



Moving the Economy by Cycling

As cycling is on the rise, bike-related sectors are increasingly seen as lucrative industries. Cycling has become an important component of tourism in Germany, and high quality bicycle products are seeing strong sales.

The most important economic factor regarding the rise in bicycle use, however, is the substitution of car traffic with cycling due to environmental concerns. Private households are considering the long-term costs of mobility, as many worry about medium-term sharp increases in energy costs. Given their ever-tightening budgets, countless municipalities have also realized the benefits of investing in cycling.

Nonetheless, it is difficult to explain the economic efficiency of cycling and to emphasize its advantages compared with the motor vehicle. The economic benefits of cycling are particularly relevant given the various hidden and unquantifiable costs attached to the different modes of transportation, although savings at the local level are often not immediately obvious. Positive economic effects of bicycle use are not only visible in the areas of mobility and traffic. Indeed, additional areas of cost reduction due to this shift away from car use include:

- Land use and the efficiency of traffic separation: Land that would otherwise be needed to accommodate car traffic can be redirected for other use. As crossing much-used streets costs time, heavily

used motorways pose barriers and render the use of towns more difficult. In addition, the mobility of weaker road-users is limited. Cyclists and pedestrians, on the other hand, use only a fraction of the space required by automobiles.

- Noise pollution: Noise not only poses an annoyance; in certain situations, it reduces productivity and may also lead to health problems. Moreover, noise drastically lessens the quality of life in urban areas, which reduces property values.
- Air pollution: In areas of constant traffic, air quality is heavily burdened by the use of motor vehicles. Among other consequences, this pollution can cause certain illnesses and could lead to a general reduction in the quality of life.
- Accidents: In addition to human suffering as a result of car accidents, economic damages result from missed time at work and the reintegration of workers into the work place. Fear of motor vehi-

Cover image: *Cyclists and Pedestrians in Paris.*
© Jörg Thiemann-Linden

Contents

Traffic costs: Comparing the bicycle and the motor vehicle 2

Economic benefits of cycling 3

Conclusion 4

cle accidents limits the quality of life; and children's mobility is reduced as a result of car traffic.



Street life in the new "Französisches Viertel" in Tübingen.
© Jörg Thiemann-Linden

Traffic costs: Comparing the bicycle and the motor vehicle

A comparison of the bicycle and the car highlights the costs of each means of transport, and identifies those who bear the burdens.

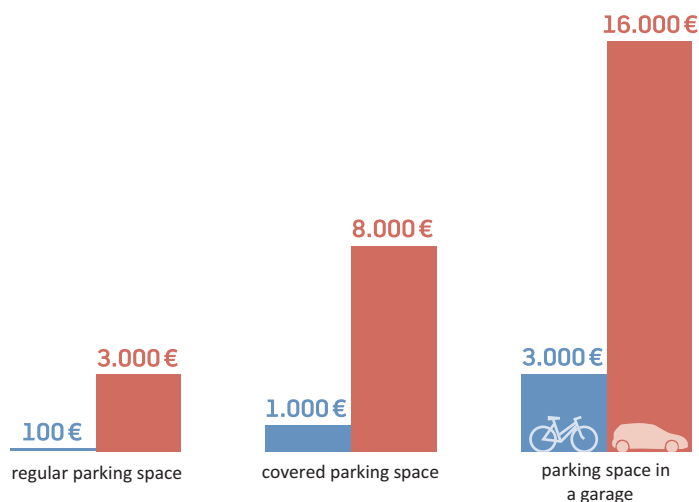
Burdens on traffic infrastructure

From the perspective of local public authorities, cycling constitutes the cheapest mode of transport by far. Nonetheless, comparing the infrastructural costs of bicycle use and car use is difficult, as both modes of transport commonly use the same road space.

Overall, however, it is clear that motor vehicles require more expensive and complex infrastructures. As efficient planning of bike routes permits bicycle traffic to be incorporated easily into existing roadways, bicycle use can also result in astonishingly low costs.

The city of Copenhagen published infrastructural cost estimates for the various modes of transport: 1 million per km of cycle path and just 67 thousand Euro per km of cycle lane stand in stark contrast to 13 million Euro per km of motorway. Maintenance costs of separate bike paths are also favourable compared with road ways, as the wear and tear of cycle paths is considerably lower.

The economic advantages of bicycle use are also evidenced by the considerable space efficiency of parked bicycles as compared to parked automobiles. According to estimates by the Austrian Traffic Club (VCÖ), bicycles require one third the parking space of cars.



Comparing costs of parking facilities for bicycles and cars (BMVIT 2011). Figure: BMVIT

Costs for daily operation and accessibility

In his thesis, traffic engineer Georg Trunk researched the costs of operating and maintaining a bicycle compared with a car. Basic operating costs included initial investments, maintenance and repair, and parking fees, in addition to time invested. His findings indicate that the bicycle is exceedingly inexpensive: the overall operating costs for cycling were 10.20 Eurocents per kilometer, as compared with 38.30 Eurocents for driving a car.

In regards to time travelled, one might assume that the car would greatly outperform the bicycle. However, in city traffic the modes of transport are comparable, as the motor vehicle is only slightly faster on average than the bicycle. Considering the drastic increase in fuel costs, the costs of motorised private transport will likewise be on the rise, and the demand for affordable mobility will make switching to alternative modes of transportation unavoidable. For greater distances, a combination of bike and rail will seem increasingly attractive.

Sources

BMVIT – Bundesministerium für Verkehr, Innovation und Technologie (Österreich) (2011): Kosteneffiziente Maßnahmen zur Förderung des Radverkehrs in Gemeinden:
<http://www.bmvit.gv.at/service/publikationen/verkehr/radverkehr/downloads/radverkehrsfoerderung2.pdf>

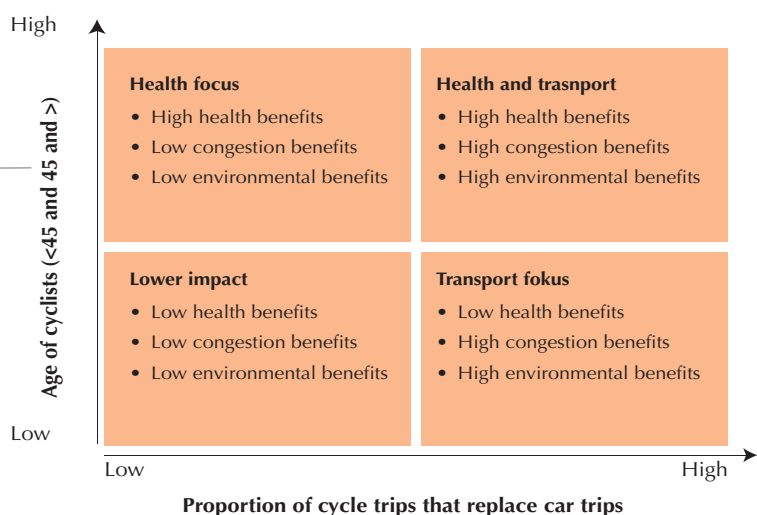
UBA – Umweltbundesamt (2001): Chancen des Rad- und Fußverkehrs als Beitrag zur Umweltentlastung:
<http://www.umweltdaten.de/publikationen/fpdf-l/1983.pdf>

Haller, Reinhard (2005): Beschäftigungseffekte von Verkehrsinfrastruktur-Investitionen:
<http://www.ub.tuwien.ac.at/dipl/2005/AC04459936.pdf>

Health costs

A study published by the London School of Economics in 2011 showed that regular cyclists missed one fewer day of work per year due to illness as compared with the average worker. The British populace has hence a heavy burden to bear: In addition to funding 760 million British Pound annually for illnesses due to inactivity, the economy must support 128 million British Pound in lost work time.

As part of the „Transport – Health – Environment Pan European Programme“ (THE PEP), the World Health Organisation (WHO) developed a calculation tool to measure the health costs and benefits of cycling per kilometre. Trunk uses this calculator to measure the health efficiency of cycling in the City of Vienna. Per kilometre cycled, 89.89 Eurocents are saved on health expenditures. These savings relate to the above-mentioned external costs to society; additionally, individuals profit from an “internal benefit” in the form of increased well-being.



Varying benefits of cycling, broken down by age and proportion of car trips replaced (SQW 2007). Figure: Difu

Additionally, the more people use bikes instead of louder means of transportation, the more effectively noise pollution is avoided. Based on a complex calculation of noise health costs in money terms, Trunk concludes that, in the inner city, 0.90 Eurocents during the day and 1.64 Eurocents at night could be saved on every kilometre not driven by car.

Environmental costs

In 2010 the German Federal Environmental Agency (UBA) co-published a handbook on traffic emission factors with its counterparts in Switzerland, Austria and the Netherlands. Based on these factors, Trunk uses the example of Austria to calculate the cost of toxic emissions (CH, NO₂ and particles) to be between 0.63 and 0.85 Eurocents per kilometre. To these figures one has to add so-called climate costs which result from CO₂ emissions. Depending on the calculation method used, these climate costs amount to 0.50 to 0.85 Eurocents per kilometre driven.

Economic benefits of cycling

From another perspective, support for bicycling not only saves on the costs of car use; it also carries with it a number of economic benefits in several other areas.

Support for public transport

Increasingly, the impact of cycling is considered when evaluating the economy of buses and trains: Bicycles serve as feeders into the local public transport network, thereby increasing the catchment area of any one stop and the overall number of customers served by public transport. For transportation authorities, a switch of large numbers of public transport riders to cycling can help to reduce the need for additional work force and vehicles during rush hour. On weekends, cyclists help to make long distance regional train services more viable.

Impact on employment

Public spending always has beneficiaries, and in the case of investments in infrastructure, the beneficiary is the construction industry. Per a given amount spent, investment in bicycle infrastructure generates far more employment than the same amount invested in the construction of motorways. Comparably small-scale road work projects see a larger percentage of expenditures on personnel as compared with material costs, and such work is often conducted by small local construction firms. In his research on Austrian traffic, Reinhard Haller demonstrated that 4.4 times the employment is generated by non-motorized infrastructure (pedestrian zones, bicycle paths) as compared with motorway construction.

The bicycle: a driving force of tourism

As in many other countries, cycling tourism has seen an important increase in Germany over the past few

Trunk, Georg (2011): Gesamtwirtschaftlicher Vergleich von Pkw- und Radverkehr. Diplomarbeit am Institut für Verkehrswesen (IVe) der Wiener Universität für Bodenkultur: https://zidapps.boku.ac.at/abstracts/download.php?dataset_id=8320&property_id=107&role_id=NONE

DTV – Deutscher Tourismusverband e.V. (2009): Grundlagenuntersuchung. Fahrradtourismus in Deutschland. Kurzfassung: http://www.deutschertourismusverband.de/fileadmin/Medien-datenbank/PDFs/Grundlagenuntersuchung_Fahrradtourismus_Kurzfassung.pdf

years. A study conducted by the German Tourism Federation indicated that in the year 2006, 153 million day trips were undertaken, of which cycle tours constituted a large proportion. Additionally, 22 million overnight stays were attributable to tourists on bicycles. Calculations based on both day and overnight trips by travellers on bikes estimated gross revenues of 2.448 billion Euros thanks to day travellers, and another 1.421 billion Euros due to overnight stays. 63% of these revenues are garnered by restaurant and accommodation businesses, and just under a quarter by retailers.

Overall economic benefits

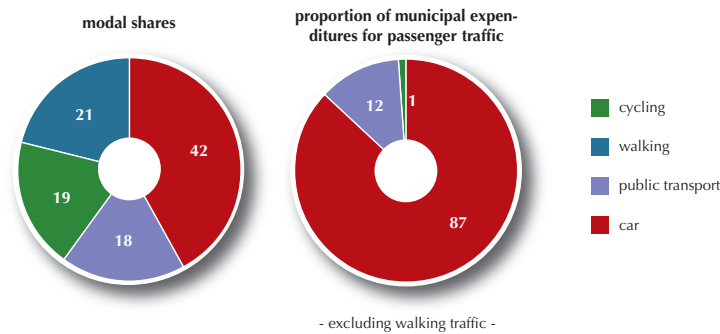
In 2011, the broadly focused „British Cycling Economy“ study was published in England by the renowned London School of Economics, presenting a diverse range of important revenue sources. 23,000 individuals are employed by the core bicycle sector alone. Their salaries amount to 500 million British Pound annually, of which 100 million British Pound go to taxes. Beyond this, 3.7 million bicycles are purchased annually, generating 1.62 million British Pound. Overall, the study finds that bicycle traffic produces an annual turnover of 2.9 trillion British Pound, equivalent to 230 billion British Pound per cyclist.

Relative costs and benefits of various modes of transport

A local-level analysis of actual expenditures on various transportation networks was conducted by the German Federal Environmental Agency (UBA) via the LCTP Tool (Least Cost Transportation Planning) in the city of Freiburg. These expenditures were compared with modal split shares for use of each of the various modes of transport, evidencing notable differences between them.

Conclusion

A second look is often necessary to fully comprehend the diverse and long-term public expenditures on the traffic sector. Many of these costs are not directly calculable but limit the ecological, climatic and infrastructural sustainability. When taking all of these costs into account, the bicycle performs remarkably well in terms of costs and benefits, especially in comparison with the car.



Modal split shares (in percent) in relation to municipal expenditures for the various transportation modes in Freiburg (UBA 2002).
Figure: Difu

Further information

Litman, Todd / Victoria Transport Policy Institute (2010): Evaluating Non-Motorized Transportation Benefits and Cost: www.vtpi.org/nmt-tdm.pdf

London School of Economics (2011): The British Cycling Economy. „Gross Cycling Product Report“: corporate.sky.com/documents/pdf/press_releases/2011/the_british_cycling_economy

SQW (2007): Valuing the benefits of cycling. A report to Cycling England: www.teespublichealth.nhs.uk/Download/Public/1012/DOCUMENT/5803/Valuing_the_benefit_of_cycling.pdf

WHO – World Health Organisation: Europe Health Economic Assessment Tool HEAT: www.heatwalkingcycling.org



Funded by



Federal Ministry of Transport, Building and Urban Development

More information on the benefits and costs of cycling infrastructure can be found in the following editions
CyE A-7 Benefits/Costs of Cycling Infrastructure Investment

“Cycling Expertise“ is available online:
www.nrvp.de/en/transferstelle

Imprint

Publisher: German Institute of Urban Affairs (Difu) gGmbH
Zimmerstraße 13–15, 10969 Berlin
Department Mobility and Infrastructure
Editor: Jörg Thiemann-Linden, Tobias Mettenberger
cycling-expertise@difu.de