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Summary

The purpose of this report is to design bicycle storage facilities for rich and poor in the city of Rio de Janeiro, as part of a worldwide bicycle policy, supported by the NGO I-CE (interface cycling expertise). This is being performed by first analyzing the local state of cycling these days. After that there has been investigated in ways to improve the poor situation of the bicycle in this town by first looking at the ones that have been there before. Also there has been a look at product marketing, which has been carried out on the courses of ‘Marketing for Industrial Design’ of the University of Twente. This information has been used in the resuming part, in which a design solution has been created, being part of the task. This design has been modelled and rendered, by making use of graphical computer software.

In the beginning the main focus was on bicycle use as well as on public transport. But during the internship the decision has been made to only focus on bicycle use, since public transport was actually used a lot in town already. It had its points that were very suitable to undergo some improvements, but this was not being focused upon in the resuming part. The focus from that point on was to change people’s attitude and behaviour towards cycling.

One of the findings is that it is quite hard to let people change their behaviour towards cycling. It therefore has been decided to make use of cyclers that are already making use of the bicycle. The idea is to enhance their position so that they will continue cycling. By keeping them satisfied, the expectation is that they will spread to word to other potential bicycle user.

The design needed to be something ‘big’, something recognizable and something that they, the local inhabitants and users, could be proud of when using it. This demand has been fulfilled in the design. A desire from Nanko van Buuren, director at host organization IBISS, was that users would get more aware of their spendings and the amount of money they were able to save, if they would use the bicycle every day instead of using the car or public transport. Therefore a solution to this has also been implemented into the design.

It is desirable if the storage facility would be combined with some kind of kiosk or local vendor, so that the facility could be guarded, and so that the facility could be a major opportunity to the kiosk because customers of the facility could be customer of the kiosk as well.
Chapter 1 Introduction and background

1.1 Introduction

This report covers an internship, which is the final stage of the Bachelor phase of the course of Industrial Design, performed by the author, Job Bergsma. The main issue, being partly a research project, was to investigate ways to offer bicycle and public transport in Rio de Janeiro as a serious alternative for the car. The main mission of this operation was: ‘To design bicycle storage facilities for rich and poor’.

The bicycle is badly represented in the traffic of Rio de Janeiro. It is stunningly dangerous and facilities like bicycle paths and storage facilities are scarce. Warner Vonk, who is conducting this research, is a graduate student also from the University of Twente and has been working on improvements in the Rio de Janeiro traffic for a couple of years. He has been one of the supervisors during this internship.

Ilanit Lutters, teacher at the faculty of Engineering Technology, University of Twente, has been the other supervisor, and assessor.

In this report, research is covered about ways to discourage cars and to create incentives for people to start using bicycles. This has been done by studying literature, questioning and interviewing random people and people working in the same sector. The results are described in this report.

As mentioned above, Warner Vonk has lived in Rio de Janeiro for several years already. His work is also part of a desired implementation of a worldwide bicycle policy, the goal of I-CE (Interface Bicycle Expertise), located in Utrecht, Netherlands. This means that indirectly this project contributes to the activities of this company as well.

The internship has taken place at a NGO called IBISS. IBISS has been founded in the late eighties and has been growing and expanding since, with a budget of about four million euro every year. The director ‘Nanko van Buuren’ shares familiarity with Warner as well, since Warner has been a student doing his internship in Rio de Janeiro as well at the same company. The pursuits of IBISS are basically poverty and health-related. But since the bicycle can offer a decrease in poverty, because it mobilizes people and possibly enables them to reach their jobs, Nanko has been interested in this kind of ‘side-project’ of IBISS. It generally differs from other projects carried out by IBISS.

The report starts with some relevant characteristics of the environment (Chapter 1), followed by analysis and research (Chapter 2 and 3), and concluding with the design part, containing my own contribution to the projects of Warner and indirectly to I-CE.
1.2 History and demographic characteristics

In this section, the demographic characteristics of Brazil and Rio de Janeiro in particular, are being described. From [1] and [2] the following can be concluded:

1.2.1. Brazil
The urbanization in Brazil increased a lot in the late 19th century, while industrialization increased from halfway the 20th century which had a direct influence on the urban network and infrastructure, like railways, ports and communication. Because of this industrialization an intense migration process took place, especially in the main urban centres, like Rio de Janeiro and São Paulo. During the 80’s this process reached a top level. The migration from then onwards did not take place anymore in the main urban centres. Still nowadays, the majority of people live in the cities (82%). Most of the migration now takes place in the urban centres in the metropolitan periphery and the medium sized cities.

Social inequality occurs a lot in Brazil, especially in the metropolitan regions. This is mainly because the urbanization process went really fast and the social provisions like housing, sanitation and education were left far behind. But it is also because of the high social inequality that just characterizes the entire nation. The housing deficit remains significant in the country with 79.8 percent of the slums located in the metropolitan areas.

The strong relation between urbanization and industrialization caused the territorial, demographic and economical characteristics of the country. In thirty years the country changed from an agricultural country into an industrialized one. Globalization had a great impact on the industrial structure. Changes towards a more productive structure were followed by the country’s free trade policy.

1.2.2. Rio de Janeiro
Brazil’s independence, which started in 1822, and the wealth gained because of the coffee trade, caused huge improvements in Rio de Janeiro. The railway system connected the city to the inland agricultural production areas, and the number of public works and services increased drastically. A public transport system caused a huge spread throughout the city and made it possible for people to live outside the city centre.

In 1888 slavery was abolished causing the coffee plantations to become empty and former slaves to migrate to the city. Social differences increased and the first ‘favelas’ appeared. The term ‘favelas’ has its origin in the first poor settlement that were located in the city centre at the turn of the century. It was home to ex-slaves and ex-soldiers, unable to integrate into the new economy.

In the late 20’s the city housed two million people. During this time Plan Agache was developed. This plan was about reserving certain areas for the upper class, while the suburbs were reserved for the working class. This is the first official plan for dealing with the favelas.

The electrification of the railway system from 1937 contributed to suburban sprawl. The only spaces that could possibly be occupied were those which were environmentally fragile, like swamps, steep hills and river banks. Growth of favelas continued and urban problems in the metropolitan area increased. Cars occupied the streets, and land prices grew dramatically, which caused the city to grow vertically. Also the number of migration increased, being the highest rate of the 20th century, with 38 percent of the population originating outside the city. Lack of housing, and the fall behind of transport forced the spread of favelas, which meant that the previously mentioned fragile areas became occupied. In the 90’s, urban growth was controlled by a plan called the Municipal Decenal Master Plan (Plano Diretor Decenal do Município do Rio de Janeiro). This plan contained the main rules and instruments to guide the city’s development, taking into account the problems of the slums that occurred in the past. However, the complexity of the problems faced, increased, while economically the city of Rio, together with São Paulo positioned itself in the rank of global cities, as it comes to development.
In the 60’s a gradual decrease in growth rate took place. This might be explained by the capital shift, in which Brasilia became the new capital of the country. Despite of this there were still immigrants coming from the rest of the country. A trend occurred in Rio, which meant that Rio became the city containing the highest number of elderly people. This resulted from a decrease in birth and death rate which started in Rio before other parts in Brazil.

The economic growth in the 90’s did not lead to a decrease of unemployment, but just followed the national pattern. The city represents a very badly distributed pattern: The richest 1 percent of the population earns twelve percent of income and the poorest 50 percent earns 13 percent. Social exclusion in Rio takes place in every area of town and not only in the suburbs. The favelas are having place in high-income areas as well as in middle-income and low-income areas, but they always contrast with the ‘rest’ of the city. These favela dwellers represent 17 per cent of the total population in Rio. Their integration to the employment market is very unstable and fragile. Their average incomes are equivalent to a quarter of people living in other areas of the city.

1.2.3. The population growth in Rio in the 90’s

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>5,480,768</td>
</tr>
<tr>
<td>1996</td>
<td>5,504,436</td>
</tr>
<tr>
<td>2000</td>
<td>5,857,904</td>
</tr>
<tr>
<td>2007</td>
<td>6,093,472</td>
</tr>
</tbody>
</table>

Figure 1

The following figures show the population spread for respectively Rio de Janeiro and Brazil. Each bar represents an amount of five years. What is striking is that Rio de Janeiro relatively has a greater amount of people in the category 30-50 years compared to Brazil.

Figure 2. Population spread Rio de Janeiro

Figure 3. Population spread Brazil
1.2.4. Automated traffic
The figures below show the use of automated traffic for both Rio de Janeiro and Brazil. It clearly shows that car use is extraordinary compared to the rest of Brazil. De colours represent respectively:

- The car
- Motorcyclists
- Vans
- Trucks
- Scooters
- Bus
- Mini-bus

![Figure 4. Traffic Rio de Janeiro](image)

![Figure 5. Traffic Brazil](image)

1.2.5. Hofstede
To approach Brazilian culture by using the dimensions invented by Hofstede, the following can be stated when compared to the Netherlands:

- The Power Distance in Brazil is bigger than in the Netherlands. This indicates that there are higher inequalities amongst the people in the country.
- The Dutch are far more individual, so Brazilians live more as a community. Their way of interacting is really informal and friendly based. The Brazilians prefer to let people feel happy rather than helping them properly, for example when asking for directions.
- The Uncertainty Avoidance Index of Brazil is the highest compared to other dimensions. This means they have very strict laws and rules to avoid uncertainty as much as possible.
- This agrees with my experiences. The law enforcement is very impressive, since there is always military police riding the streets with huge guns aiming out of the window right at your face. And according to stories told, the local police have the habit to first shoot and ask questions later.
1.3 Financial characteristics

The Monthly Employment Survey found that in January 2009, there are 5.494 million persons 10 years or older (working age population) in Rio de Janeiro, among which 50.9% were employed, 3.0% unemployed and 46.1% inactive. The results show stability in the forms of insertion of workers in the labour market, both in relation to the previous month as in the previous year. The average real income usually earned by people occupied the city of Rio de Janeiro, estimated at U.S. $ 1573.60

People that are working in the private sector as well as people working in the public sector in the field of education, health and public administration earn the most average amount of money (around 2000 Reais, about 800 Euro). Domestic worker earn the least, only a quarter of this amount (500 Reais, about 200 Euro). This means that there is a huge difference between wages in Brazil and that there is no clear minimum wage.

1.4 The favela live – Characteristics

The inhabitants of Rio de Janeiro consist of a great number of immigrants from the countryside, who came to Rio during the period of industrialization. During the urbanization process there have been groups of inhabitants that were left behind, because social provisions were left behind, like housing and education. Favelas arose because of this fact. These favelas take place in all parts of town, but ALWAYS differ from the ‘normal’ part of town. The favelas represent 17 percent of the population of Rio. Favelas are always located at poor building areas like mountains and swamps. Obviously they are not well protected against rainy weather. [1]

People in the favelas have their own culture and have much more relationships with each other than in other areas of town. A lot of them live in the favelas to be able to afford their necessary livelihoods. Favela inhabitants are generally seen as second class citizens, since they do not have the right to profit from social services and facilities. This makes them feel very insecure and very dependent on political actions.

The relationship between people from the favela and the rest of the town is very cold. People from the favelas are seen as the main cause of all the violence and are therefore discriminated based on social status by the rich. Discrimination occurs a lot especially when applying for jobs.

The people themselves are not willing to take action to increase their lives, since they are more concerned about their daily problems. Besides that, they very much expect the government to change their situation, since the Brazil culture is very paternalistic.

Advantages of people living in the slums are that they represent a cheap flexible labour force and are a good example of the interaction of different cultures.

There is a direct link between social inequality and criminality. Relatively a lot more black people fall victim to violence than people from white origin.
Figure 6. Favelas in Rio According to 1999 data

Number of Homicides according to Colour and Place of Victim

<table>
<thead>
<tr>
<th>Area of victim residence</th>
<th>White</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of population</td>
<td>% of victims</td>
</tr>
<tr>
<td>South zone and Barra da Tijuca</td>
<td>81.2</td>
<td>33.3</td>
</tr>
<tr>
<td>North zone</td>
<td>61.1</td>
<td>37.6</td>
</tr>
<tr>
<td>East zone and suburbs</td>
<td>55.6</td>
<td>41.5</td>
</tr>
</tbody>
</table>

Figure 7. Assets available to slum dwellers
1.5 Conclusions

From the previous sections, the following aspects are important to take into account in the research project:

There is a lot of social inequality amongst society. The wages are badly spread, which means that there is great luxury and great poverty. The poor inhabitants of favelas are being excluded socially. This means that it is very hard for them to apply for social provisions, find a job, etc.

Favelas take place in all parts of town, but always differ from the ‘normal’ part of town. These favelas have their own culture and represent 17% of the population in Rio de Janeiro. The inhabitants that have jobs form a cheap and flexible labour force.

In Rio de Janeiro, there are relatively a lot of elderly people and the inhabitants are on average less individualistic than Dutch people. They tend to live more like a community.
Chapter 2 Analysis

2.1 Problem

The more cars there are driving in the city, the less space there is, which means that municipalities decide to create more roads. This leads again to more people using the car, which leads to more occupation of the roads. This again means that people are less interested in public transport and cycling because it respectively takes too much time and it is more dangerous, which again leads to more use of the car. It is clear that we are dealing with a vicious circle. This situation is depicted in figure 8. The red indicated boxes form the framework of the problem and will be contemplated in the next part.

Change of attitude

It seems that the governmental attitude towards cycling is changing due to problems like traffic jams and consequences of pollution. Bicycles, from a governmental point of view, are being seen as a promising alternative for the car. Five years ago (2005) the Ministry of Cities decided to reserve an amount of R$ 62 million and has been spending so for the next couple of years [5]. This money is intended for the construction of bicycle paths and parking facilities, with the hope that by doing so cycling is becoming more popular and safe.

There are several laws in Brazil concerning bicycle use, stating that bicycle users should be approached just the same as any other vehicle. However the majority of the traffic participants are not aware of these laws and therefore the bicycle is sort of discriminated in traffic. Even police officers are not really aware that cyclers have any right to be on the road just like any other vehicle.

It can be stated that the government is willing to change the city into a more bicycle-friendly one, but the mindset of local authorities and inhabitants is not really ready for this development. Therefore a start-up has to be created in which people recognize and agree with the possibilities that the bicycle has to offer.
2.2 Demands and stakes

2.2.1. Demands and stakes from travellers
On behalf of the government of Rio de Janeiro a survey [5] has been taken place from October 2002 till December 2003. In this survey, about 34,000 households were questioned which contained 99,310 people. Findings leading from this survey are:

- 3.24% of all trips are made by bicycle
- 34% of all trips are made by foot
- On average people walk 20 minutes to their destinations
- On average collective transport takes 70 minutes
- On average individual transport takes 37 minutes
- The immobility in Rio is 46.6% (people who are not able to make trips)
- 50% of the inhabitants travel because of work and 21% travel because of educational purposes

In a report by ITRANS [5] from 2002, the mobility and transport opportunities for the poor society of several metropolis are described. Of the people involved 56% was female. Remarkable results were:

- Women seemed to be less mobile than men.
- Women do not like travelling in company of their children because of lack of money, lack of availability of transport at the weekends and overcrowded busses.

Recommendations that these involved people gave about the public transport and bicycle use, were in general three obvious ones: Lower fares, more comfort and more transport. Besides these some other recommendations were given:

- More vans and mini buses (which is a bit of the same as more transport)
- Increase of competition in the sector (which will lead to lower fares)
- Bicycle paths for people to travel by bicycle more safely (safety is a huge factor when cycling)
- Fewer private cars in the streets
- Education and training of drivers and conductors
- Priority for mass transit (fewer traffic lights – also known as stop lights - for buses, preference for buses in the streets; bus lanes to improve the speed and safety of bus transport)
- More safety (both inside and outside the vehicles)

2.2.2. Demands that nowadays can/cannot be fulfilled by bicycle/public transport
In the following, a number of alternatives for the car are listed. In each case there is considered if they meet up with the demands of their users.

A. Bus
Buses in Rio do not really have a schedule, which means they can never be too late. However in most areas the busses come every 5 or 6 minutes, the whole day through. They do not necessarily stop at bus stops but are also willing to let people out at other places. A bus ticket nowadays costs about R$ 2,50. This is rather expensive when you need to take three busses to get to your destination. It is not a surprise that most people consider the bus way too expensive.

The new busses (around 25% of the total busses) were considered comfortable, since they are air conditioned. Most busses however are considered uncomfortable, with their hard or broken seats and bad suspension.

The courtesy of the drivers was good, but their driving behaviour was not, since they drive way too fast, they do not always stop at bus stops and most of the time they are just not well qualified at all to drive a bus.
Travellers also complained about overcrowded busses, the irregular timetable and lack of transportation in the weekends and late hours. In addition to that, safety was named to be an issue since travellers had to deal with violence and muggings in and outside the bus.

B. Metro
The metro in Rio de Janeiro operates at a fixed rate of R$ 2.80 and is available from 5 a.m. until midnight. On Sundays it is possible to bring a bicycle into the metro as well, although few people know that. On most stations there are places to put the bicycle. People did not complain about the subway, because of its comfort and air conditioning.

C. Minivan
Minivans have fixed routes but will stop anywhere along the route to let people get on or off. Minivans are often used for big distances for example to Niteroi which is a city across the bay, opposite Rio de Janeiro. Prices are normally higher than when going with the bus (R$ 5.00), but they are considered more comfortable and useful for bigger distances.

D. Bicycle
The main findings about the use of the bicycle were:

- The few people that live in the favela use it to just ride within the favela and do not go outside. Leaving the favela is just not very practical because of steep stairs and pedestrian bridges.
- Violence is a big reason for not using the bicycle, since according to the questioned people it was much easier to hide when walking, rather than cycling.
- Another reason is that employers do not want their employees to arrive at work sweaty, because of their efforts while cycling.
- There are hardly any places to park the bike, and at the few places where it is possible to park the bicycle there is a high risk of theft.
- The distance is too great. When the distance is more than 10 minutes, they prefer taking another type of transport.
2.3 Stakeholders

Stakeholders [6] are important in the process of implementing a project (to offer the bicycle and public transport as a serious alternative for car use), since by involving them they could contribute to certain aspects of the implementation. Primary stakeholders are those that are directly affected by the project, both positively or negatively. The secondary ones are the intermediates when realizing the project. By making use of and involve key-stakeholders, the results of the project can increase rapidly. The table below shows the (potential) stakeholders that are involved, along with their particular interests or threats and the importance of that stakeholder.

What is remarkable in this scheme is that there are far more opportunities than threats, which means that cycling could be a very positive development when introduced.

<table>
<thead>
<tr>
<th>Primary stakeholders</th>
<th>Interest: Opportunity or threat</th>
<th>Importance (1-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The inhabitants, everyone who makes use of the bicycle and public transport</td>
<td>Opportunity: The pleasure of being outside in the open air and be physically active for a short time</td>
<td>3 – Key stakeholder</td>
</tr>
<tr>
<td>Motorized transport in general</td>
<td>Opportunity: Less cars, which means less jams Threat: More bicycles on the street to pay attention to</td>
<td>1</td>
</tr>
<tr>
<td>Bus companies (internal and external)</td>
<td>Opportunity: Make more money</td>
<td>3 – Key stakeholder</td>
</tr>
<tr>
<td>Employers</td>
<td>Opportunity: Positive image when employees are cycling, especially when taking into account climate and global warming. Besides that, they do not have to pay travel vouchers for their employees. Threat: People arriving all sweaty at their jobs.</td>
<td>2</td>
</tr>
</tbody>
</table>

Secondary stakeholders

<table>
<thead>
<tr>
<th>Secondary stakeholders</th>
<th>Interest: Opportunity or threat</th>
<th>Importance (1-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBISS</td>
<td>Opportunity: More people are mobile, which means more people could find work. Opportunity: The bicycle parking facilities could serve as a base of promotion for IBISS Opportunity: When people are cycling they will save more money than when they travel with public transport. This contributes to the awareness of spending and saving that people need (desire from IBISS) to have.</td>
<td>1</td>
</tr>
<tr>
<td>I-CE</td>
<td>Opportunity: Development of a bicycle policy in other parts of the world is one of the objectives of I-CE</td>
<td>1</td>
</tr>
<tr>
<td>Companies concerning bicycle use</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Ministério de Cidades (ministry of cities)</td>
<td>Opportunity: Realizing their objectives</td>
<td>3</td>
</tr>
<tr>
<td>Other potential Sponsors</td>
<td>Opportunity: familiarity of their names</td>
<td>1</td>
</tr>
</tbody>
</table>
2.4 Problems for Public transport and bicycle and their solutions

2.4.1. Problems

The following problems [5] can be discerned:

A. It is too expensive to travel by public transport

Although the price to get a bus in the main centre is not that expensive, a lot of people have to come from the suburbs which means taking several busses. This means that travellers could pay up to three times as much compared to a trip when using only one bus. And although it is obligated by law for the employers to pay the travelling costs for their employees, a lot of discrimination occurs leading to applicants being rejected because they live too far away. In the graph below you can see the relationship between percentage of employed people in Rio divided into income-categories and the percentage of employed people who actually receive help for transportation. Remarkable here is that people in the low income-categories are the least rewarded when it comes to transport coverage.

![Figure 9. Total distribution of employed people & employed people who receive help for transportation, by monthly income](image)

B. The image of the bus compared to train and subway

The image of the train and especially subway is much better than that of the bus. Reason for this is several good qualities of subway, namely safety, speed and comfort. The train was considered positive for its low fare and comfort. The bus is very slow, due to traffic jams and especially a lot of traffic lights. It also can get unsafe, because of robbers and pickpockets and it can get very uncomfortable, either because of the driving manners of the driver and because of the absence of air-conditioning. Besides that, busses tend to be overcrowded in some suburb areas. This does not contribute to improve the image of bus use either.

C. The bicycle

To start, the image of the bicycle is not positive, since cycling is seen as a thing that poor people do. And besides that it is not considered a serious means of transport but rather a leisure activity. The temperature is also a bad influence to cycling since people can get sweaty when cycling which is not appropriate when arriving at work. It is stated that when a trip longer than ten minutes of cycling has to be done, people rather choose to use some kind of motorized transport.

In addition to that, the motorized traffic does not pay any attention to cyclers which makes it very dangerous to drive on the same road as the motorized traffic does. Therefore an infrastructure is needed solely for cyclers. There are already some cycling paths, as is shown on figure 10 but these are covering way to little area to form a serious alternative for motorized transport. Besides that, theft has a major influence on bicycle use. People are just too afraid to get their bicycles stolen. And at last, compared to cars, bicycles have limited luggage space.
2.4.2. Solutions to these problems

A. It would be better if employers would maintain a standard amount of money that they offer for travelling compensation. This would still be unpleasant to the people that need to come from far, and thus pay more. But it would be a lot better compared to when they are being rejected in the first place, because they are too expensive to compensate their travel costs.

B. To tackle the problems concerning bus travelling and the resulting bad image that comes along with this, it is important to focus on demands that travellers make when driving by bus. For a comfortable trip, the following conditions are needed:

- Comfort when sitting down
- A shorter travelling time
- Comfortable climate conditions
- More safety

As mentioned in the previous part, to increase one’s comfort when sitting down, it is a solution to use comfortable, soft seats or to use normal plain seats but with a driver that knows how to drive properly with respect to the travellers. As also stated, the use of air-conditioning could make a lot difference since when standing still with absence of wind, the heat can be very disturbing, which is very counterproductive for the mood of the traveller in concern. To reduce travelling time it is a solution to make use of special lanes that are reserved for only bus travel and perhaps a reduction of traffic lights or traffic lights that somehow work in the advantage of busses. As it comes to safety, there is a division between inside and outside the vehicle. People waiting for the bus can be very vulnerable victims for robbers and even inside the bus people cannot be certain that their valuables are safe.

This however is not easy to be tackled since it is not really a characteristic of the bus as it is more of a social problem. The only thing that you could do is warn a lot, both audible as visual, to make people aware of the dangers both in and outside the bus.
C. The problem concerning bicycle use as follows:

- It is very unsafe to drive on the streets and there are by far not enough bicycle lanes
- The weather conditions are not suitable for long distance trips
- It is either considered transport for the poor or leisure activity instead of serious transport
- Theft

As stated previously, for the city to become more dynamic, a better bicycle infrastructure is required, but since people will not really use the bicycle when they need to travel more than ten minutes, this infrastructure has to focus on transportation nearby dense areas of employment, because of the heat people living in the suburbs still will not use the bicycle even when proper bicycle lanes are available.

Theft is another problem, since people do not trust their bikes at bicycle storage facilities, afraid of getting them stolen. So to tackle this problem it should be ensured that the bicycles are actually stored safely, but also that people trust the facility as being safe. So it is a combination of real safety and perceptual safety.

Even when all cycling conditions are perfect, there is absolutely no guarantee that people will actually make use of it. This is because the mindset of the inhabitants of Rio de Janeiro is not really pro-bicycle use. As is stated, riding a bicycle is either considered as transport for the poor, or a leisure activity. To change this mindset, people need to be convinced that the bicycle can be a proper means of transport for home to work. This can be done by proper marketing. For example if rich people are going to use the bicycle more, other people will start to notice this and start to think the bicycle might not only be appropriate for just the lower classes. In order to change the idea that cycling is more of a leisure activity, people just need some good examples. This can be done for example by companies, to support pro-cycling projects for their employees, while serving perhaps as pioneers for other companies. This image could work out very well, since climate themes globally are ranking very high on agendas of most policy makers. Companies could use this theme to change their image into a more positive one.

When more people would grab the bicycle to their works, this would mean that less cars would be dominating the streets, leading to less traffic jams and a cleaner environment. People should therefore be made more aware of these advantages.
2.5 Conclusions

From this chapter, the following can be concluded:

In general it can be stated that the main demands about public transport are comfort, safety and low fares. These demands can best be fulfilled by the subway.

The bus is not very comfortable, because the heat can get very high and because of the driving habits of the driver which are quite rude.

The bicycle as a means of transport is therefore seriously challenging the rest of transporting means when it comes to fares. A bicycle is an initial investment, but after that you can use it as many times as you want.

Problems concerning public transport and bicycle use are mostly incontrollable, however things like the **image and mindset** that people have towards public transport, are subjects to influent.

➔ **The goal from now on is: To focus on image and mindset people have of bicycle use**

➔ **The method to do this will be: Making use of marketing**

The next chapter will be about looking how to create this start-up by making use of the mindset of Brazilian (Rio de Janeiro) people and by looking at examples of marketing towards a more bicycle integrated society elsewhere.
Chapter 3 Method: Marketing

3.1 Retrospect

3.1.1. Intro
The previous chapter contains a lot of information that can be used in the continuing part, in which the goal is to create interest and motivation amongst the local inhabitants to make use of the bicycle and public transport.

The focus from now on will be on cycling in particular. This is because:

- This project is more about cycling (it was determined in advance that this project for a major part would be about designing bicycles)
- It is stated that the most important controllable aspect that I am able to influence is mindset towards the bicycle

3.1.2. Previous chapter
Some significant points that have been put out in the previous chapter are:

- The city contains a lot of elderly people. This has to be taken into account when implementing a marketing campaign. Elderly people are usually more scared and afraid.
- The wealth is bad spread.
- People from favelas are often disclosed from the rest of society. In order to reach this people one has to analyze the culture of that favela.
- The government is willing to invest in bicycle lanes. This is good to know since it might be possible to get support from the government.
- Bicycle use is considered for poor people only or as a means of recreation. Therefore one has to show that cycling can be a proper means of transport.
- Cycling is very dangerous in Rio de Janeiro, since there are hardly any cycling lanes and no one knows that cyclists have the same rights in traffic as cars.
- Theft. People are afraid to get their bikes stolen. Therefore it has to be made sure that people have trust in the fact that bicycle storages are completely secure.
- People do not want to cycle for more ten minutes.
- Opportunities for stakeholders. These could play a major role in funding projects.

3.1.3. Conclusions and recommendations from UT students
Since the UT-students Paul and Jasper were performing research in the same field, it is useful to look at their conclusions and recommendations. [5]

- Secure parking facilities. This would contribute to the sense of comfort that people need when they are using the bicycle.
- To educate the inhabitants. Especially children, since they are more easy to get accustomed to the idea that cycling is a proper part of traffic.
- Status is very important to people here. So it would be appropriate if the bicycle also is a way of showing off.
- It is the rule to first let the drug lords know what the idea is, when implementing new things. This is best been done by making use of organizations that are know in the neighbourhood, for example IBISS.
- An idea to get funds, is to combine a campaign or project with projects in the centre of town, since then it is more likely to receive governmental funding.
3.2 Familiarization with a bicycle policy

3.2.1. I-CE, locomotives
Since Rio de Janeiro is not the first city that is moving towards a more bicycle friendly environment it is very appropriate to first have a look at examples from other cities that are dealing or have dealt with the same problems and were the same sort of (desired) development has taken place.

The ‘Locomotives network’ [6] is an international network of civil society organizations working on increasing cycling mobility. The network facilitates exchange of knowledge and expertise between civil society organizations. It is hosted by I-CE, an international NGO for low cost mobility and integrated cycling planning. It is an interface to the Dutch cycling culture and capabilities. They have set up a broad range of strategies to reach people and convey their message.

These are some steps stated in order to create a sustainable cycling environment:

- A good analysis of the existing and the desired situation
- A clear insight in the relations between strategic, tactical and operational goals
- Involvement of stakeholders, allowing them to modify the strategy to stimulate their sense of ownership of it.
- Points of action to be developed on travel market, transport market and traffic market in order to enlarge the usability of cycles and to improve the competitive position of cycling.
- Strategies should be based on the strengths of cycling, trying to avoid its weaknesses
- Readiness to react on developments, both opportunities and threats
- All parts of the user-vehicle-road system should be targeted

3.2.2. Getting publicity
Publicity is very important in order to reach people but will not result in change of people’s behaviour. Publicity makes people receptive to the message, it will open the door for people that are actually willing to change their behaviour towards cycling.

In the following [7] some examples of ways to get publicity, are given.

A. Events
Civil society organizations can get ‘free’ publicity by using organized events. Not only there is a direct face to face contact with the inhabitants, there could also be a lot of media around like newspapers, radio and television recording the event.

B. Car free days
An example of an event is ‘Car free days’, which show how people can enjoy the streets in their city without the dominance of cars. Apart from this but directly connected, car free days can showcase alternatives to the automobile. It therefore can increase commitment by the general public for the subject of non motorized transport or create ground for change of behaviour.

C. Ciclovia
In 1974 the city of Bogotá introduced Ciclovía, a recreational cycling event on Sundays. Every Sunday morning 120 km of roads are closed to motorised traffic for seven hours so that they can be used for cycling, skating, jogging and getting together. The Ciclovía has been copied throughout Latin America. It is a way for people to ride safely and freely throughout their streets while they exercise and have fun. It is an event organised by municipalities and it is to create a sense of belonging to the inhabitants, to let them feel that their municipality cares.

In Copacabana (Rio de Janeiro), the motorist way along the beach is being closed on Sundays, which means pedestrians and cyclists do not have to worry about the traffic and feel totally free when crossing and walking around the street. This means that the municipality of Rio de Janeiro has an open attitude towards such events.
D. Producing a video
The videos made by partner organisations all promote the use of non motorised transport, the improvement of the traffic system for non motorised transport and the affordability of bicycles. They also all can be considered both an instrument for advocacy as well as promotional material informing people about benefits of cycling and about possibilities for behavioural change.

The video “Cycling friendly cities”, funded by the Dutch government shows how cities can become better places for people when they have a widespread and quality bicycle network. The video is used both to address current or future policy makers as possible bicycle users like students and scholars. This video shows the possibility to create attractive public space by intervening in the traffic system. This can create commitment from the general public for this theme, which can help to create backing for the activities by the civil society organisation.

E. Target group oriented activities
Target group activities have the same aims as public activities, but in this case the information is more specific and more adjusted to individual problems and opportunities. Besides that, these activities are more directly purposed to change behaviour. An important aspect of target groups is that they can or will support each other within the group to start change behaviour as well. Groups that were approached by the Locomotives program:

- **Pupils and students.** These can be reached for example by giving information about the benefits of cycling, like health and environmental characteristics. But also how to cycle in traffic, maintenance of the bicycle and to perform simple repairs.
- **People from middle to high income.** Since riding a bicycle is considered for poor people only it is very useful to approach middle and high incomes since it will automatically attract poor people as well.
- **Companies.** Approaching them can be done in the form of general campaigns aimed at all workers to inform them about the possibilities of the bicycle or specific activities which include supporting driving a bicycle.
- **Health care workers.** A great advantage of involving health care workers, is that they can inform patients and suggest to use a bicycle as a means of transport. This is very useful, since people like health care workers are being seen as people one would like to take advice from.

F. Cycling Advocates’ Network (CAN)
The Cycling Advocates’ Network (CAN) was formed in 1996 as New Zealand’s national network of cycling advocate groups. It is a voice for everyday cyclists - recreational, commuter and touring. CAN works with central government and local authorities, on behalf of cyclists, for a better cycling environment. In 2004 they have published a document in which 50 ways [8] are described in order to create a more cycling friendly based society. These 50 ways (full version in Appendix A) are categorized into different stages of implementing. Below are the steps which are particularized to the promotion of the bicycle:

- **Dispel myths about reasons for not cycling.** Such as hills, weather, distance, passengers and luggage. Every community already has cyclists who overcome these perceived barriers every day.
- **Publicise cycle facility provision.** Such as cycle route networks (direction signs and maps) and cycle parking.
- **Publish a map of cycling routes and facilities.**
- **Develop and promote cycling activities** (e.g. rides, displays) in association with cycling clubs and groups.
- **Use cyclists in council promotional events and media.**
- **Encourage other employers** to develop travel plans to help their employees find better ways to travel than private cars.
As can be seen these steps contain some strategy parts which are quite similar to the ones that the locomotive program uses. For example using events and other ways to get the people familiar with the phenomenon cycling. Approaching companies is something which is also advised, although ‘to encourage other employers’ differs from general publicity, since publicity coming from a colleague is more valuable because the information is coming from someone familiar, which means it is being received as a more reliable message.

G. Delft
The municipality of Delft launched a new cycling campaign [9] in 2006, in which the phrase ‘Delft fietst’ (Delft cycles) was the central theme. This phrase could be found in folders, papers and websites. Besides that there were several target groups which were being approached, in order to let children start cycling earlier and to let the elderly stop cycling later. The message that they tried to convey was that Delft is a by all means a city for cycling. The communication plan had two main goals which were:

- To inform people about all types of cycling information (Opening hours of bicycle storages, places to buy bicycle facilities, how the municipality helps realizing a bicycle policy etc.)
- To persuade people to use the bicycle

H. Travel blending
Recent projects [10] in Australia, Santiago and Chile show that a means of social marketing called travel blending may be changing travel behaviour of the inhabitants. In essence, it is about reducing the number of car trips people make every day. Most people make four or five trips a day, to work, to go shopping, etc. It therefore might be possible to substitute some of these trips which are performed by car, into a bicycle trip. Travel blending starts with interviewing individuals to find out about their transport choices. Usually some of these questioned households are open to make some changes into their travelling behaviour. The program supplies whatever information people need along with supplies and a lot of encouragement to make these changes.

The results were remarkable. Of 380 households asked, the program caused 6 % decrease of all trips by car immediately and 1 % additional decrease after twelve months. Public transport trips rose from 6 % to 7 % of all trips and cycling trips rose from 2% to 4%. The technique is now being used throughout Australia and some cities in Europe.

I. Tilburg
The Dutch municipality of Tilburg has implemented a same sort of promotion [11]. Principals of the communication to the inhabitants were:

- Inform target groups about the cycling policy and certain actions resulting from this
- Stimulating target group to cycle more often
- Motivating target groups to use the cycle more often
- Creating a platform for cycling policy and actions to several target groups
- Persuade target groups of the importance of cycling

The communication messages in Tilburg are based on safety, while cycling and when the bicycle is stalled, health and environment.

Promotional actions of the municipality contained:

- General promotional action
- Communication focused on target groups
3.2.3. Strengths and weaknesses

In order to create a reliable relationship with the customer, one has to look at attributes that are relevant to this relationship, to find out what the needs and demands of each traveller are.

<table>
<thead>
<tr>
<th>Quality attributes</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility (availability in space of a mode)</td>
<td>Easiness of access to the transport system and the activities</td>
</tr>
<tr>
<td>Frequency (availability in time of a mode)</td>
<td>Index of occurrence of the transport service within the time interval</td>
</tr>
<tr>
<td>Reliability</td>
<td>Minimization of uncertainty of the commuter in relation to the effective service delivery according to pre defined requirements.</td>
</tr>
<tr>
<td>Travel time</td>
<td>Period necessary to fulfil necessary activities for the displacement between an activity and another one.</td>
</tr>
<tr>
<td>Comfort</td>
<td>Material welfare referring to the service offered, in relation to the expectations of each one</td>
</tr>
<tr>
<td>Price</td>
<td>Value established by a political decision based on contractual definitions and/or skilful analysis</td>
</tr>
<tr>
<td>Safety</td>
<td>Confidence of the commuter that he will be protected against accidents that will affect his physiological or psychological integrity</td>
</tr>
<tr>
<td>Ease of use</td>
<td>The degree to which travellers spend affective and cognitive effort on a journey by public transportation.</td>
</tr>
<tr>
<td>Communication &amp; information</td>
<td>Information that customer receives, through different communication media, about the transit company contributing to his perception of the service and company</td>
</tr>
</tbody>
</table>

Table: Quality attributes of public transport [12]

For promoting the bicycle it is important to focus on the strengths and avoid talking about the weaknesses. In order to do that there first have to be looked at what these strengths and weaknesses are. In the following table they are enumerated [13].

**Strengths and weaknesses of the bicycle**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual and independent choice on time of travelling (flexibility)</td>
<td>Not fit for longer distances</td>
</tr>
<tr>
<td>Travel from door to door</td>
<td>Cyclists are vulnerable</td>
</tr>
<tr>
<td>Relatively impervious for congestion</td>
<td>Limited luggage transport capacity (compared with cars)</td>
</tr>
<tr>
<td>Easy to use, little training required</td>
<td>Exposure to unpleasant weather conditions</td>
</tr>
<tr>
<td>Low costs per km travelled</td>
<td>Low status and lack of respect by other road Users</td>
</tr>
<tr>
<td>Limited space consumption</td>
<td>Initial investment for purchase sometimes unaffordable</td>
</tr>
<tr>
<td>Little impact on liveability of cities</td>
<td></td>
</tr>
<tr>
<td>No environmental impact</td>
<td></td>
</tr>
<tr>
<td>Reasonable luggage transport capacity (compared with walking)</td>
<td></td>
</tr>
</tbody>
</table>
People use a lot of excuses for not using the bicycle. In the following some common excuses are given, along with their counter arguments. It consisted originally of twelve excuses and answers. The complete version is found in Appendix B.

3.2.4 Common excuses and answers:
In [14] there is a list of common excuses and answers for soon to be bicycle users. Here are six of them. The rest can be found in Appendix B.

A. It is too far to ride
   Answer:
   *Consider driving or using public transport part of the way and riding the rest. This is especially useful if you work in a traffic-congested area. Reducing motor vehicle use will help the environment and becoming a bicycle commuter will create more awareness of other cycle commuters when driving.*

B. I am out of shape
   Answer:
   *Cycling no more difficult than walking. When riding more, you will ease your way into better shape, building fitness that will be a regular part of your schedule. In case of health problems, it is best to consult a doctor for suggestions on getting started.*

C. There is no secure place for my bike
   Answer:
   *In most cases there is a storage room or closet where the bike can be secured behind a locked door. Otherwise, it could be locked to an immovable object, such as a lamppost, with a strong secure lock.*

D. I have to dress smartly for work
   Answer:
   *Some bicycle commuters simply ride in their business clothes - they seem to command more respect from motorists. Many ride in casual or cycling clothes and change when they arrive. These can be carried on the luggage carrier on the backside.*

E. What if it is rainy or cold
   Answer:
   *One can begin as a fair-weather bicycle commuter - when the forecast is bad, no cycling. Some people may overcome the elements and commute every day, but it does not mean everyone has to. It still means a dramatic improvement.*

F. It is not safe to ride in traffic
   Answer:
   *The fear of riding in traffic is often much greater than the actual danger. Most bicycle accidents involve children and cyclists who do not obey the law. So one has to minimize risk by riding properly visible, responsibly, and following all traffic laws.*
3.3 Product Marketing

3.3.1. Gaining and maintaining customers
Since the goal is to make people enthusiastic about cycling it is highly appropriate to look at some theories about marketing. A report from 2006 [15] stated that people make decisions for products based on:

- Routines: “I do not know why I buy this brand but I am buying it for years”
- Impulse behaviour: a product seems surprising, new, intriguing and is affordable. In this case it is not necessary to evaluate the pros and cons on beforehand but the consumer buys the product in order to evaluate it during the use.
- Social determined behaviour: the preference for a certain type of product is being determined by the frequency at which others use it. It is as well possible that consumers buy products because others don’t buy it in order to be unique;
- The use of simple decision rules: “it is expensive so it must be good”, “it is Philips so then it is good”;
- The attractiveness of the (shop) environment.

In order to be able to control his sales, suppliers try to get better control over the consumer behaviour of their customers by:

- Customer relationship marketing, which means focusing on separate transactions between vendor and customer and establish a valuable relationship this way.
- Cross selling: Making use of a previous purchase in order to lower the barrier to purchase another product.
- Individualisation of the service: Supply to the needs of the individual customer

These three dimensions can be represented in a cube, as shown on figure 11. It represents one’s position in the market (Synergetic marketing in the figure)

The three axes (three dimensions) represent the following characteristics:

- Prolongation of the provider-customer relation
- Augmentation of the supply (offer) per customer by supplying service packages
- Individualization of service supply

Figure 11: marketing development model
3.3.2. Customer value
Below a schematic representation of how customer value a certain product is given [16]. On the left the advantages that people experience in the consideration of buying a product and on the right the obstacles they face. This is partly because of a high price. If this representation would be reflected on the marketing of bicycle policy and in particular the marketing of bicycle storages then the most important aspect would be in first place ‘image’. This could either be a good or a bad thing. People could use it as an example for the rest of society (social advantages) to show that cycling is fully normal, appropriate and a proper alternative for the car. Or people are being pushed away from it because of the possible negative perception of cycling (a poor people only activity or just a leisure activity). ‘Price’ is not too much of a sacrifice since people will actually save money when making use of the bicycle instead of the car (or other types of transport but walking).
‘Psychological sacrifices might be a bigger factor, since switching to this type of transport might be a lot of psychological effort, while in practice it is actually very easy. People might be worried about things that in reality are not that much of a burden, like for example theft. Bicycles could be parked totally safe, people still need to feel that their bikes totally safe. This is the difference between real safety and perceptual safety.

Figure 12. Components of customer value

3.3.3. Consumer segmentation
The following scheme shows how consumers can be segmented into the diverse dimensions: Behavioural, Psychographic and Profile.

Figure 13. Consumer segmentation [16]
The ‘profile’ dimension has been discussed in the beginning of this report, containing demographic, socio-economic and geographic characteristics.

3.3.4. Psychographic dimension
In the following [16], aspects of the psychographic (lifestyle and personality) dimension will be discussed.

A. Carioca’s
“Carioca is a Portuguese adjective or demonym word that refers to the metropolitan area of the city of Rio de Janeiro, Brazil. The original word "Kara’i oca" comes from the indigenous Amerindian language of the Tupi people, meaning "White Man’s House".

Carioca’s care about being joyful, care about being young at heart, no matter what age. They believe they are privileged living in a place gifted by God, a city that spread out from beaches, mountains and nature, resulting in beautiful sunsets, magnificent beaches, hot sand, bronze bodies and breathtaking landscapes. The carioca’s are proud of the city and for them is the best place of the world to have fun.

Carioca’s love tourists and love talking about their culture, as well as learning the cultures of those who visit. Carioca’s are warm and friendly, they are proud people who like to talk and socialize, along with helping anyone in need, with their greatest feature being that they are always smiling. They will normally greet you first or they will pleasantly respond to your greeting.

Music is a very big part of Rio’s culture, with the main music rhythm being Samba, which is the major emphasis of the carnival parades. All Carioca’s can dance the Samba and are always ready to teach someone else.

At the beach Carioca’s usually practice frescobol, volleyball, body or surfboarding and, of course, beach football.

A Carioca is not a true Carioca if he or she does not cheer fanatically for a team. There are four main soccer teams in Rio.

B. Men and Women
Like many other Latin-American countries, Brazil has a rather ‘macho’ culture. Brazilian women are known to be very strong and demanding and not easily pushed around. Beauty is a common attribute to a Carioca woman and Carioca males often show their appreciation with a long look or a kind comment. Both sexes can be a bit possessive and may not want you looking at “their property”. Men can be surprisingly forward and can make some comments when a female is passing, which is just an expression of appreciation.

C. Promptness
Virtually no event starts on time. No service personnel will ever see the fault in making you wait while they finish up gossiping on the phone. Even your friends are not immune. If you invite people for dinner, do not expect to see anyone for at least two hours after the specified time (fashionably late).

D. Interview
Conversation with Flavinha de Souza, graduating on urban planning at the University of Twente:
In order to make cycling a success one has to make sure that cycling is being seen as ‘cool’. To create that it is very helpful to involve famous people in this campaign, for example actors of the local broadcasting central named ‘O Globo’. The effect is that people will recognise these people and since they feel affiliated with them, they will associate the same feeling with cycling.
3.3.5. Behavioural dimensions
The behavioural dimension is very dependent on the place where the bicycle storage is located, since not every part of town can be reached easily by bicycle. If the bicycle storage is located at a place that is either a strategic point, for example a point close to their work or close to a metro station, and also easily to reach, then this is very beneficial and thus worth considering. Therefore when looking which group will be targeted there has to be looked at the location and at the people to whom it can be an improvement to use the bicycle.

3.3.6. Introducing a new product

![Categories of Innovativeness](image)

When innovating a new product [16] there will be different stages of adapters over time, with different types and quantities of people. In the beginning there are the innovators, who are usually being seen as nerds or geeks.

Early adopters, also called sneezers, are the people that actually have connections with mass society but are usually always in the front-row when adopting to new techniques. At that point the techniques are usually proved worth or determined to gain some market share. This is an interesting group since these people have a big influence on the next stage, the early majority.

The early majority are the frontrunners of the great majority. These are the people that are always willing to stay modern, but first need to be sure that a new product is thoroughly tested.

The late majority is the second half of the great majority and these are the people that are joining when a product is already selling greatly.

‘Laggards’ is the final category and these people usually never adept to a new technology, and if so, they will do this at the final stage of the product.

3.4 Principles of behaviour change

Before implementing a policy [17] one needs to realise how people will respond on a certain action. Besides that, if things are not going the way they should one has to intervene in time. The most important of these principles are:

- **Own attitude is not sufficient.** Even if someone thinks cycling is very desirable, he or she would not always act this way if the common opinion on cycling is against cycling. A negative public attitude towards cycling is influencing the ones who are normally actually positive towards it.
- **Attitudes are being formed by behaviour.** So if people are forced a little to use the bicycle they will adapt their attitude to their behaviour and will eventually even start thinking positive about cycling. This means that policy is a matter of sustaining.

- **You cannot trust individuals to change behaviour.** People have to be sure that others will do so as well. Therefore as mentioned above, it is important in the beginning to initially force people a little so people will start to feel like as if it is normal what they do.

- **Habits have to be broken.** Because most human behaviour is based on habits. Arguments will not work, something drastically needs to occur first.

- **Justice.** People want to be treated equal and with justice. If the policy is not equal in their eyes, this could mean that their behaviour could get counterproductive, since people will show opposite behaviour.

- **Credibility.** It has to be made sure people will see a change of policy as a change in favour of the community rather than as a change based on self-interest.

**The Prochaska model**
The Prochaska model [18], or stages of change model, is the rate of motivation that people have in changing their behaviour towards something. It can be divided into five different stages:

- **Precontemplation**
  One is not aware of a problem and is not considering change of behaviour. This person has no intention to take action within the next six months.

- **Contemplation**
  A considering phase in which one is balancing between the positive and negative aspects of changing his or her behaviour and intends to take action within the next 6 months.

- **Preparation**
  A preparation phase in which one is promising him or herself to change behaviour. Intends to take action within the next thirty days and has already taken steps in this direction.

- **Action**
  In the action phase one is showing the new behaviour. This is being done in less than six months after the preparation phase.

- **Maintenance**
  In this phase the change of behaviour has been sustained for six months.
3.5 Conclusions

The most important aspects from previous sections are described below. It is best to not only approach people individually, but to distinguish certain groups in which people can make each other enthusiastic.

To create segments of people one could select people by dimensions like behavioural, profile and psychographic dimensions.

People normally want to live their lives according to their habits, because that just is the easiest way. To break this habit something first needs to happen.

It is highly desirable if different stakeholders would join and support this in the process. This would have several advantages.

To gain publicity one could think of cycling events, commercials, radio airing time, newspaper space, folders, vouchers, travel blending, lecturing at schools and focussing on target groups.

Theories of product marketing could be applied to cycling (and in particular the use of bicycle storages) as well.
Chapter 4 The bicycle storage

It is mentioned in the video “Cycling friendly cities” (mentioned earlier on chapter 3.2) that in a culture where cycling is mostly considered leisure activity, such events are insufficient to change this culture. Also the theory of behaviour change shows it takes a lot of effort to change ones behaviour, because you need to really force a person in the beginning of the process to change, else they will stick with their lives as they are at that moment.

In agreement with Warner Vonk, supervisor of this project, it is decided that the main focus will be on the existing user instead of approaching non-users. The theory is that, when satisfying the users more that are already there, they will gain a better image about cycling and spread the word to others. In other words, it means first satisfying the existing user, before focusing on the non-existing users.

The focus hereby will be solely on bicycle storages, because:

- It is pre determined that a major part of the project would be about designing bicycle parking facilities
- A start-up point is needed, from where the rest of the campaign (to implement a bicycle policy) can be developed.
- There is a demand for proper parking facilities. Nowadays parking facilities are very unsafe, so people do not trust them.
- There are cycling paths available, but often there are no parking facilities. This is a major threshold for people in order to take the bike to work or any other short distance trip.
- These bicycle parking facilities and its marketing could serve as a measurement to see if the idea is being received positively. If more people start using the bike, the cycling policy can be more expanded, step by step.
- A point of focus had to be created, in order to decrease the scope and size of the project

→ The challenge is to let existing users make use of the bicycle parking facilities
4.1 Dimensions

Before starting to design the bicycle storage, it is very useful to make a subdivision of dimensions which should be taken into account before designing. The following division is stated:

- Customer based dimensions
- Stakeholders
- Location dependent dimensions
- Budget

4.1.1. Customer based dimensions

A. Beating anxiety

When customers were previously used to putting their bikes at handrails in alleyways, we now want them to make use of the storage facility. Therefore a little change in behaviour is needed. It is possible that in a primary phase people do not trust the facility. A solution to this is, in the first place, to make the facility express something that is familiar to them. This will decrease the threshold, caused by eventual anxiety that people have.

This can be done by making use of popular figures, like mentioned actors from ´o Globo´ or famous football players. This will cause people to associate the facility with these famous people and feel comfortable with it.

Example: In the beginning of 2010 a Dutch campaign started, named ‘Heel Nederland fietst’. It emphasized partly on Dutch immigrants that do not consider cycling being ‘cool’. A solution that campaign came up with, is to use role models, in this case football players from the Dutch soccer club ‘Feyenoord’, to gain enthusiasm amongst these immigrants.

B. Customer demand pyramid

The figure depicted below shows three dimensions: money, effort and time. These are also shown in the customer value scheme on Figure 12. The most important dimension is the amount of effort (red) people have to deliver. This is the basis for the facility to be successful. Of second importance, the amount of time (yellow) it takes to perform a certain action. This is less important, but still of primary relevance. And third, the amounts of money (green) people are willing to spend. This is merely a matter of luxury than a primary need. [19]

![Figure 15](image)

The customer-satisfying-pyramid (figure 16) works bottom-up and is corresponding with the three dimensions shown in figure 15. It also contains some attributes which are shown on the quality attributes of public transport-table in Chapter 3.2.3.

At first, one has to take into account the trust (red) people have in the facility, which means paying attention to (social) safety and reliability. Secondly the yellow part is about the ease and velocity when using the facility.
This still is essential to the customer. Mention the yellow circle: The feeling of ease is also influenced by the red part. The green part is the least important part, because it emphasizes on luxury instead of primary needs. However this could deliver something extra to the facility which could change people’s mood at that moment and leave positive memories which could make them want to use the facility another time. People’s comfort and emotions are, as indicated by the green circle, not only influenced by the green part, but by the whole pyramid.

Figure 16

Safety and reliability (red part pyramid)
Safety has been discussed for a major part in chapter two. It is not always about real safety, as it is also about perceptual safety. The safety that people think they have. Therefore it not only has to be safe, it also has to look safe.

So the first demand, deferred from this fact, is:

The storage facility needs to be closed from the outside world or needs to be guarded. This means that strangers will not be able to access the bikes from the outside world. It also means that people will not be able to access the facility from no other place but the entrance. All of this will fully contribute to the perceptual safety that people have of stalling their bicycles.

It is highly appropriate to have an employee working at the facility. One who guards the bikes and even better: Places and retrieves the bicycles. Reliability is in this case of major importance. People need to have trust in this employee.

Easiness of use (yellow part)
The solution shown above (the fact that they do not have to place the bicycle themselves) will also fully contribute to the intercourse people have with the facility. People can just hand over their bikes, they will be stalled ‘automatically’ and they can just leave right away.

Comfort and emotions (green part)
To make sure people are comfortable when using the storage facility one has to keep in mind the points that were put out in the previous chapter about marketing. Doing this, there can be looked at the described theory about product marketing, previously in this report. This stated (aspects to keep in mind):
- Customer relationship marketing, which means focusing on separate transactions between vendor and customer and establish a valuable relationship this way. For the storage facility this means a good interaction with the employer working there (if the storage has hired an employee), which will include courtesy and promptness.

- Cross selling: Making use of a previous purchase in order to lower the barrier to purchase another product. If a user has been making use of the storage previously, and liked it, the threshold to do it another time is significantly lower.

- Individualization of the service: Supply to the needs of the individual customer. When there are customers that are coming back frequently, on for example a daily basis, it is appropriate that this customer is recognized as an individual, and not just as a number.

C. Some guidelines

When designing something in Brazil that is meant to be for everyone, the philosophy is to only focus on the rich when it comes to design and expression. This is because of the importance of status in Brazil: The poor and middle incomes want to have the same things that the rich have as well, in order to gain or maintain a high-status level.

However, this fact only applies to attracting people. It does not mean that the low-income groups do not have to be taken into account. The product has to be there for all income groups that want to make use of it. This means, if the product needs to be paid for, one has to look at the weakest link, the low-income groups, in order make it affordable for all people.

In addition to this Nanko van Buuren (frontman of IBISS) told something he had experienced in the municipality of Caxias, close to Rio de Janeiro. Caxias has lots of favelas, with lots of poor people. A while ago, the municipality decided to place some luxurious, fancy bus stops. Normally bus stops across this part of town were often violated or demolished. However this time all of the luxurious bus stops were kept intact, which was according to Nanko a matter of respect. People felt respected that the municipality did this thing and therefore the people did not intend to do any damage to it. This phenomenon should be taken into consideration when designing the facility.

4.1.2. Stakeholders

In chapter 2.3 there has been paid some attention to stakeholders. However this was mainly concerning a bicycle policy in general. The storage facility is a part of this policy and therefore the mentioned stakeholders are automatically also stakeholders when bicycle storage facilities are implemented in town. Yet, there are some different stakeholders that need to be mentioned since we are talking about bicycle storages in particular. These are:

Primary stakeholders

- Employers working at the facility. The opportunity for them is to earn money. The threat is that they could be violated, when for example some robbers try to steal some of the inventory. So it needs to be assured that the facility will collect some money in order to hire these employees. This could be done for example combining it with a kiosk.

- Kiosk. A previously mentioned idea is to combine the facility with some kind of kiosk. The opportunity in this is to gain more attention for both the facilities, and therefore more profit.

Secondary stakeholders

- The construction company that will establish the facility. The opportunity for them is to gain some commerciality while constructing the facility. In order to this the name of the company can be mentioned visibly for the outside world.
- IBISS. The opportunity for IBISS is a more widespread cognition of their name

- Sponsors, in particular the insurance company ‘Sul America’ which is responsible for the (free) placement of the bicycle racks along the beach and other locations in town. The opportunity of course is a positive image, an extension of the image they already have, supporting the implementation of bicycle racks.

- Warner Vonk/I-CE. Opportunity: If the facility makes it to production, it will contribute to their goal of spreading out a worldwide cycling policy.

4.1.3. Budget
Since there was no clear view on what the budget was going to be like, there has been decided in accordance with Warner Vonk that for every design a high-end version and a low-end version will be created, so that there is a design solution for both cases (high and low budget).

4.1.4. Location
Three locations have been picked out, on which the design will be focused. This is to make sure that the design is multi applicable and can adept to different locations. These are the different locations:

1. The first one is the shopping mall in Bangu (Figure 22)
2. The second one is a ‘passarella’ (Figure 19 and 20), which is pedestrian bridge to cross a busy road.
3. The third one is a subway station called ‘Cantagalo’ (Figure 17 and 18). This is situated in Zona Sul, the rich part of Rio de Janeiro which contains the main beaches like Copacabana and Ipanema.

![Figure 17 and 18](image1.png)

![Figure 19 and 20](image2.png)
4.2 Conclusions of field work

As part of the research a field study has been done to the characteristics of existing storage facilities. The main findings were that in approximately 80% of the cases the storage facility is just a plain white rack to support the bicycles. An example of this is shown on figure 21. These facilities are located at the sporadic places where there are bicycle paths, mostly at touristic spots. However hardly anyone is placing his or her bicycle at these facilities. Usually they are empty, and if there is a bicycle, it is usually an old bicycle wreck. Most of these racks or being offered for free by the insurance company ‘Sul America’.

Occasionally, the storage facility differs from these white racks, for example at the shopping centre in Bangu (Rio de Janeiro). The findings were, after asking the security guard:

- People are actually making use of the storage facility. This bicycle storage located next to a shopping mall in Bangu contained approximately 100 bicycles.
- The facility has rush hours on 12 o’clock and from 5 to 6 o’clock
- People are not paying for the facility
- The facility is being guarded the whole day through
- Customers need to hand over a card to retrieve their bicycle
- Customer bring their own locks
- The facility is closed poorly from the outside world
4.3 Resulting Demands

Customer based demands:
- The facility has to be guarded and/or has to be closed from the outside world
- The customer needs to be able to leave and retrieve the bicycle within one minute of time
- The bicycle racks need to be designed so that the rack is attached to the frame and not to the tire (demand from Nanko and Warner).
- The design has to try to trigger positive emotions of the customer, in has to be recognizable and make people proud when using the facility.
- The facility has to contain something that is familiar to the customer, in order to take away the anxiety.
- If there is an employee working there, he or she needs look official and reliable

Non-customer based demands:
- The sizes have to correspond with, and the design has to be suitable in the concerned location, varying from 50 to 150 m²
- For every design there has to be a high-end and a low-end version because it is unclear what the budget will be like.
- In addition: A demand from Warner was to implement some natural aspects, like trees, into the design.

It has to take into account demands from several stake holders:
- The design has to be made so that the facility could easily be combined with a kiosk or information centre.
- There has to be space for stakeholders advertising their name or brand, like IBISS and Sul America.
Chapter 5 The design

5.1 Brainstorm and first ideas

Before starting the design, a brainstorm has been performed by making use of an Excel-sheet. This has been done by filling one column with items to trigger the customer’s emotions based on the psychographic dimensions as mentioned in chapter 3.3, filing one with properties of a storage facility and another one with several aspects of bicycle use. The result is listed below.

<table>
<thead>
<tr>
<th>Emotional aspects</th>
<th>Aspects of use</th>
<th>Facility properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate, beach, sun environment, palm trees</td>
<td>Arrival: Brake, stop, step of, walking on with bike</td>
<td>Appearance of facility: Rich, expensive, beautiful, remarkable, recognizable,</td>
</tr>
<tr>
<td>Soccer, Flamengo, Botafogo, Vasco da Gama, world championship, Ronaldo, Kaka, Pele, Zico</td>
<td>Possibility one: Walking to rack, perhaps waiting because of rush hour, placing bicycle, locking the bicycle, walk out</td>
<td>Interaction with user: Relation, comfort, easiness of use, efficiency, effectiveness,</td>
</tr>
<tr>
<td>Training, eating healthy, fruit</td>
<td>Possibility two: Walking to beginning of facility, hand over your bicycle, receive a number of show identification, walk out</td>
<td>Elements of facility: Rack, foundation, size, division, efficiency of location, covered in, trash bins</td>
</tr>
<tr>
<td>Olympic games</td>
<td>Retrieval possibility one: Walk to facility, waiting because of rush hour, searching bicycle, unlock bicycle, retrieve bicycle, walk out with bicycle, jump on bicycle</td>
<td></td>
</tr>
<tr>
<td>Samba, carnaval, music, drums</td>
<td>Retrieval possibility two: Walk to facility, show number to guard or show ID, await retrieval, walk out</td>
<td></td>
</tr>
<tr>
<td>Friendliness, laughing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cool, image, expensive, style</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caipirinha, rice and beans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Favela, violence, own cultures in favelas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pride, proud of the city</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women, bikini babes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actors from O Globo, a broadcaster</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relax attitude, laid back, warmth</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

After doing this, there has been a look for combinations between these columns in order to create some ideas. These results will be discussed on the next page.
In the first sketches there has been experimented with the shape of the facility. In all cases the idea is to create something big, something to look up to and to be proud of.

Figure 23. The soccer-like shape on the bottom left which will be returning later on in the process
Figure 24 and 25
Figure 28 and 29
5.2 The fun theory

On figure 32 some balls are shown, being a projection on the floor. They are interactive with the pedestrian. When kicking the balls, the balls will move as so. This led to a memory of a phenomenon that includes a bit of the same thing, as will be explained in the following.

The fun theory is a phenomenon that a group of Swedish designers came up with. It states that if you make something (which could be anything) fun to do or use, people are getting enthusiastic and more people are starting doing or using it. An example below is the stairs in a subway station in Stockholm. As a result of this action more people are using the stairs instead of the escalator. This contributes to physical health on a small scale.

This theory provided some more inspiration as is elaborated on the following pages.

The idea is to try if there is an aspect that could be implemented in the storage facility, keeping the philosophy in mind: ‘If something is fun to do, people are going to do it’. The following sketches show some of these ideas.
Figure 34 and 35
Figure 36
5.3 Concept

5.3.1. Concept

In accordance with Warner Vonk it has been decided to choose one of the shapes, the one on figure 31. This has been chosen as the design of the facility. This has been chosen because it fits best to the demands. It is something big, something recognizable and something to be proud of since it exhibits a similarity with a soccer ball. And it is pretty clear that the people are extremely fond of soccer. Also this shape is able to adapt to different sizes, it has enough space to host a kiosk and the walls of the facility have enough surface for advertisements. The design is therefore very flexible as well.

In addition to this it has been decided to use the ‘fun theory’ for another phenomenon in the same facility. So from this point on, the shape of the facility will be elaborated based on figure 31 and one aspect of the fun theory will be elaborated and applied to the facility.

In one of the conversations, Nanko van Buuren, director at IBISS, stated that it would be highly pleasant if the inhabitants of the favelas and people in general were made aware of the fact that they receive free electricity, free water and that if they save all the money they receive for travelling they could ‘earn’ a quarter of their monthly wages.

It has been decided with Warner that this fact is going to be combined with an attribute of the fun theory similar to things these designers have put out previously. This would include:

- A display on which the customer can see personal information
- The information needs to consist of a number that states either how much money was saved when cycling instead of taking public transport or the car, and how much carbon oxide has been saved by doing so. This number of carbon oxide might not be very relevant information to the user since they cannot really visualise what it says. But at this stadium it satisfies since it is yet a concept. In a later stage there will be looked for ways to make this number a more catchy and ‘relevant’ one.

So the main task formulated in one phrase: When the customer enters or places the bike, ‘something funny’ needs to happen in order to make people either excited and on the other hand make people aware of money and environment.

There has been paid a lot of attention to the display while brainstorming but it ended with the conclusion that it would be best to implement an actual display instead of things like a projection on the wall or something similar. The idea at this point was that every customer that is walking in, would have a display attached to their bicycle rack.

More ideas concerning this principle:

- With regular customers: adding the amounts of money and carbon oxide they saved, every time they enter the facility again into a cumulative number. At a certain amount they will receive refunds.
- Regular customer will receive a card to access their personal account on the display. This will display other relevant information as well like weather forecast and horoscope for example.
- An idea was to lighten up empty, unoccupied racks with a green light, and the occupied ones with a red light.

There has been some ideas concerning the shape of the display as can been seen on the following figures.
Figure 39

Figure 40. Amount of money and carbon oxide per day and per month
At first the idea was to create a display for every customer. However it has been decided after this that the focus will be on one single display for all customers. One could think of a central spot in the facility to locate this display so that customers are always passing by when they need to place or retrieve their bicycles.

On the one hand this display needs to be triggered when the customer enters the facility, on the other hand this display needs to be interactive with the user. This means that the display needs to have buttons so that the user can configure and receive relevant information about his or her trip.

Because most displays at information service areas are touch screen nowadays, this display has been decided to be touch screen as well. On figure 41 there is an example of the concept. The complete functioning is elaborated in Appendix C.

Figure 41
5.3.2. Shape of the facility

Figure 42 and 43
Figure 44 and 45
It has been decided in accordance with Warner Vonk that three versions of the facility will be created, dependent on different locations. By doing this, it is being proven that the facility can adapt itself to different conditions. The three versions are based on real locations, namely at a shopping mall, at a subway station and at a passageway. The models are shown in the following part.

The idea was to apply mosaic on the walls, as is been done at the famous stairs of Lapa (figure 47)
5.3.3. Modelling

The facility has been modelled into three different sizes

Figure 48. An oblong version of the facility

Figure 49. A shorter version of the previous one
Figure 50. This version of the facility is meant for a more square-like environment

Figure 51 and 52. The display pole at the facility
5.3.4. Renders

These models were taken into a rendering program (3ds Max) and fit into the desired location:

Figure 53 and 54. The 'passarella' (passage way) version of the facility
The facility will probably stand out a lot from the general environment, but this is not a problem, because:

- Throughout the whole city rich and poor areas are mixed up, which means that extremely luxurious shops are altered by old, quase-demolished buildings. Figure 17 shows that a subway entrance, one of the potential locations for the facility, is quite fancy already which means the design of the facility would not disturb.
- It is predetermined that the facility needs to stand out from the rest of town, in order to not get violated as is been described in the example of bus stops in chapter 4.1.1.

After creating these renders, it has been decided to not use the mosaic walls, but instead of that make the inside of the facility visible from the outside. Therefore from this point on, ivy plants are being applied to the facility. Ivy plants have been chosen since it is stated in the demands that the facility needs to exhibit something natural like a tree. The result is visible at the next part.
Figure 56. Version 1 of the facility
Figure 5 and 8. Version 2 of the facility
Figure 59. Version 3 of the facility

Figure 60. The facility at night
For the low-end versions of the facility, it has been decided to only use the bicycle racks, display and a fence in order to decrease costs. The results are shown in the next bit.
CHAPTER 6 Implementation

6.1 Sizes

On figure 6.4 the sizes of the front part of the facility are shown. The rest of the sizes of the facility can be found in Appendix D.

Figure 6.4

6.2 Materials

The following parts can be distinguished:

- Frame for the twelve faced shape
- Faces for the twelve faced shape
- Fences
- Plants for fences
- Bicycle racks
- Lights
- Display
Frame
To create the frame, the material ‘carbon steel’ has been chosen for its strength and relative cheap price compared to similar metals.

Faces
In order to make the faces of the Dodecahedron (twelve faces) the thermoplastic Polyurethane has been chosen. This because of its optical, mechanical and durational capabilities. The material is water and scratch resistant, flexible and transparent. Besides that it is very likely to resist fractures.

Fence
The idea is to use a conventional fence and customize this into the right shape. Probably a fence from the brand ‘Heras’ will satisfy.

Lights
The facility will need some in and outward lighting. Solutions to this are not yet investigated.

Plants
Ivy plants will be used to decorate the fences.

Racks
Conventional bicycle racks will be used.

Display
A conventional display, as used at information points, will be used at the facility

6.3 Prices
The following costs have been distinguished. These are based on version one (the oblong one) of the tree versions of storage facilities.

6.3.1. Materials costs

Frame
On a Dutch website [20], a retailer is selling steel tubes for about 10 Euro per meter. About 50 meter is needed, which means the material cost will be 500 Euro.

Faces
The faces will be about 0,5 m² and 0,01 m thick which means a volume of 0,005 m³.
1 m³ = 35,31 ft³
So 0,005 m³ = 0,18 ft³
The density of Polyurethane is 70 lb/ft³
So we have 0,18 * 70 = 12,6 lb
The price is 2,0 USD per lb, so material only will cost 25,6 Dollar, which is about 20 Euro.
There will be 10 faces used, so the total cost will be 200 Euro.

Lights
These are estimated to be around 100 Euro.

Fence
On estimate about 3.000 Euro, material only.

Plants
On estimate these will cost around 100 Euro.
Display
On estimate, screen + protection will cost around 1.000 Euro.

6.3.2. Construction costs

Welding of frame
On estimate around 1.000 Euro

Construction of the faces and fitting
Not based on any source, but on estimate about 5.000 Euro

Customized fence
Not based on any source, but on estimate about 2.000 Euro

Bicycle racks
From an official document, [21] of the municipality of Roosendaal (the Netherlands), it can be derived that the construction of this will be around 10.000 Euro.

6.3.3 Total costs

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame</td>
<td>500 Euro</td>
</tr>
<tr>
<td>Faces</td>
<td>200 Euro</td>
</tr>
<tr>
<td>Lights</td>
<td>100 Euro</td>
</tr>
<tr>
<td>Fence</td>
<td>3.000 Euro</td>
</tr>
<tr>
<td>Plants</td>
<td>100 Euro</td>
</tr>
<tr>
<td>Display</td>
<td>1.000 Euro</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>4.900 Euro</strong></td>
</tr>
<tr>
<td>Welding of frame</td>
<td>1.000 Euro</td>
</tr>
<tr>
<td>Construction of the faces and fitting</td>
<td>5.000 Euro</td>
</tr>
<tr>
<td>Customized fence</td>
<td>2.000 Euro</td>
</tr>
<tr>
<td>Bicycle racks</td>
<td>10.000 Euro</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>18.000 Euro</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Between 20.000 and 25.000 Euro</strong></td>
</tr>
</tbody>
</table>
6.4 Implementation and reflection

6.4.1. Implementation
This report will be transferred to Warner Vonk. After that, he will be looking for sponsors that are interested. At the moment of writing, there are already some companies interested in a solution to theft problems of bicycles. If the interest gets more concrete, more elaboration of the design has to be performed. The costs need to be calculated more accurate, sizes have to be more detailed and proper construction companies have to be searched for. Also a proper investigation needs to be performed to the feasibility of combining the facility with a kiosk or other type of local vendor. But this would be the next stage of the design.

6.4.2. Reflection
After finishing the design it is relevant to look if the design meets up with the predetermined demands. The overall and most important demand was that the facility would offer a positive contribution to the (existing) cyclist. Therefore it needed to be something big, something recognizable and something that they would fancy. The get inspiration, some ‘psychographic’ dimensions were considered, of which the aspect ‘soccer’ has been chosen to implement in the design. The Rio de Janeiro inhabitants are crazy about soccer and looking forward to the upcoming World Championships soccer in 2014 it would be a perfect way to gain attention and enthusiasm for cycling as well, since people would associate these items with each other.

An important aspect of the facility is safety. The bicycles need the be safe from the outside world. The walls of the facility (high-end version) are therefore being kept high, which makes it impossible for thieves to access the facility without using the front entrance. The low-end version is not being closed from the outside world as such, so in this case it would be best to make use of an actual guard. This is not uncommon, since the facility at the shopping mall in Bangu (figure 22) has one as well.

A point of discussion is the position of the display in the facility. During rush hour, it might be an obstacle for people coming in and going out, especially with the demand of one minute storing and retrieval time. It therefore might be better to locate the display pole outside, in front of the facility. In that case, if people are making use of the display, they would not disturb or hold up other people that want to make use of it.

The sizes of the facility are quite big. Therefore the facility needs to be located at a spot where there is enough space. However this would not be a problem when the predetermined locations are being analyzed. The shopping centre in Bangu, mentioned earlier, is an location with a lot of space since there is also a huge car parking area. Also locations at subway stations would satisfy, since most subway entrances are located at public squares, which usually have enough space to serve as a bicycle storage facility.

Something which is not certain yet, is the amount of money it would cost. These, right now, are based on estimations. The materials are not the cause of the uncertainty, it is the construction costs that are poorly defined in this stage. Therefore proper investigation needs to be performed in order to make a suitable estimation of the spending.
CHAPTER 7 CONCLUSIONS AND RECOMMENDATIONS

Conclusions
The purpose of the project was to design bicycle storages for rich and poor. The idea behind this was that if rich people were getting interested in making use of the bicycle, the poor would soon follow. At first the scope was pretty wide, containing research not only about the bicycle, but about public transport as well. It followed that public transport was not actually that bad represented at all, and that it was only the bicycle that was completely unrepresented in the city of Rio de Janeiro. Therefore the focus was being put on the bad image of the bicycle, and how to change people’s behaviour towards it.

After this, the conclusions was drawn that it would take huge efforts to change people’s behaviour and that it would be better to focus only on the people that were already using the bicycle. This decision was also more in line with the main task of designing bicycle storages. So from this point on, the task was to design a bicycle storage for the existing user. However, if this would only be a plain rack, without any fanciness, this would not contribute to the main goal, and would also not contribute to enhancing the enthusiasm and image people have towards cycling. It needed to be a facility that people could be proud of, and that would not be very likely to get violated. First there has been a look at things the local inhabitants like, and apply these to the facility.

In the end a design has been chosen that shows similarities with a soccer ball, since soccer is an extremely popular issue in Brazil, almost one of primary human necessities. This design has been applied to three different locations, to show that the design is flexible and can adapt itself to different situations. Also an aspect of the so-called ‘fun theory’ has been applied to the design. The reason for this was to make people aware of the money they save when they are cycling, and about the pollution they would cause when taking another type of transport. This has been done by using a touch screen display like the ones used at general information points. This aspect of the ‘fun theory’ is not a phenomenon that would be listed on their website (www.funtheory.com) as a good example. But the ‘fun theory’ as a phenomenon has been a great inspiration to the implementation of this display.

It has been decided that the low-end version of the design would only contain bicycle racks and this display, to reduce the amount of money, but still be effective.

The design solution meets the demands that have been given in advance. However something that is not fully elaborated yet, is the desirable combination with a kiosk. It is very well possible to implement this on both sides of the entrance. This however is a subject that needs to be detailed in the next stage of the design, if interest is being shown in the first place.

Recommendations
As said, it would be highly desirable if the facility would be combined with a kiosk. This has several advantages. The kiosk employees can for example guard the bicycles. In return, the customers of the facility might be interested in the supplies that the kiosk has to offer, like water, bread, or anything that they can use on their way to their jobs.

The display at this point has been a way to convey information about money and pollution that the bicycle user is saving and preventing to spend. This behaviour is likely to be rewarded. Therefore an idea is to give the regular customers a card, which keeps track of the amount of money they have saved. If that amount reaches a certain amount of money they will receive something free from the kiosk. This way, the saving of money gets to be some sort of competition, which might even attract new cyclists. This fact is actually the key point of focussing on existing user instead of new users. When satisfying existing users, new users will be attracted by just spreading the word.

It is best if the facility is being implemented at a location that is close to a bicycle path, so that the facility is easy reachable. This might sound obvious, but bicycle paths in Rio de Janeiro are extremely scarce.
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Figures

Figure 1-5 [http://www.ibge.gov.br/home/estatistica/populacao/default_censo_2000.shtm]
Figure 6,7 [1]
Figure 8 [Zandee & Hulleman , 2008]
Figure 9 [5]
Figure 10 [Transporte Ativo, 2007, http://www.ta.org.br/site/pop1.htm#Map]
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Appendix A

50 ways to establish a bicycle policy

[8]

Develop a Council Cycling Strategy
1. Develop a cycling strategy in consultation with local cyclists. Seek out best practice strategies from around NZ.
2. Include a vision and a few strategic objectives.
3. Set realistic and measurable targets (e.g. for crash reduction, cycle usage, route construction).
4. Allocate specific funding each year for projects to encourage cycling.
5. Include “the 4 Es” (engineering, education, enforcement and encouragement) within the strategy.
6. Establish a positive physical environment including neighbourhood or city-wide traffic calming in urban areas, and best practice cycling facilities.
7. Articulate a clear strategic role for cycling within the regional land transport strategy (RLTS) and Council plans.
8. Require cycle planning and design in all new land developments and road alterations.
9. Develop cycling network plans and implementation programmes consistent with (or contained within) Long Term Council Community Plans (LTCCPs).

Promote Cycling within Council
10. Create a cycling culture within Council and establish Council as a leader in cycling provision.
11. Integrate cycling safety issues into the work programme of the road safety co-ordinator and Council’s Safety Management System.
12. Appoint a cycle officer and provide him or her with adequate support and resources.
13. Introduce staff travel plans incorporating secure cycle parking, showers, lockers, cycle allowances for work trips and fleet cycles.
14. Undertake in-service staff training on providing for cyclists for all relevant planning and engineering staff.
15. Participate in National Bike Week – celebrate with a Bike to Work Day breakfast.

Promote Cycling in the Community
16. Dispel myths about reasons for not cycling, such as hills, weather, distance, passengers and luggage. Every community already has cyclists who overcome these perceived barriers every day.
17. Publicise cycle facility provision such as cycle route networks (direction signs and maps) and cycle parking.
18. Publish a map of cycling routes and facilities.
19. Develop and promote cycling activities (e.g. rides, displays) in association with cycling clubs and groups.
20. Use cyclists in Council promotional events and media.
21. Encourage other employers to develop travel plans to help their employees find better ways to travel than private cars.
22. Nominate Council or other groups for CAN Cycle-Friendly Awards.

Work with Schools and Universities
23. Encourage schools, Police, parents’ groups and others to organise trips for students that do not involve car travel.
25. Ensure all students in Year 6 receive approved cycling training.
26. Encourage schools to retain their school cycle parking rather than demolishing it.
27. Help universities and tertiary institutions develop travel plans to minimise car use.
[www.eeca.govt.nz/programmes/travel.aspx]

Collect Data and Monitor Cycling
28. Collect cycling data, including cycle traffic counts, Census and NZ Travel Survey, collisions, hospitalisations, surveys on route selection or difficult locations and opinion surveys of cyclists and the general public.
29. Monitor where cyclists are not going and work out why. Then do something about it!
30. Record accomplishments in meeting targets of the strategy and report publicly on these.
**Build High Standard Facilities**

31. Reduce urban speed limits on local and collector roads to 30 or 40 km/h (with traffic calming if necessary).

32. Design roads for cyclists too – this is cheaper in the long run and often more effective than retrofitting cycling facilities later.

33. Consider building cycle lanes (on-road) as well as cycle paths (off road) on the same road – different cyclists have different needs.

34. Avoid building cycle paths on just one side of a road unless safe, convenient facilities are available for cyclists to cross to use the path.

**Review Parking Policies**

35. Enforce parking restrictions on cycle lanes and routes.

36. Use angle parking only if there is ample space behind the cars for cyclists to be seen by drivers backing out.

37. Provide conveniently located, well designed and secure cycle parking in new developments and at popular destinations such as shopping centres, libraries, sports facilities and civic buildings.

**Communicate with Cyclists**

38. Establish a cycling committee of cycling organisation representatives, interested councillors, government agencies.

39. Include cyclists in consultation on major projects – roading, public transport, parks and recreation, urban development and design.

40. Engage all cycling groups in Council consultation – mountain-biking, racing, recreational and advocacy groups, as well as commercial groups like tour operators and retailers.

41. Arrange regular meetings between Council staff and cycling representatives to identify problems early and avoid costly mistakes.

42. Establish systems for reporting cycling hazards (e.g. phone hotline, freepost hazard reporting card, e-mail address, website).

43. Check CAN’s website for technical information and contact details for local advocacy groups.

**Develop Links**

44. Develop links with other local authorities and organisations (e.g. ACC, LTNZ, MOT, Police, health providers, Transit NZ) in your region to share ideas and resources.

45. Establish regular meetings with other agencies to promote cycling and co-ordinate programmes, routes and campaigns with them.

**Get and Use Cycling Resources**


49. Cycle-Friendly Employer

50. Join CAN as a supporting organisation (many councils, government agencies and consultants are already members).
Appendix B

12 common excuses and 12 answers to use the bicycle

1 It's too far to ride
If you live too far from work, consider driving or using public transport part of the way and riding the rest. This is especially useful if you work in a traffic-congested area. Reducing motor vehicle use will help the environment and becoming a bicycle commuter will create more awareness of other cycle commuters when you drive. Or you can take the train part of the way. Taking your bike along for the ride saves petrol and money.

2 It takes too long
Because of traffic in urban areas, cycling generally takes less time than driving for trips of five kilometres or less and about the same time for five to eight kilometre trips. For longer trips, consider that you are saving time by combining your daily exercise with your commute. Also, do not forget your savings of time, money (and the environmental benefit) when you eliminate visits to the petrol pump.

3 I'd have to get up much earlier if I rode my bicycle
If your daily commuting is less than 16 kilometres in total, the difference in commuting time will be insignificant. But even if your commuting is longer, 30 minutes of extra sleep will not be nearly as invigorating as an early morning ride. You will arrive at work alert and refreshed. Likewise, your evening ride home should leave you more relaxed, since you will not face the aggravation of sitting in rush hour traffic. And you will not have to rush off to an evening gym workout to unwind. You will have already accomplished that!

4 I'm out of shape
If you leave yourself plenty of time and go at an easy pace, you will find cycling no more difficult than walking. As you ride more, you will ease your way into better shape, building fitness that will be a regular part of your schedule. If you have health problems, consult your doctor for suggestions on getting started.

5 I cannot afford a special commuting bicycle.
You do not need one. Any old bike that can be taken through a quick service will suffice if properly adjusted and maintained, and it’s less attractive to thieves. If you have a recreational bicycle, you can fit it with a lightweight carrier-rack and bag or use a rucksack to carry the necessary commuting items. With the fixed cost of operating a car at around R1.50/ kilometre, the money you would save commuting by bicycle on an average 16-kilometre round trip would buy you a R2800 bicycle in six months time (not to mention the health benefits or the savings to the environment). Alternately, you can visit a BEN outlet or service centre or contact the BEN Cape Town office at 021-6714655 or visit the website - www.benbikes.org.za - where you can learn more about the ongoing programs.

6 There's no secure place for my bike
There is probably a storage room or closet where your bike can be secured behind a locked door. Maybe you can even take it to your office - what a status symbol! Or check to see if daily storage is available in nearby buildings, at bike or sports shops, or at garages. Otherwise, lock it to an immovable object, such as a lamppost, with a strong secure lock, preferably where you can see it.

7 I have to dress smartly for work
Some bicycle commuters simply ride in their business clothes - they seem to command more respect from motorists. Many ride in casual or cycling clothes and change when they arrive. You can carry your change of clothes in a backpack or in panniers on the bike, or even transport them back and forth on days when you do not ride.
8 I cannot shower at work
Depending on the weather, you may not need a shower if you ride at a leisurely pace. If you do, take a cloth, soap, towel and deodorant and clean up at the bathroom sink, or look for a public facility or health club within walking distance of your workplace where you can shower. Then encourage your employer to install showers where you work.

9 What if it’s rainy or cold?
Begin as a fair-weather bicycle commuter - when the forecast is bad, do not cycle. Some people may overcome the elements and commute every day, but it does not mean you have to. If you only ride when the weather report is favourable, it will still make a dramatic improvement. The more you enjoy bicycle commuting, the more you will look forward to your daily ride. You may eventually decide to invest in raingear and cold weather clothes so you can commute year-round!

10 It’s not safe to ride in traffic
You can share the road successfully with cars by riding lawfully and assertively. The fear of riding in traffic is often much greater than the actual danger. Most bicycle accidents involve children and cyclists who do not obey the law. Minimize risk by riding properly - visibly, responsibly, and following all traffic laws. In stop-and-go traffic, a fit cyclist can generally keep up with the traffic flow, so it is acceptable to maintain your place in the roadway. Hugging the pavement invites danger as cars try to squeeze past you. To help prevent injuries always wear a helmet. You can also reduce the risk of riding in traffic by using less congested secondary roads.

11 I’d have to ride in the dark.
Wear light coloured reflective clothing, use a good lighting system and choose a route that avoids major thoroughfares. There are a variety of bike mounted lights that can help you see and be seen.

12 I need my car for work.
Some jobs do require a car, but many transportation tasks could be handled equally well on a bike. Meet with your employer and see if your company might not benefit from a more environmental friendly image if you conducted your business by bike. Consider that many traditional tasks adapt well to cycling, whether it is police work, meter reading, postal delivery, etc. If you absolutely cannot use a bike at work, then use your bike for personal errands at work and at home.
Appendix C

The functioning of the display

Figure 65. The welcome screen

Figure 66
Step 1

Please tap the distance you have traveled by bicycle

0–5 km  5-10 km  10-15 km  15-20 km

Figure 67. One of the buttons becomes green

Step 2

How many days a week do you use this facility?

1  2  3  4  5  6  7

Figure 68. Repeating the same idea for another two questions
Figure 69. In case of ‘walking’, the following screen appears, dependent on distance.
Figure 7.1. In all other cases this end screen appears
Appendix D

Sizes of the facility

Figure 72
Figure 74