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Economic benefits of increased cycling

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Abstract

Cycling is not only improving the livability of cities, public health, air quality, or the CO₂ balance, it also creates “hard economic value and jobs”. It is therefore a perfect tool for transition in the transport sector, providing a large number of assets, including jobs. Although the latter point is important to attract public authority consideration and investment in cycling, good information has hitherto been lacking.

At regional or city level, some estimates of jobs in the cycling sector are available. At European level however, job figures have been quite scarce.

This is the reason why ECF, in partnership with its Cycling Industry Club (CIC), asked TML to assess the jobs in the European cycling sector.

TML assessed the number of jobs today and in the future, assuming a doubling in the modal share of cycling. It calculated full-time equivalent jobs in 5 subsectors:

- bicycle retail (mainly sales and repair),
- bicycle industry (manufacturing and wholesale),
- bicycle infrastructure,
- bicycle tourism (accommodation and restaurants),
- bicycle services.

For most sectors job figures linked to cycling were not directly available. TML therefore consulted literature, national studies on the subject, national accounts, used some proxies and did some statistical analysis to provide estimates of jobs in the cycling sector.

The study found that more than 650,000 jobs are linked to cycling today in the EU-27 and more than 400,000 new ones could be created in the future with a doubling of cycling modal share. Other interesting findings concern the characteristics of these jobs. Cycling could, compared to other sectors, create:

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- more local jobs,
- more jobs for lower skilled workers,
- more jobs per euro spent.

It could thus open an interesting window for opportunity for a transition to a more inclusive Europe.

In 2015, ECF is producing another report on the economic benefits of cycling, more specifically regarding benefits which occur at the local level.

Several studies have shown that, besides creating jobs, making cities more cycling-friendly has beneficial effects for e.g. the businesses of local retailers or for property value along traffic-calmed roads. ECF's aim is to provide an overview of the results of the research done so far and identify areas where further investigation is needed.

The paper summarises both reports in order to show how cycling as a mode of transport is a factor of economic growth and provides social benefits.

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1. Introduction

In reaction to the global financial and economic crisis that started in 2008, job creation has become a main priority of EU policy. In this context, ECF has decided to commission academic consultancy Transport & Mobility Leuven to carry out a study that quantifies the contribution of the cycling sector to job creation in Europe. This study has been realised with support from ECF's partners in the Cycling Industry Club. It continues the work that has been initiated by ECF with the report on the cycling economy, estimating the economic benefit of cycling at EUR 205 bn per year for the EU-27 (European Cyclists' Federation, 2013).

So far, investments in cycling have mostly been driven by factors like the need for a more efficient transport system, congestion relief, health benefits or improved access. Employment in the cycling sector has rarely been used as an argument at the international level, except for cycling tourism. The aim of the study is to show that employment in the cycling sector is a co-benefit of investments in cycling, and also a benefit in its own right.

2. Number of jobs

2.1. Main findings

We estimate the jobs in the European cycling sector today at around 650.000 full-time equivalents (EU-27, excluding Croatia). With a doubling of bicycle modal share, the employment potential of cycling jobs represents more than 1.000.000 full-time equivalents.

This study takes into account jobs in the bicycle industry, bicycle retail, bicycle infrastructure and bicycle tourism sector. The table below shows the jobs of the respective sectors today (left) and with a doubling in bicycle modal share (right). We find that bicycle tourism is by far the largest contributor to cycling jobs.

Table 1. Overview of jobs in the cycling sector today and with a doubling of modal share.

Subsector	Employment (FTE) today	Employment (FTE) with doubling of modal share
Bicycle retail (mainly sales and repair)	80 587	122 196
Bicycle industry (manufacturing and wholesale)	22 629	32 133
Bicycle infrastructure	23 417	36 484
Bicycle tourism	524 052	869 927
Bicycle services	4224	8448
Total	654 909	1 069 188

2.2. Methodology

2.2.1. Current jobs linked to cycling

We divide the cycling economy into five subsectors:

- Bicycle retail
- Bicycle production
- Bicycle infrastructure
- Bicycle tourism
- Bicycle services

For each of these subsectors we calculate the economic value by turnover, with the exception of bicycle infrastructure for which we use investment as the main indicator. We translate turnover into Full Time Equivalent jobs, based on the FTE/turnover ratio that we find in the Eurostat Structural Business Statistics. The statistics are available for a number of sectors following the NACE (Statistical Classification of Economic Activities in the European Community) sector classification. We selected the NACE codes that contain bicycle related activities as illustrated below. For example, we use the NACE 3092 ratio for the manufacture of bicycles.

- NACE 3092 Manufacture of bicycles and invalid carriages -> Manufacture of bicycles
- NACE 4211 Construction of roads and motorways -> Bicycle infrastructure
- NACE 4649 Wholesale of other household goods -> Bicycles and their parts and accessories wholesale
- NACE 4764 Retail sale of sporting equipment in specialized stores -> Pedal cycles retail, cycle accessories dealer retail, cycle agent retail
- NACE 49 Land transportation -> Transportation for cycle tourism
- NACE 55 Accommodation -> Cycle tourism expenditure
- NACE 56 Food and beverage -> Cycle tourism expenditure
- NACE 7721 Renting and leasing of recreational and sports goods -> Bicycle hire
- NACE 9529 Repair of other personal and household goods -> Repair of bicycles

The selected sectors are broader than only bicycles. We therefore made adjustments to the FTE/turnover ratios where appropriate and when available data allowed us to do so. We also cross-checked the results that we obtained with those from national studies.

2.3. Estimation of job creation with doubled modal share of cycling

To estimate the job creation effect of increased cycling, we first provide some detail on our bicycle growth scenario. We express the implication of the growth scenario as an increase in bicycle modal share. This share is based on a study by Gallup (2011) on “the future of transport”. This study is a representative survey of the European population (at the national level), in which bicycle modal share is expressed as the share of respondents who indicate that the bicycle is their main mode of transport that they use for daily activities. There are other, more common ways to express the share of a transport mode, such as the share of trips or the share of distance travelled (vkm) per mode. However, this data is not available at the European level and we will therefore use the data from Gallup in this study (Gallup, 2011).

One of our main observations is that data on bicycle modal share at the national level is very scarce. There is more availability of modal share statistics at the city level¹, but this is not suitable for our study. Eurostat does collect data on the modal split for transport of passengers and freight in terms of distance covered (vkm). However,

¹ See, for example, the EPOMM database http://www.epomm.eu/tems/compare_cities.phtml

the bicycle is not included as a transport mode in these statistics. We recommend an improvement in the availability of statistics on bike use and, in particular, on the modal share of bicycle transport in terms of number of trips or distance travelled. This could be collected by Eurostat as part of their modal split database and would be an important step to evaluate policies to promote cycling in the future.

We evaluate what would be the employment effect of a doubling in bicycle modal share. Table 2 shows the current modal shares and the modal shares that would be attained in a bicycle growth scenario. The European bike modal share average has indeed doubled in the growth scenario, in comparison to the current modal shares. The weights for calculating the average are given by the % of all road traffic (in vehicle-kilometers) of each country.

Table 2. Overview of bicycle modal share in terms of % of total trips (two last columns are used to check that EU27 weighted average of potential modal share is indeed double the current modal share).

EU Countries	Current modal share	Modal share (Growth scenario)	% EU traffic	vkm - all road (TREMOVE)
Belgium	13.0%	25.6%	2.40%	93 298
Bulgaria	1.9%	5.1%	0.60%	23 417
Czech Republic	7.1%	16.5%	1.47%	56 895
Denmark	18.9%	32.4%	1.32%	51 413
Germany	13.0%	25.6%	19.39%	752 695
Estonia	5.0%	12.5%	0.24%	9 371
Ireland	3.1%	8.0%	0.83%	32 339
Greece	3.1%	8.0%	1.90%	73 871
Spain	1.9%	5.1%	8.59%	333 407
France	3.1%	8.0%	14.17%	550 048
Italy	5.0%	12.5%	15.22%	591 109
Cyprus	1.0%	2.7%	0.11%	4 339
Latvia	8.1%	18.2%	0.36%	13 938
Lithuania	5.0%	12.5%	0.75%	28 955
Luxembourg	1.9%	5.1%	0.20%	7 853
Hungary	18.9%	32.4%	0.90%	34 809
Malta	1.5%	4.1%	0.03%	1 215
Netherlands	31.0%	37.3%	3.74%	145 305
Austria	8.1%	18.2%	1.51%	58 803
Poland	9.0%	20.3%	4.69%	182 243
Portugal	1.9%	5.1%	1.72%	66 772
Romania	5.0%	12.5%	1.44%	55 745
Slovenia	7.1%	16.5%	0.45%	17 301
Slovakia	9.9%	21.7%	0.83%	32 376
Finland	13.0%	25.6%	1.54%	59 902
Sweden	17.1%	30%	2.19%	84 884
United Kingdom	1.9%	5.1%	13.40%	520 307
EU27	7.64%	15.3%	100.00%	3 882 610

We define different growth rates for each country because it is easier to double modal share in countries where the modal share is currently very low; for example in Cyprus the modal share only needs to increase by 1% to

achieve a doubling whereas in Netherlands modal share would have to increase by 31% to the very high level of 62%. For this reason, we set the growth potential for bike use in each country inversely related to its current modal share¹. We show the resulting bicycle shares in the growth scenario in the third column of Table 2. You will see in this table that countries with a relatively low modal share (such as Bulgaria or Cyprus) have more than doubled that share in the growth scenario, whereas countries with a high modal share (such as Netherlands or Denmark) have not doubled their modal share. The weighted average bicycle modal share in the growth scenario is 15.3% for EU27. This is exactly the double of the current modal share. Please note that these numbers are derived from an estimate of how a doubling of modal share in the EU27 could be split between Member States. It does not indicate how modal share will actually evolve in these countries.

We study the economic implications of an increase in bicycle modal share on FTE jobs, following a similar approach as for the current level of jobs. This means that we translate increasing modal share into turnover growth (or investment growth for the subsector of bicycle infrastructure). Then, we translate turnover or investment into employment using the FTE jobs/turnover rates of the relevant sectors.

3. Job intensity

Job intensity is an important indicator, because it gives an idea about the number of jobs that can be sustained with a given revenue stream in various economic sectors. This number thus indicates the job intensity of a certain turnover realization. We analyse average European job intensity in various economic sectors.

In Table 3, we compare job intensity in the cycling economy with employment intensity in related sectors for motor vehicles. The data we use are from Eurostat Structural Business Statistics (Eurostat, 2014). We make sure that we conduct a representative comparison by using a balanced sample of European countries. This means that we take the weighted average of FTEs/turnover, only including the countries where data is available for bike sector and for the other transport sector. If not, we could bias the comparison between both groups.

Table 3. Job intensity comparison between bicycle subsectors and related sectors (in FTE employment/1M€turnover, average for EU).

	Bicycle	Other transport
Manufacturing	4.89	Car: 1.63 Ships and boats: 4.07 Air and spacecraft: 3.9
Sales + accessories sale	5.42 (without adjustment) 8.13 (with adjustment)	Motor vehicles: 1.92
Repair	5.23	Motor vehicles: 7.59
Infrastructure	Cycle-specific: 7.33	General: 5.73

The table shows that for a similar increase in turnover, job creation in cycling industry is above that for other transport modes. This observation holds for manufacturing activity and for retail sale of bicycles and accessories/equipment. It is also true for investment in infrastructure. The employment effect of cycling infrastructure is 1.28 times higher than the employment effect of general transport infrastructure. The only activity for which the situation is different is repair: job creation per turnover is higher in motor vehicle repair than in bike repair.

The adjustment factor we mention in the table refers to the fact that we have increased the jobs/turnover rate based on the numbers from the French ATOUT study (Mercat, 2009). Without the adjustment factor we use the FTE/turnover rate from Eurostat Structural business statistics for sector NACE 4764 “Retail sale of sporting

¹ We use an exponential transformation of current modal shares to be specific. This means that the difference in growth rate between countries with a low modal share and a country with modal share of 16% (the middle of 31% and 1%) is larger than the difference in growth rate between a country with 16% modal share and the Netherlands.

equipment in specialized stores”. With the adjustment factor, we use the FTE/turnover rate from the French ATOUT study. In any case, both job intensity indicators are higher for the sale of bicycles than for motor vehicles.

3.1. An opportunity for a more inclusive Europe

The qualitative evaluation of jobs in the bicycle sector shows that a number of them do not require high levels of qualification. By providing easily accessible employment for groups that are disadvantaged on the labour market because of their low qualification levels, this offers an opportunity to contribute to the objectives of an inclusive Europe.

The information we provide is largely based on a study by Eurofound (2014) on ‘working conditions and job quality: comparing sectors in Europe’. This study provides several job quality indicators for Europe, at the level of NACE sectors. We have seen earlier that this sector classification does not correspond entirely with the cycling sectors as we defined it. The NACE sectors are too broad and encompass other activities besides cycling. On the other hand, cycling related employment is scattered over several NACE codes.

For this qualitative analysis, we select a number of NACE codes which contain the most important groups of cycling jobs.

Despite the fact that the analysis is approximate as the relation between NACE codes and cycle sectors is not always exact, we can still conclude that job quality in the cycling sector is only slightly lower than the average European job, in spite of the NACE sectors in which cycling employment can be found. Industrial jobs typically offer a lower job quality than many services jobs (such as financial services, public services, etc.). Also, a high share of cycling employment is in the tourist industry, which mainly consists of food & beverage and accommodation as employment sectors. These are also below average in terms of job quality according to the Eurofound report.

On the other hand, this observation also creates opportunities: the cycling sectors provide chances for people with relatively low qualification levels, for whom finding employment can be a real challenge in the current job market situation. Cycling thus helps achieve the EU target for inclusive growth – 75% employment rate for women and men aged 20-64 by 2020 – by getting more people into work, especially those lacking higher qualifications.

3.2. Cyclists are better for the local economy

Another interesting point about (functional) cycling is that it contributes probably more to the local economy than the use of other transport modes. Cyclists go more to local shops, restaurants, cafés or other local businesses than users of other transport modes.

A study by the Austrian Ministry for the Environment came to the conclusion that shopping by bike accounts for a consumption volume of EUR 2.53 billion per year and that an increase of the modal share of cycling by one percentage point would increase turnover of local retailers by 0.2% or EUR 87.6 million per year in Austria. If the potential of cycling for shopping trips would be fully used, turnover of local retailers would increase by EUR 1.3 billion. This would benefit mainly retailers in city and village centres (Lebensministerium, 2010).

Applying the calculations used in this study to the rest of the EU leads to the following results (European Cyclists’ Federation, 2015):

- At the moment, customers going shopping by bike account for a consumption volume of more than 111 billion EUR in the EU-28.
- If the modal share of cycling was doubled in the EU (excluding Croatia, using the same growth scenario as in Table 2), this would generate an increase in retail turnover for local retailers of more than 27 billion EUR. This would give an economic boost to city centres, towns and villages all over Europe.

Lots of other studies also show that cyclists spend in the local economy compared to users of others transport modes. We provide a small sample of those studies and their main conclusions:

- A survey of Fubicy for ADEME, the environmental agency found that:
 - Non-motorized clients are more loyal than motorized clients.
 - Non-motorized clients spend less per shop visit, but they visit shops more frequently
 - The shops in the city centers create less automobile traffic than shopping centers at the periphery.
(Fubicy, publication 4841)
- In Copenhagen, cyclists contribute the most to the turnover of the retail sector. (Kästrup, 2013)
- A study of the Portland State University (Clifton et. al., 2012) came to similar conclusions for Portland. Cyclists spend more in the local convenience stores, bars, cafés and restaurants.
- A survey from Dublin showed that retailers on the main inner-city shopping streets systematically over-estimated spending levels of customers travelling by car and under-estimated the spending of customers using other transport modes, including cycling (O'Connor et al., 2011)
- The New York City Department of Transport found that the installation of protected bicycle lanes on 8th and 9th Avenues in Manhattan was correlated with an increase in retail sales of up to 49% in that area (New York City Department of Transport, 2012).

4. Caveats

4.1. Not all employment in the cycling sector taken into account

The present study only looks at job creation in certain key sectors of the cycling economy. However, in certain sectors there was very limited or no data available on the amount of cycling jobs. For example, for cycling services the amount of jobs that we included could be an underestimate because data on this sector was so sparse. Including data for these fields would increase the total number of jobs and could be the subject of further research.

Furthermore, due to issues of data availability, the newest EU Member State Croatia is not included in this study. For the EU-28, the number of jobs in the cycling sector is therefore probably slightly higher than presented here.

In the manufacturing sector, the job creation effect of doubling the modal share of cycling might be underestimated. The reason for this is that with increasing modal shares, bike prices go up which could imply that cyclists buy less cheap Asian bikes and more bikes which are assembled in Europe. Within the limits of the study, we were not able to investigate trade flows and therefore our numbers will not pick up such an element.

Finally, the study takes only direct effects into account. Indirect effects are not taken into account. An indirect effect is for example the jobs created at the steel or aluminium producer who provides input for the bicycle manufacturer.

4.2. Room for improvement of the estimates

This study estimates the gross job effect. It does not account for the fact that if people did not cycle, there could be other jobs replacing cycling employment. The net job effect would take this into account. As a result, the job growth numbers that we indicate for a doubling of bicycle modal share should not be interpreted as indicating a net employment growth numbers for the entire economy. They should be considered as the increase in cycling jobs, whereas jobs in other sectors may diminish in compensation. Nevertheless, our calculations have also shown that job intensity per 1M€turnover is higher for the cycling economy than for other transport modes.

To analyse the difference between gross and net effects, we should ask the question what the situation would be with cyclists and without cyclists. It is clear that without cyclists and cycles, a part of these jobs would have disappeared (the net effect). It is also clear however that other jobs would be created in the production of other transport modes (the compensating effect). The net employment effect of cycling is the difference in the number of jobs in a situation with cyclists and a situation without cyclists.

For example, we expect that an increase in cycling jobs might lead to a small reduction in jobs in the car industry and retail sectors. More cycling means (a bit) less cars, or at least car use. Based on our own studies and the Copenhagen bicycle accounts, the share of cycle trips replacing car trips is around 10% to 20% (Transport & Mobility Leuven & ProVélo, 2014). Further research is needed to see if this means suppressing car ownership or car

use – if only the latter is concerned, jobs in the car industry will largely be unaffected. On the other hand, we have also seen that job intensity is higher in the cycling industry sector than in the car industry. For this reason, we do expect that an increase in bicycle modal share will in the end lead to a net job growth effect.

Also, we want to stress that our estimates for employment growth potential in case of a doubling of bicycle modal share are based on a relatively simple statistical model. We correlate current modal share with cycling economy indicators in a cross-section of EU27 countries, and subsequently use these correlations to estimate the economic impact of increasing modal shares by extrapolation. This approach leaves the room open for statistical problems, such as endogeneity bias, which would imply that we over-estimate the employment effects of increasing modal shares. However, limited data availability and limited resources have motivated the current approach for this study.

The numbers we provide are based on available data and statistics, completed with calculations and analyses. The quality of our estimates is obviously linked to the quality of the data that we use. Quality of available data and statistics greatly vary.

- Data on employment in the manufacturing and retail sector are good. Estimates on tourism sector can be improved, especially the link between an increase in modal share and the increase in bicycle tourism.
- Data on current bicycle modal share and growth potential in bicycle use are poor. No consistent time series are currently available in Europe. This means that there is much room for improvement of the estimate of job impacts of an increased modal share of cycling.

References

- Clifton et al (2012). Business Cycles – catering to the cycling market, Transport news 280, 2012: 26-32.
- Eurofound (2014). Working conditions and job quality: comparing sectors in Europe.
- Eurostat (2014). Structural business statistics database.
- European Cyclists' Federation (2013). Calculating the economic benefits of cycling in EU-27
- European Cyclists' Federation (2015). Shopping by bike: Best friend of your city centre. Cycling and Local Economies.
- Fubicy, commerces de centre-ville et de proximité et modes non motorisés, rapport pour l'ADEME, publication 4841.
- Gallup (2011). The future of transport: Flash Eurobarometer Report, European Commission.
- Kästrup M. (2013). Are cyclists good customers, City of Copenhagen.
- Lebensministerium Österreich (2010). Studie Radfahren und Einkaufen. Potentiale des Fahrrads für den Einzelhandel in Österreich.
- Mercat N. (2009). Spécial économie du vélo, étude complète. Indiggo-Alternmodal pour Atout France.
- New York City Department of Transport (2012). Measuring the Street: New Metrics for 21st Century Streets.
- O'Connor, D., Nix, J., Bradshaw, S., Shield, E. (2011). Shopping Travel Behaviour in Dublin City Centre. ITRN2011, University College Cork, Cork, 31st August-1st September, 2011
- Transport & Mobility Leuven & ProVélo (2014). Impact en potentieel van fietsgebruik voor de economie en de werkgelegenheid in het Brussels Gewest.