

The Economic Significance of Cycling

A survey to illustrate the costs and benefits of cycling policy world-wide

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Preface

This paper is based on a study by Interface for Cycling Expertise, published as 'The Economic Significance of Cycling, a study to illustrate the costs and benefits of cycling', VNG Uitgeverij, The Hague 2000. Compiled by Jeroen Buis and Roelof Wittink, to order via i-ce@cycling.nl for Euro 12.50. More details about the study than are provided in this paper can be found in this publication.

1. Introduction

A well-functioning traffic and transport system is vital for any city. Therefore a huge amount of money is invested in traffic facilities in cities worldwide. The principal investment is made for the private motor traffic and public transport. Walking and cycling, though important means of transport with a considerable modal share in most cities, are seldom included in major urban transport plans. Although facilities for non-motorised transport are relatively cheap this is often a disadvantage when it comes to large-scale transport projects. Subsidies are often only for expensive infrastructure projects and non-motorised transport is often overlooked due to a lack of powerful stakeholders. Executing cost-benefit analyses of citywide bicycle networks and policies and showing the economic benefits of cycling could put the bicycle on the political agenda.

The study not only provides a collection of different approaches to evaluate the economic benefits of bicycle policy, and a series of illustrations, but is also answering the question as to which economic arguments for investing in bicycle policy are most valid in different local situations.

2. Literature study

In the first part of the study, the literature study, some general information is given about the potential of cycling in different local situations. Next, policies to promote bicycle use are brought up. Finally, eight different benefits emanating from successful bicycle policies and bicycle use are discussed.

2.1. The potential of cycling

The potential of the bicycle as a means of urban transport, in many cities around the world, is much greater than the current level of bicycle use. Increasing safety problems due to not considering cycling as a valid mode of transport and an increase in private motor vehicle ownership led to a decline in bicycle use. This downward trend was stopped in various countries in the 70's, 80's and 90's due to local traffic and transport policies that took the bicycle into consideration. This shows that there is a potential for bicycle use even when incomes, car-use and car-ownership increase.

The following factor can be distinguished when determining the potential of cycling in urban areas:

1. *The length of the trips made by urban residents and the urban structure*
2. *The present transport and traffic system and mobility patterns (this includes road safety)*
3. *The socio-economic features of the population*
4. *Ownership of cars, motorised two-wheelers and bicycles*
5. *The attitude towards cycling and other modes of transport*
6. *The geographical features of the concerned urban area*
7. *The climate*

These factors are not only important to determine the potential of cycling, but can also give insight in the reasons why people don't use the bicycle as a means of urban transport. In situations where the most influential constraints can be overcome by bicycle policies, there is a significant potential for (increasing) bicycle use.

2.2 Policies to promote and improve bicycle use

The following can be done to increase bicycle use and improve the situation for future and existing cyclists:

- Plan cities and city developments in such a way that trips are kept as short as possible,
- Provide for good bicycle facilities,
- Include education and marketing in the bicycle promoting plans,
- Make sure bicycle policies are part of a fully integral traffic and transport policy,
- Make sure that capacity building and other institutional matters are included in the policy.

The fourth point is especially important and often disregarded. Whenever plans for the bicycle are seen as totally independent from car and public transport plans, the chances for bicycle policies to be successful decline significantly.

The first step that has to be taken to get planners and politicians ready to support and develop bicycle-promoting policies is to get the topic on the political agenda. This study aims to contribute to this by showing what benefits result or can result from these kinds of policies, and how these benefits relate to the costs of these policies.

2.3 A wide range of benefits emanating from bicycle use and successful policies

When investing in high quality bicycle facilities and starting bicycle friendly transport policies, a wide variety of economically relevant effects can result.

Benefits resulting from bicycle policies are either saved costs because motorised trips are substituted by bicycle trips and benefits resulting directly from an increase in bicycle use, such as better health for cyclists.

The following benefits and saved costs can be realised by implementing integral bicycle policies:

1. The costs of traffic and transport facilities

Cost savings in construction and maintenance costs for car infrastructure as well as cost savings for infrastructure and exploitation of public transport, because bicycle facilities are cheaper than facilities for motorised transport.

2. Accessibility and use of space

Cost savings due to the fact that bicycles need less space for riding and parking than car traffic and can help to reduce congestion.

3. The urban economy and the quality of life

The bicycle can help to reduce the negative impact of motorised traffic on the urban quality of life. Which, especially in city centers, can lead to a more attractive climate for retailers, cafes and even companies to locate a new business.

4. Improving the environment

A clean and quiet means of transport like the bicycle can help to combat urban air pollution and noise nuisance.

5. Health

In most developed countries more than half of the population exercises too little. Cycling for half an hour a day would have a major effect on the prevention of a number of illnesses.

6. Traffic safety

Cyclists don't cause severe accidents. An increase in bicycle use, nevertheless, can cause an increase in accident rates, because cyclists are vulnerable road users. On the other hand, when bicycle infrastructure is designed in a proper way, the total amount of accidents can fall as studies in the Netherlands have shown.

7. The role of the bicycle for employment

The bicycle can play a role for employment in various ways. In the first place there is the bicycle industry including selling and repairing, which can lead to local economic activity. Furthermore the bicycle can be used at work leading to increased incomes, especially in developing countries.

8. Travel costs and individual mobility

The bicycle is not only a cheap mode of transport for society, but also individual users can save money through such use. This is the case in both developed and developing countries. For poor people a bicycle means access to markets (to buy and sell) and jobs, thus improving their economic situation.

Main outcomes

The publication about the economic significance of cycling shows a wide variety of examples from all over the world to illustrate the economic benefits of cycling policy. Some of the main outcomes of the study are mentioned in the following. Details and data can be found in the publication.

Investing in bicycle infrastructure will not automatically produce savings in the traffic budget. This will only be the case when bicycle use increases considerably.

On traffic routes, road capacity can benefit enormously from bicycle and other public amenities that streamline the various means of transport. Savings in time and use of space both have an important economic value.

Cycling, walking and public transport improves the quality of life in city centres, thus attracting more activities and people, as a result of which consumer spending increases.

Several studies show that air pollution caused by motorised traffic leads to more deaths than traffic accidents. Investing in the bicycle turns out to be a very cost-effective way to pursue an environmental policy.

Cycling for half an hour every day has a significant effect on the prevention of heart and vascular disease, diabetes and high blood pressure. Also this positive effect of cycling on public health is much greater than any negative effect from traffic casualties.

The safety of cycling can be improved drastically by proper planning. Low accident rates involving cyclists in the Netherlands shows that this is the case. There are many ways in which the bicycle can be used as a means of (goods) transport at work, resulting in increased earnings.

Particularly in developing countries, bicycle use has significant effects on the level of prosperity.

2. Case studies in four continents

To investigate the variety of economic benefits of bicycle policy in cities in different continents, four case-studies about different cities have been carried out. The concerning cities are Amsterdam in the Netherlands, Bogotá in Colombia, Delhi in India and Morogoro in Tanzania. The main objective of the case-studies was to give insight in how local differences result into different benefits of bicycle policies. Available data and surveys are used to execute the studies. This means that the benefits included in the case-studies were determined by the available data. Which led to different studies with different emphasizes and methodologies.

The common question in each study was:

'What economic benefits can be attributed to an increase in bicycle use due to local bicycle policies?'

2.1 Four cities in four continents

The four selected cities are located on four different continents and are very different. There is one rich city (Amsterdam) two low-income cities (Delhi and Morogoro) and one medium-income city (Bogotá). There are two big cities (Delhi and Bogotá with respectively 13 and 6 million inhabitants) and two relatively small cities (Morogoro and Amsterdam with respectively 200.000 and 800.000 inhabitants). To gain insight in the possible bicycle use in each city it is important to know the modal split.

There is a clear relation between income and mobility and car-use: The richer the city or people the higher the car-use. In Amsterdam 30% of all trips are by car, in Bogota 19% and in Delhi between 5 and 15% and in Morogoro 4%.

Public transport use is higher in the mega cities than in the smaller cities: About 40% in Delhi and 56% in Bogotá and only 15% in Amsterdam and 11% in Morogoro. The next paragraph will focus on the share and potential of cycling.

2.2 Bicycle use and the potential of cycling

All four cities have some kind of bicycle culture. In Amsterdam, Morogoro and Delhi cycling is one of the main means of urban transport with respectively 28%, 20% and between 7 and 20% of all trips (in Delhi different studies show different data). In Bogotá hundreds of thousands use the bicycle at weekends for recreational purposes, but cycling as a daily means of transport is still uncommon, with a share of only 0.5% of all trips.

To determine the potential of cycling it is also important to know the trend in bicycle use. In Bogotá and Amsterdam the share of the bicycle is relatively stable. In Amsterdam cycling is part of the culture and integrated in the urban traffic planning. The heavy flows of motorised traffic in Bogotá, however, make it dangerous and unpleasant to cycle. In Morogoro bicycle use is declining mainly because of increased speeds of motorised traffic that cause safety problems. When further road construction plans are carried out bicycle use is expected to drop significantly. It is important to know that many inhabitants would like to use the bicycle but are forced to walk (65% of all trips) because they cannot afford a bicycle. In Delhi bicycle use is falling since the 1950's and is expected to decline further due to an increase in motor vehicle ownership (cars and motorised two-wheelers) and road safety problems.

The potential for an increase in bicycle use can be determined partly by looking at the abovementioned reasons for its non-use or decline in use. In all three third world cities the bicycle is, or could be, an important mode of transport, particularly for the low-income population, providing a fast, flexible and cheap alternative for public transport or walking. This is particularly important for those who cannot afford public transport. The fact that in all four cities more than 50% of all trips concern easy to cycle distances and all cities are (almost) flat, emphasizes the potential of the bicycle in these cities.

The effects of bicycle policies that focus on safe facilities for cyclists, will be significant in Morogoro and Delhi where simply stopping the downward trend could quickly make a huge impact. In Bogotá new daily cyclists have to be created. Experiences with car-free routes on Sundays and a car-free day on a Thursday in February 2000 show the enormous potential for the bicycle. In Amsterdam it is much harder to increase the levels of cycling because so much has been done already for cyclists and many people cycle there already.

2.3 Four studies, four approaches

Underneath the methodology, the presumed bicycle policy and the cost benefit ratio of all four studies are presented. After that the results of the studies are presented in a graph.

Amsterdam:

- Model calculation in the metropolitan area of Amsterdam (ROA)
- Bicycle policy: Strong improvement of the 'core bicycle network' and citywide supply of high quality bicycle parking facilities.
- Result: bicycle use in ROA will increase from 27 to 29% of all trips.
- Cost-benefit ratio = 1 : 1.5

Bogotá:

- Mainly using prices per kilometre for (external and internal) costs of motorised traffic as a mode
- Bicycle policy: Construction of a city-wide bicycle network accompanied by education and promotion campaigns.
- Assumption: The modal share of the bicycle will increase from 0.58% in 1999 to 5% in 2009.
- Cost-benefit ratio = 1:7

Delhi:

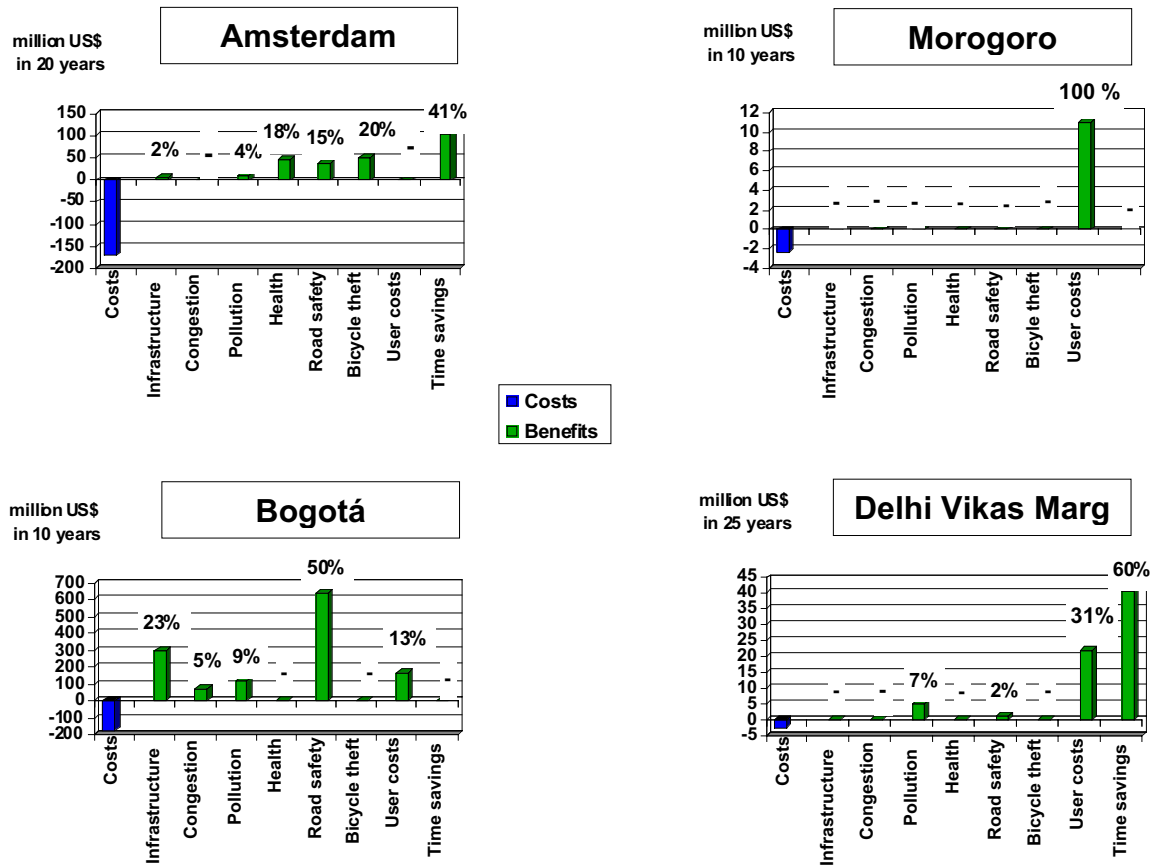
- Calculate benefits for reconstruction of one road, Vikas Marg
- Bicycle Policy: Reconstruction of a 9 kilometre corridor to a road with bus lanes and bicycle tracks.
- Assumption: The modal split stays the same on the studied road.
- Cost- benefit ratio = 1 : 20.

Morogoro:

- Calculate benefits emanating from time-savings and reduced travel costs for users.
- Bicycle policy: A city-wide bicycle network accompanied by traffic calming measures.
- Assumption: The modal share of the bicycle will increase from 20% in 1999 to 25% in 2009, instead of fall to 10%.
- Cost- benefit ratio = 1 : 5.

The above shows the different methodologies used in the different studies, resulting in outcomes that are difficult to compare. Nonetheless it is interesting to see what the different outcomes are to give a first indication of the benefit of bicycle policies in different local situations.

Figure 1 shows the results of the four studies.



It is clear that that all studies include different benefits. Nonetheless some conclusions can be drawn from the graphs above as is done underneath.

3. Conclusions and recommendations

- Both the city studies as well as the literature study show that a wide variety of benefits justify investments in bicycle planning and policies.
- It is shown that the cost-benefit-ratios are better in situations where so far nothing has been done to promote cycling and improve the situation for cyclists. The more the potential of cycling has been transformed into actual bicycle use, the harder it is to further increase the use of the bicycle.
- It has been shown that user cost savings and time-savings are a considerable part of the economic benefits of cycling. This also illustrates the potential of cycling for poverty alleviation.
- More research is needed to develop methodologies for the cost-benefit analyses of bicycle policies, to enable comparison of different studies.