cidade e país:

Seu cargo e responsabilidades sobre o programa de compartilhamento de bicicletas:

Qual o modelo de negócio do programa?

( ) PPP – Parceria Público-Privada

( ) Público

(X) Privado

( ) Outro (Favor especificar):

A taxa paga pelos usuários cobre os custos operacionais?

( ) O programa é gratuito

( ) Menos de 10%

( ) Entre 10% e 50%

(X) Entre 50% e 75%

( ) Entre 75% e 100%

( ) Mais que 100% (o programa é lucrativo)

Existe alguma outra fonte de renda?

(X) Publicidade nas bicicletas

(X) Publicidade nas estações

( ) Outra (Favor especificar):

Quais os números relativos ao programa de compartilhamento de bicicletas na sua cidade?

Número de bicicletas: 500

Número de estações: 50

Número de Empregados: 20

Número de Usuários: 6000

Viagens realizadas por mês: 300

Outros:

Qual o número aproximado de bicicletas roubadas e/ou vandalizadas por mês?

Não temos registro de vandalismo e/ou roubo. As bicicletas são controladas por chip eletrônico e após o horário de funcionamento são travadas nas estações.

Como o programa é informado à população?

(X) Internet - Webpage (Por favor, indique o endereço web):

( ) Rádio

( ) TV

( ) Jornais

(X) Publicação especializada

( ) Outros (Favor especificar):

Qual a infraestrutura cicloviária na sua cidade?

(X) Ciclo-faixas (via compartilhada com o tráfego motorizado) (Se possível, especifique aproximadamente quantos quilômetros):

(X) Ciclovias (segregadas do tráfego motorizado) Km:

( ) Via compartilhada com pedestres (calçada compartilhada, com divisão para pedestres e ciclistas) Km:

( ) Ciclo-rota (Rota ciclistica planejada, contendo um ou mais dos itens acima citados) Km:

(X) Bicicletários (assistidos/com segurança) – Aproximadamente quantos/quantas vagas:

(X) Paraciclos (Não assistidos) - Aproximadamente quantos/quantas vagas:

( ) Outros (Favor especificar):

Qual a divisão modal aproximada na sua cidade?

Não dispomos destes dados

Bicicleta:_____%

Carro:_____%

Motocicleta:_____%

Transporte Público (Metrô/Trem/Ônibus):_____%

Pedestres:_____%

Outros: _____% (Favor especificar):

Por favor, escolha uma ou mais barreiras para a utilização de bicicletas como meio de transporte na sua cidade?

(X) Cultural

( ) Econômica

(X) Falta de infraestrutura

(X) Falta de interesse político

( ) Falta de interesse da população

( ) Outra (Favor especificar):

Qual é a importância do programa de compartilhamento de bicicletas no sistema de transporte da sua cidade?

( ) Nenhuma importância

( ) Baixa importância

(X) Média importância

( ) Alta importância

( ) Fundamental

Qual sua opinião sobre a importância das bicicletas no futuro do transporte na sua cidade?

( ) Menor importância que hoje

( ) A mesma importância que hoje

(X) Maior importância que hoje

Você usa bicicleta como meio de transporte no seu dia-a-dia?

( ) nunca

(X) eventualmente

( ) frequentemente

( ) sempre

Por favor, anexar qualquer outra informação relevante sobre o programa de compartilhamento de bicicletas e tráfego não motorizado na sua cidade (Pesquisas, relatórios, etc).

Use o espaço abaixo para as considerações que considerar necessárias:

Abaixo está a transcrição de uma entrevista que concedemos para uma Faculdade do Rio de Janeiro - FACHA - Curso de Pós-Graduação em Marketing Digital.

A SAMBA oferece algum benefício para o cliente além do serviço em si?

O SAMBA oferece para seus usuários uma alternativa de transporte público complementar que é ecológicamente correta e proporciona, além do serviço em si, para o usuário e a população em geral, menos poluição ambiental, menor ruído, menor consumo de energia, maior convivência social, melhor percepção do ambiente urbano e um melhor condicionamento físico. Nosso foco sempre foi o de promover melhor mobilidade com tecnologia e mais qualidade de vida.

2 - Como foi pensada a estratégia para o lançamento do produto? A empresa se baseou no tipo de serviço que já existia no Rio de Janeiro através de profissionais que alugam bicicletas informalmente ou pesquisou em outros países como funciona a precificação desse serviço?

O lançamento do produto (que é também uma prestação de serviço) surgiu de uma chamada pública (licitação) promovida pela Prefeitura da Cidade do Rio de Janeiro para concessão da implantação de bicicletas públicas de aluguel nesta cidade. Após vencida a licitação pública, nossa principal estratégia foi adequar a tecnologia existente à realidade brasileira, visto que, soluções semelhantes fabricadas no exterior certamente falhariam pelas adversidades que enfrentaríamos: furtos, entempéries, vandalismo, etc. Todo o design, tecnologia e sistemática de operação e manutenção do sistema SAMBA foi desenvolvido pela empresa pernambuca SERTTEL (líder nacional em soluções para mobilidade urbana e gestão do trânsito em cidades); Este Know-how da Serttel, juntamente com uma farta pesquisa internacional fez com que surgisse uma solução simples para io usuário final mas, robustecida de alta tecnologia de informação: data center, telefonia móvel, conexão em tempo real, energia solar, sintetizadores de voz, entre outras. Coube à Mobilicidade prospectar o produto, gerenciar o relacionamento com os clientes e gerenciar a parte comercial do negócio que é um ambiente virtual de comercio eletrônico. A fase 1 do lançamento foi composta de uma campanha publicitária e seleção de ususários para avaliação e validação do sistema. Os 200 primeiros clientes que se cadastrarem no site www.mobilicidade.com.br receberão um passe gratuito para utilizar as bicicletas até o dia 29 de dezembro de 2008. Em janeiro deste ano, o SAMBA foi comercialmente liberado para o público em geral e, desde então, temos participado de inúmeros noticiários (CNN internacional, jornais, revistas) e eventos de relevância nacional como o Seminário Internacional da Bicicleta ocorrido em abril na cidade de Florianópolis em Santa Catarina e o Seminário Nacional de Transporte Cicloviário realizado em junho na cidade de Sorocaba em São Paulo. Outros impulsos importantes têm sido demandados pela pela própria

Prefeitura da Cidade do Rio de janeiro que, na última semana do meio ambiente, contou com a participação do Prefeito, Eduardo Paes e demais secretários, num passeio ciclístico pelo bairro de Cobacana para divulgação do sistema de bicicletas públicas (SAMBA) que, não é apenas um aluguel de bicicletas; a filosofia do sistema é muito maior: Trata-se de um meio de transporte ofertado ao público para curta viagens e conexão com outros meios de transporte (isto se chama intermodalidade). Veja mais detalhes na reportagem da CBN: *http://oglobo.globo.com/rio/transito/mat/2009/05/31/paes-inaugura-primeiras-ciclofaixas-da-cidade-em-copacabana-756119466.asp*

3 - Qual foi a estratégia de promoção utilizada na época do lançamento do produto? O que foi feito para estimular a promoção de vendas, propaganda, publicidade, relações públicas e força de vendas?

Ver item (2)

4 - Pesquisando sobre o SAMBA encontramos os objetivos da empresa, mas gostaríamos de saber qual é a missão e a visão da empresa?

Empresa comercializadora do sistema SAMBA: MOBILICIDADE (Empresa de vanguarda em soluções de TI para ambientes urbanos)

Missão da MOBILICIDADE:

Disponibilizar produtos e serviços que proporcionem comodidade e mobilidade às pessoas nos ambientes urbanos, utilizando-se de tecnologia da informação, inovação e criatividade gerando melhor qualidade de vida e preservação ambiental.

5 - Depois de algumas pesquisas encontramos algumas lojas que tem o serviço de aluguel de bicicletas. Como o SAMBA se diferencia delas? Vocês se sentem ameaçados com isso?

Ver item (2). Nosso serviço é: oferta de bicicletas públicas, mediante locação, para utilização como transporte cicloviário, daí o nome SAMBA, que é uma sigla: Solução Alternativa para Mobilidade por Biciletas de Aluguel

6 - Quais são seus principais concorrentes?

Não existe solução similar no Brasil. Nossos concorrente estão no exterior e são: JC deCaux (França); BIXI (Canadá); Veolia Transport (França); Clear-Channel, entre outras.

Antes de imprimir,
pense na sua contribuição
para com o **Meio Ambiente.**

5) RE: Research about Bicycle-sharing Programs - KTH

Terça-feira, 21 de Julho de 2009 5:00
De: "Bicicas" bicicas@bicicas.es
http://www.bicicas.es/
www.castello.es
Castello, spain
Para: "'Edgard Dias Batista'" <eadb@kth.se>

De: Edgard Dias Batista [mailto:eadb@kth.se]
Enviado el: lunes, 13 de julio de 2009 20:38
Para: bicicas@bicicas.es
Asunto: [?? Probable Spam] Research about Bicycle-sharing Programs - KTH

Royal Institute of Technology - KTH

Stockholm - Sweden

Research about Bicycle-sharing Programs - KTH

Dear sir/ms,

We kindly ask you to answer the following questionnaire about the bicycle sharing program in your city. This is part of a master degree research in the Royal Institute of Technology - KTH, about the role of bicycles in the transportation systems of cities.

It will take approximately 3 minutes and you can answer directly in the body of this email, or you can use the word document attached if you prefer.

Thank you very much for your participation!

Kind regards,

Edgard Antunes Dias Batista - <mailto:eadb@kth.se> eadb@kth.se

Which is the business model of the bicycle-sharing program?

( ) Public-Private Partnership

(X) Public

( ) Private

( ) Other (Please specify):

Do the user's fees cover the operational costs?

(X) The program is free of charge

( ) Less than 10%

( ) Between 10% and 50%

( ) Between 50% and 75%

( ) Between 75% and 100%

( ) More than 100% (the program is profitable)

Is there any other source of income?

(X) Advertising in the bicycles

( ) Advertising in the bicycle stations

( ) Other (Please specify):

What is the figures of the bicycle-sharing program in your city?

Number of bicycles: 150

Number of stations: 12

Employees: 7

Trips per month: around 10.000

Others: after summer is gonna be 38 stations and 400 bikes

What is the approximated number of stolen/vandalized bicycles per month?
0.17 per month

_____

How is the bicycle-sharing program advertised to the population?

(X) Internet - Webpage (Please give us the address):

( ) Radio

( ) TV

(X) Newspaper

( ) Specialized publication

( ) Other (Please specify): Bus

How is the bicycle infrastructure in your city?

( ) Bicycle lane (shared with motorized traffic) (If possible, specify how many Km): 20

( ) Bicycle path (segregated from motorized traffic) Km: 26

( ) Bicycle/pedestrian lane (shared sidewalk) Km: 21

( ) Cycle Route (planned route containing one of more items from above) Km:

( ) Assisted bicycle-parking facilities - Approximately how many: 80

( ) Unassisted bicycle parking facilities - Approximately how many:

( ) Other (Please specify):

What is the approximated transportation modal share in your city?

Bicycle:_5_%

Cars:_60_%

Public transport:_20_%

Pedestrian:_15_%

Others: __5_% (Please specify): motorbyke

Please chose one or more barriers to the bicycle utilization in your city?

( ) Cultural

( ) Economical

(X) Lack of structure

( ) Lack of political interest

( ) Lack of interest of the population

( ) Other (Please specify):

What is the importance of the bicycle-sharing program in the transportation system of your city?

( ) No importance

( ) Low importance

(X) Medium importance

( ) High importance

( ) Fundamental

What is your opinion about the importance of bicycle in the future of the transportation in your city?

( ) Lower importance than today

( ) The same importance than today

(X) Higher importance than today

Do you commute by bicycle?

( ) never

( ) eventually

(X) frequently

( ) always

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