



cycling and green jobs

A joint report by UN Environment-WHO-UNECE



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Riding towards green economy: Cycling and green jobs

A joint report by UN Environment-WHO-UNECE

List of acronyms

ECF	European Cyclists Federation
EPOMM	European Platform on Mobility Management
EU	European Union
GVA	Gross Value Added
IPCC	Intergovernmental Panel on Climate Change
PJGHT	Partnership on Jobs in Green and Healthy Transport
SDGs	Sustainable Development Goals
THE PEP	Transport, Health and Environment Pan-European Programme
UK	United Kingdom
UN	United Nations
UN Environment	United Nations Environment Programme
UNECE	United Nations Economic Commission for Europe
UNSTAT	United Nations Statistics Division
WHO	World Health Organization

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Foreword

A shift towards green economy is one of the key objectives of the 2030 Agenda for Sustainable Development. It was also one of the main themes addressed by the Eighth Environment for Europe Ministerial Conference, held in Batumi, Georgia, on 8–10 June 2016. The transport sector, which in all countries is one of the largest economic actors, can play a major role in promoting this transition, particularly in the urban environment, where 8 out of 10 Europeans are expected to live by 2030 (ST/ESA/SER.A/352).

Meeting the accessibility needs of an ever-growing urban population presents European cities with important challenges related to emissions of air pollutants, CO₂ emissions and noise, as well as land consumption and congestion, which in turn affect the quality of urban life and the attractiveness and competitiveness of cities. As part of the policy response to these issues, an increasing number of cities across the pan-European region are considering the promotion of cycling as a means to address the multiple and complex challenges. While the benefits of cycling for health and the environment have been clearly demonstrated, there is a need for further research on the economic implications of cycling promotion, particularly with respect to the potential for creating jobs. Filling this knowledge gap would be very important, since it would provide policymakers with new compelling arguments to advocate for and in support of an increased number of more effective cycling policies and interventions.

Working together under the framework of the Transport, Health and Environment Pan-European Programme partnership on jobs in green and healthy transport, the United Nations Economic Commission for Europe, the UN Environment and the World Health Organization Regional Office for Europe set out to investigate this emerging area of research. This new study represents the first attempt to collect evidence from cities in the pan-European region on the number of cycling-related jobs, using a standardized approach, and highlights the role that green and healthy jobs can play.

Although further research will be required to address some methodological challenges, the initial results are very promising. They clearly indicate that the promotion of cycling could contribute to the creation of a significant number of jobs in a broad range of professions.

In addition to the benefits in terms of improved air quality, lower greenhouse gas emissions and reduced congestion, together with the opportunities for increased physical activity and the adoption of sustainable production and consumption patterns, incorporating green jobs and cycling-related initiatives into urban policies will move us closer towards achieving the 2030 Agenda for Sustainable Development.

This report seeks to inspire policymakers to promote the change we want and to move one step closer to the vibrant, sustainable and healthy cities where we wish to live.

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1 Introduction: Green and healthy transport can play a positive role in job creation

Transport is an important economic sector in its own right; it provides employment for around 11 million people and accounted for about 4.9% of the total gross value added (GVA) in the EU-28 in 2012 (European Commission, 2015). It also enables trade and provides access to leisure and education activities. However, unsustainable transport is a major polluter: transport is responsible for around 23% of energy-related CO₂ emissions globally (IPCC, 2014). It is also a source of air pollutants and noise, and contributes to significant damage to the environment and to human health. Other adverse impacts include road traffic injuries and congestion, social exclusion and reduced opportunities for physical activity, where transport discourages or impedes cycling and walking (WHO, 2014).

There has been a growing need to develop 'greener' (or sustainable) transport policies that enable the provision of transport benefits, while contributing to better health, a cleaner environment, and greater social cohesion. The attainment of this objective was one of the reasons for the establishment of the Transport Health and Environment Pan-European Programme¹ (THE PEP) in 2002 by governments of the pan-European region. Since then, THE PEP launched a new Partnership on Jobs in Green and Healthy Transport (PJGHT) with UNECE, WHO, UN

Environment and other organizations, in response to Goal 1 of the 2009 THE PEP Paris Declaration (WHO/UNECE, 2014)², which aims "to contribute to sustainable economic development and stimulate job creation through investment in environment- and health-friendly transport", as well as the outcome of THE PEP 2010 Symposium on green and healthy-friendly investments and jobs in transport (WHO/UNECE, 2011) and THE PEP Amsterdam Declaration (WHO/UNECE, 2009).

One of the aims of the PJGHT is to consolidate evidence and analyse the potential of greening existing jobs and creating new green jobs in mobility. Such evidence-based information would facilitate national, subnational and local authorities to develop sustainable transport policies and plans, and encourage the shift of required investment to stimulate job creation.

In 2014, the PJGHT published a report³ on the job creation potential of green and healthy transport. The report consolidated and analysed national studies (including from Austria, Canada, France, Spain, UK and USA) on jobs in public transport, cycling and walking. The report showed that green and healthy transport is a significant employer. It further revealed the positive impact of cycling

¹ <http://www.thepep.org/>

² http://www.unece.org/fileadmin/DAM/thepep/en/hlm/documents/2009/Amsterdam_Declaration_ENG.pdf

³ http://www.euro.who.int/__data/assets/pdf_file/0003/247188/Unlocking-new-opportunities-jobs-in-green-and-health-transport-Eng.pdf

Green and healthy transport is a significant employer

and walking-related jobs to the local economy. Conclusions from several studies reviewed in the report indicated that cycling and walking initiatives are more labour intensive than those of roads; on average, cycling projects generated 11.4 jobs per each US\$1 million invested, 9.9 jobs in pedestrian-only projects and 7.8 jobs in road-only projects (Garret-Peltier, 2011).⁴ The report also estimated the cycling-related job creation potential in urban areas should major cities in the pan-European region achieve the same cycling modal share as the Danish capital, Copenhagen (WHO, 2014; see Section 2.1).

4

One of the findings of the PJGHT 2014 report, however, was that many estimates for the number of cycling jobs referred to the national level, while only a few estimates referred to cities. This current report aims at filling this gap in order to provide comprehensive, evidence-based information for the promotion of cycling as a greener and healthier mode of urban transport and a potential strong economic actor and green job creator in the region. This report focuses on the job

potential for cycling in cities: an increased share of cycling in urban transport provides multiple benefits, such as the reduction of energy consumption, air pollution and traffic congestion (which constitute an economic loss of US\$1,740 per car driver⁵). It also increases physical activity, which reduces the risk of cardiovascular and other diseases. Furthermore, many of the new cycling-related jobs will be created locally and thus benefit the local economy.

The report presents the number and types of jobs associated with cycling, using data from 39 pan-European cities (the 37 for which information was received for this report, plus the information on two cities from other reports). It briefly recaps the findings of the 2014 PJGHT report, presents a review of existing studies and explains the methodologies that have been used (Section 2). The report also presents additional evidence on the number of jobs associated with cycling in cities, which was collected and analysed for the purpose of this report. The numbers from the 2014 PJGHT report are revisited to identify the implications of the new information collected and analysed in this study. Finally, the report concludes with a discussion of the findings and gives recommendations for national and local policymakers.

⁴ The figures for the job intensity of cycling infrastructure are similar to those for the United Kingdom (Wu, 2013).

⁵ <http://inrix.com/economic-environment-cost-congestion/>

2 Reviewing existing estimates of the number of jobs associated with cycling

2.1 The report 'Unlocking new opportunities: Jobs in green and healthy transport'

The PJGHT's 2014 report, 'Unlocking new opportunities: Jobs in green and healthy transport', reviewed the evidence for the job creation potential of green and healthy transport (WHO, 2014). While the definition of a 'green and healthy job' in transport covers many areas, including the design and manufacture of low carbon, energy-efficient vehicles and the provision of mobility services such as car sharing, the focus of the report was on a field that is less documented: jobs associated with public transport, cycling

and walking. It drew on a range of different sources, from studies that have attempted to identify the number of green and healthy jobs across the economy as a whole, to information on jobs associated with particular 'green and healthy' transport projects.

It was clear that the evidence for the number of jobs associated with cycling was better than for the other two modes. Using a methodology based on a linear extrapolation of the data on jobs and cycling modal share of Copenhagen to other cities (see Box 1), the report estimated, that around 76,600 cycling jobs could be created if 56 major cities in the pan-European region achieved

Box 1 Summary of the methodology used in the 'Unlocking new opportunities: Jobs in green and healthy transport' report

The report 'Unlocking new opportunities: Jobs in green and healthy transport', which estimated the potential number of additional cycling jobs if 56 major cities of the pan-European Region had the same cycling modal share as Copenhagen, used a basic statistical method: simple extrapolation. The data used was based on a comparison of the population of the cities with that of Copenhagen and the proportion by which the respective modal shares of cycling would have to increase to reach the share of Copenhagen.

The methodology consisted of estimating the **existing** number of cycling jobs for a city by using the city's own population and cycling modal share, multiplied by the relationship between this data implied by the data for Copenhagen.

The estimate of the number of jobs that would be created if the city achieved the same modal share as Copenhagen was based on the assumption that the relationship between cycling jobs and cycling modal share was constant, so that the number of jobs increased as the modal share increased.

The potential number of **additional** cycling jobs was the difference between the 'existing' number of jobs and those associated with a modal share equivalent to that of Copenhagen.

Source: WHO (2014).

the same cycling modal share as the Danish capital Copenhagen. This figure was clearly an underestimate of the full potential, as it only covered one city per country, and only a small proportion of the cycling jobs that could contribute to making urban mobility greener, healthier and more efficient.

2.2 An increasing number of studies suggest that the number of cycling jobs can be significant

The previous report identified several studies that had estimated the number of jobs associated with cycling for different geographical areas. Since the publication of that report, a number of further reports on cycling jobs had been published. The findings of all of these reports are summarised in Table 1. As is clear, the reports focus on different administrative levels, from the EU level and national studies (on Austria, Canada, France, Spain and the UK), to studies focusing on regions (Wallonia and Brussels) and cities (Copenhagen and Portland). Estimates range from the hundreds of thousands for the EU and the tens of thousands for countries, to the hundreds for regions and cities. Table 1 also contains information relating the estimate of the number of jobs to the population of the geographical area covered. This information is discussed further and presented graphically in Section 3.3 and Figure 3 of this report.

2.3 The quality and consistency of the data is important in estimating the number of cycling jobs

In order to estimate the number of jobs associated with cycling, the reports that were reviewed often combined top-down approaches, e.g. using European

level or national statistics, with bottom-up approaches, i.e. engaging with the administrations and the companies concerned (see Annex 1 for more detail). The studies that focus on smaller geographical areas tend to include more bottom-up estimates than those that focus on larger geographical areas. A supplementary approach was to use city-specific, regional or national data and scale these up by an appropriate factor to estimate job numbers at a wider geographical scale. Additionally, several studies used selected numbers from other studies in order to help with their estimates.

The approach taken to identifying the number of a particular type of cycling job varied between studies, although some patterns can be identified: industry data (e.g. manufacturing and retail) were more likely to be collected from national sources, while estimates for jobs relating to sporting events and tourism were more likely to be obtained from regional surveys and then scaled up to the national level.

The study on Austria (Miglbauer et al., 2009) was the only one to estimate the implications for the wider economy. It used an input-output model to estimate the wider impacts on jobs in the economy when the level of spending rises as a result of increased employment. Such models have been used in a similar way to estimate the jobs associated with investment in public transport (Weisbrod and Reno, 2009). The approach is based on matrices of purchases and sales between industries, usually at the national level, and can be used to identify the impacts of changes to these patterns and subsequently the impact on employment. Miglbauer et al. (2009) referred to these additional jobs as “indirect” jobs, which underlines an issue

Table 1 Overview of the studies on cycling jobs

Area covered	Report(s)	Number of full-time equivalent (FTE) cycling jobs (per 1 000 people)*	Activities covered
EU	ECF (2014)	650 000 (1.3 jobs per 1 000)	Retail, production, infrastructure, tourism and services (public bicycle hire schemes and cycle logistics)
Austria	Miglbauer et al. (2009); Miglbauer (2013)	18 328 direct and induced jobs, of which 10 865 are direct These figures are equivalent to 2.2 jobs per 1 000 people, of which 1.3 jobs per 1 000 are direct	Manufacturing, trade (wholesale and retail), services (repair/ rental), e-bikes, cycle tourism, cycle sports events and infrastructure; induced jobs
Canada	Campbell and Wittgens (2004)	71 per 100 000 households	Not explicit – using regional economic data
France	Dumont et al. (2009); Roche and Mercat(2010); Mercat (n.d.)	35 000 (0.5 jobs per 1 000)	Cycling industry (producers, importers, distributors, etc.), provision of cycling amenities, public bicycle hire schemes, leisure rentals, cycling clubs, federations and events, tourist-related jobs
Spain	Avilés Palacios et al. (2010)	11 500 (0.2 jobs per 1 000)	Bicycle rental, manufacturing, distribution, retail and repair; public bicycle hire schemes
UK	Ekosgen (2010)	Between 22 500 and 23 500 (0.3 to 0.4 jobs per 1,000)	Provision and maintenance of cycling infrastructure by the public sector; the manufacture, sale and maintenance of bicycles
Wallonia Region (Belgium)	TML and Pro Vélo (2014a)	622 (0.2 jobs per 1 000)	Bicycle sales and maintenance, cycling infrastructure, services to cyclists (food, hotels, etc.), organizations promoting cycling and organizing sporting events
Brussels Region (Belgium)	TML and Pro Vélo (2014b)	230 (0.2 jobs per 1 000)	Bicycle purchase and maintenance, cycling infrastructure, administration (regional and municipal), bicycle rental, services (training, promotion, etc.), bicycle messengers
Copenhagen, Denmark	City of Copenhagen (2011)	650 (1.2 jobs per 1 000)	Businesses selling and repairing bicycles
Portland, Oregon (USA)	Alta (2006, 2008)	2006: Between 600 and 800 jobs (or between 1.1 and 1.5 jobs per 1 000) 2008: Between 850 and 1150 jobs (or between 1.5 and 2.1 jobs per 1 000)	Frame builders, component manufacturers, race promoters and bike shops

Notes: The figures for jobs per 1,000 inhabitants were not provided in the reviewed reports. Sources used to estimate the figures are: Eurostat (2016) for the EU; UNSTAT (2016a) for national estimates; TML & Pro Vélo (2014a) for Wallonia; TML & Pro Vélo (2014b) for Brussels; City of Copenhagen (2011); and the United States Census Bureau (2016) for Portland.

with respect to terminology, as these jobs were considered to be “induced” jobs in the previous report (WHO, 2014). In this report, we use the WHO definition and thus refer to these jobs as induced jobs.

The review demonstrated that there are different ways of estimating the number of jobs associated with cycling. All methods require assumptions, which differ depending on whether the approach is: i) top-down and based on national (or EU level) statistics; ii) bottom-up involving direct engagement with relevant companies and organizations, or iii) scaling-up regional figures to wider geographical areas.

While it is possible to identify some patterns, it is not possible, or indeed useful, to conclude that there is a preferred or more appropriate approach to estimating the number of each type of cycling job. It is likely that the approach chosen depends, at least in part, on the availability of data for the city, region or country concerned, and the resources that can be allocated to the report. However, it is clear that many assumptions need to be made, as a result of the fact that few statistics refer only to cycling. Instead, statistics often refer to a wider range of industries or activities, which need to be adjusted to estimate the number relevant to cycling. In this respect, better and more consistently disaggregated data would facilitate the estimation of the number of cycling jobs.

3 Improving the evidence base: Collecting more information on the number of cycling jobs

3.1 Collecting data on cycling jobs from cities using a standardised approach

As the aim of the data collection work for this report was to bring together and analyse estimates on the number of cycling jobs in cities, a bottom-up approach to the data collection was chosen. Such an approach is likely to be more accurate and of more relevance to city authorities, which helps them understand not only the current levels of cycling jobs, but also the potential employment benefits of increasing the modal share of cycling in the city.

The approach taken was to contact relevant authorities directly in order to encourage them to undertake a similar exercise to that of Copenhagen (City of Copenhagen, 2011) and estimate the number of jobs associated with cycling in their city (see Annex 2 for more details on the methodology used). The review indicated that it was the first attempt to collate evidence on the number of cycling jobs from different cities across the pan-European region using a standardised approach.

Responses were received from 37 different cities or regions from 15 different countries, with information for another two cities taken

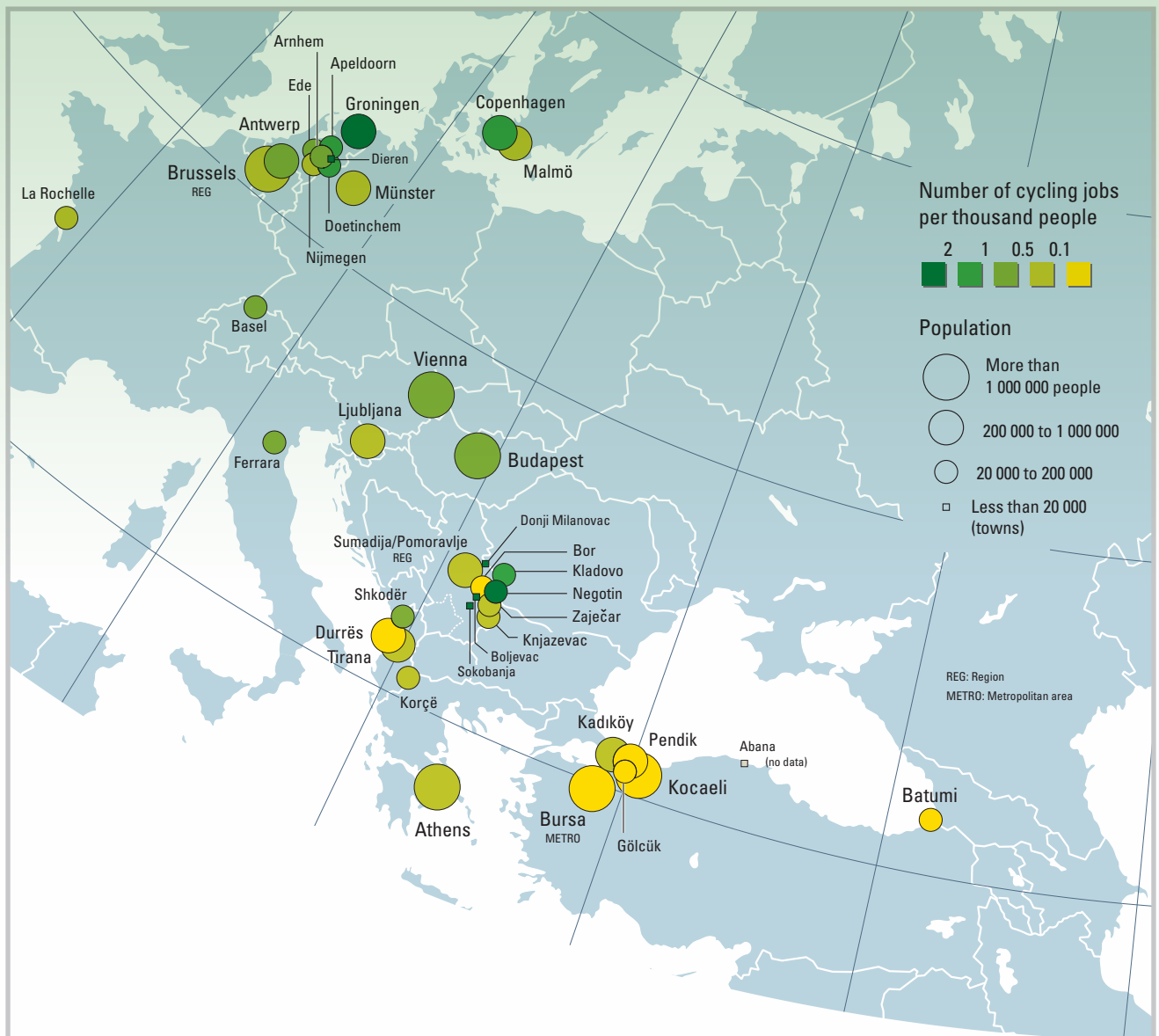
from other reports (see Figure 1). There was only one response from most countries, the exceptions being: Albania, the Netherlands, Serbia and Turkey. In each of these cases, a regional or national representative either collected information relating to a number of authorities, or contacted authorities directly.⁶

Most of the data received related to a city or a town, but in some cases they related to a wider region, e.g. the Turkish metropolitan regions of Bursa and Kocaeli, and the Serbian regions of Sumadija and Pomoravlje. The population of the cities and regions varied significantly, from less than 50,000 to over one million.

In total, nearly 6,800 cycling jobs were identified in 39 cities and regions (including data collected from Copenhagen and the Brussels region from other reports; see Table 1). The estimate of the number of jobs per city varied significantly, with four cities having 650 jobs or more, and two having more than 1,000, whereas the majority had less than 100 jobs).

⁶ For the Netherlands, data for six of the seven municipalities (i.e. all except Groningen) were gathered by a representative of the province of Gelderland. In Serbia, the data collection was coordinated by the national Ministry of Agriculture and Environmental Protection. In Turkey, the data collection was coordinated by the Turkish Health Cities Network. In Albania, the data was collected by the Environmental Centre for Administration and Technology, based in Tirana.

Figure 1 Map of participating cities and regions, including total population and number of cycling-related jobs per 1,000 people



Map designed by Emmanuelle Bournay (Zoi Environment Network for UN Environment).

Table 2 Estimates of the potential additional number of cycling jobs if cities had the same cycling modal share as Copenhagen

Estimates of 'existing', 'potential' and additional jobs		CITY					
		Tirana, Albania	Vienna, Austria	Brussels, Belgium	Athens, Greece	Budapest, Hungary	Ljubljana, Slovenia
Relating to the previous report	Existing jobs	109	563	172	226	182	129
	Potential jobs	948	2 092	1 280	2 935	2 060	335
	Potential additional jobs*	839	1 528	1 107	2 709	1 878	206
New estimates	Existing jobs**	150	1 058	230	905	1 049	110
	Potential jobs	1 300	3 930	1 709	11 765	11 858	286
	Potential additional jobs	1 150	2 872	1 479	10 860	10 809	176
% increase of new estimate compared to the estimate used in previous report		37	88	34	301	476	-15

* The number of 'Potential additional jobs' is the number of 'Potential jobs' minus the number of 'Existing jobs'.

** As noted in Box 1 (p. 5), the number of 'Existing jobs' is related to a city's population and cycling modal share. In all but one case (Budapest), the new 'Existing jobs' estimate provided for this report related to a significantly different population and/or cycling modal share than were used in the previous report. In order to ensure that the estimates of the previous report were comparable to the new estimates, it was necessary to make revised estimates of 'Existing jobs', 'Potential jobs' and 'Potential additional jobs' using the new population and modal share figures. Hence, for all cities other than Budapest, the numbers in Table 2 'Relating to the previous report' are higher than the equivalent numbers used in the previous report.

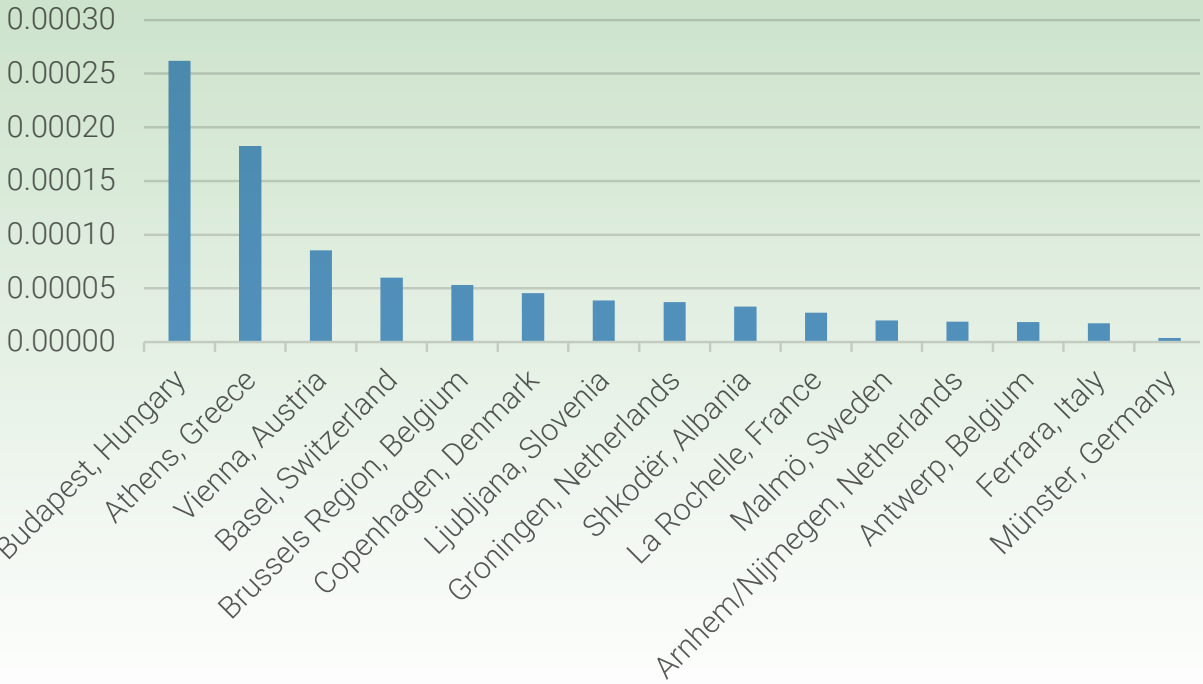
3.2 Up to 435,000 additional jobs might be created if 56 major cities had the same cycling modal share as Copenhagen

The estimate of the 2014 report was recognised as being conservative, i.e. that around 76,600 cycling jobs could be created if 56 major cities in the pan-European region achieved the same cycling modal share as Copenhagen. The basis of that estimate, the number of cycling jobs in Copenhagen, only included cycling jobs in retail, wholesale and design rather than the wider range of jobs considered in this report (see Section 3.4 for more information on other types of cycling jobs). The data collected for the current report supports the conclusion that the previous report had underestimated the number of cycling jobs. Subsequently, an updating of the

previous estimate was undertaken using two new pieces of information.

The first evidence that demonstrates the potential extent of the underestimation in the previous report is related to the six cities that were covered in both reports (see Table 2). As presented in Box 1, in order to estimate the number of additional cycling jobs associated with the same cycling modal share as Copenhagen, it was necessary to estimate the number of existing jobs in each city. For the six cities covered in both reports, the new estimate of the number of existing jobs collected for this report was compared to the estimate from the previous report. As shown in Table 2, for all but one of these six cities, the new estimate of the number of existing cycling jobs was higher than the estimate used in the previous report. In two cases – Athens and Budapest – the estimate was much

Figure 2 Cycling jobs per 1,000 inhabitants per modal share for those cities for which a modal share was provided



- Notes:
- 1) Figure 2 includes Copenhagen and Brussels, for which data on the number of cycling jobs was available from the respective reports mentioned in Table 1.
 - 2) The population estimates underlying the numbers presented were provided by those submitting information for the purposes of this report. Where data was not provided, population estimates were taken from a United Nations database (UN, 2016b).
 - 3) Data on the number of cycling jobs underlying the numbers presented were provided by those submitting information for the purposes of this report, except for Brussels and Copenhagen (see Table 1, p. 13, for the source of the information for these cities). The job numbers represent the total number of jobs provided for each city; no adjustments have been made.
 - 4) Data on cycling modal share were taken from the information provided for this report. Where such information was not provided, it was taken from EPOMM's modal split tool (EPOMM, 2016), where available. A joint figure for cycling modal share was provided for the city region of Arnhem/Nijmegen.

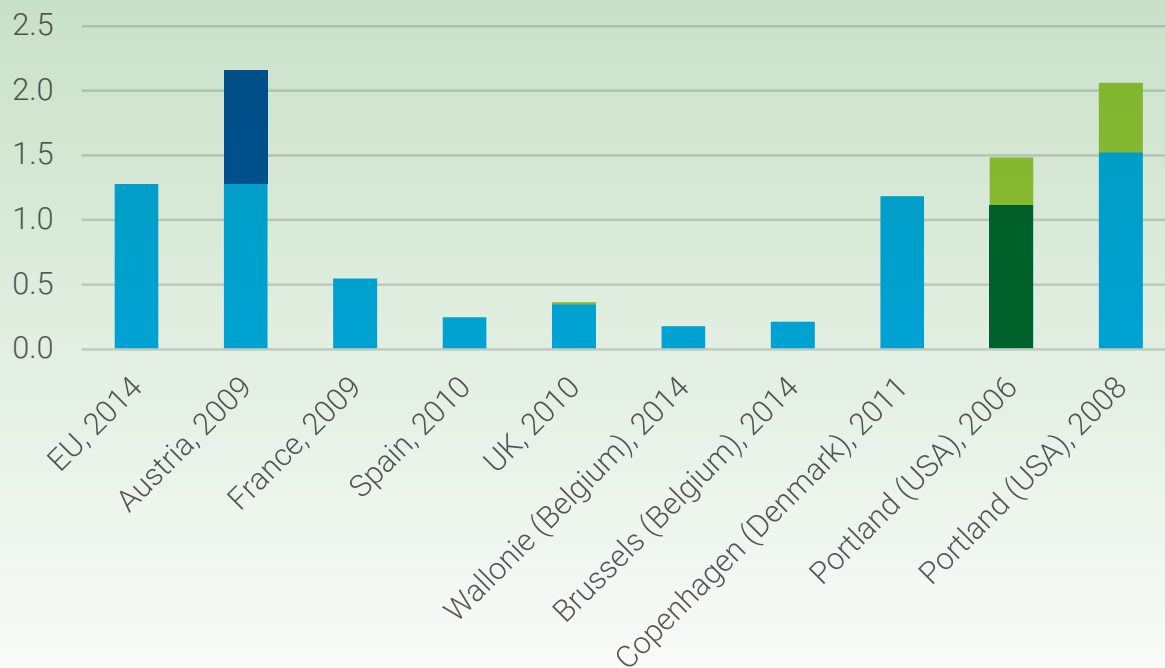
higher. As a result of the higher estimates of the existing number of jobs, the estimates of the potential number of additional cycling jobs also increased. This demonstrates the benefits of collating information about cycling jobs directly from cities.

Across the six cities, the average increase in the estimate of the potential number of additional cycling jobs that might be generated by achieving the cycling modal share of Copenhagen was 153%. If this average increase was applicable to all of the cities covered in the 2014 study, an additional 202,000 jobs could be created if all of the 56

cities achieved the same cycling modal share as Copenhagen.

The potential number of additional cycling jobs was significantly underestimated in the 2014 study. This second piece of evidence pertains to the relationship between a city's 'jobs per 1,000 people' and its cycling modal share. As discussed in Box 1, the job estimates were based on the data for Copenhagen, which effectively gave a factor relating Copenhagen's 'jobs per 1,000 people' to its cycling modal share. The data collected for this report allow this factor to be calculated for a wider range of cities, i.e. all those for which information

Figure 3 Jobs per 1,000 people for countries, regions and cities covered in the studies listed in Table 1



Austria — direct jobs — induced jobs

As noted in Section 2.3, these induced jobs are actually referred to as “indirect” jobs in the original report.

UK and Portland, Oregon (USA) — low estimate — high estimate

Sources of job and population estimates: See Table 1, column 2, p. 13.

regarding population, number of cycling jobs and cycling modal share were available. In Figure 2, the factor for Copenhagen was the one used in the previous report to estimate the potential number of additional cycling jobs that might result from increasing the modal share of cycling in 56 major cities to that of Copenhagen. It is clear from Figure 2 that data from other cities suggest that this factor could be up to six times higher than that of Copenhagen.

For the city with the highest factor – Budapest – the estimate of the number of existing jobs appeared to be more comprehensive than that of Copenhagen, as the information received covered a large number of different types of cycling job, whereas the estimate for Copenhagen only covered cycling jobs in retail, wholesale and design. Consequently, a

more liberal estimate of the number of jobs that might be generated if the 56 major cities of the pan-European region achieved the same level of cycling as Copenhagen was estimated using the factor that relates Budapest’s ‘jobs per 1,000 people’ to its cycling modal share, as presented in Figure 2. Taking such an approach suggests that an additional 435,000 cycling jobs might be created by increasing the modal share of cycling in the 56 cities covered in the previous report to the level of Copenhagen (see Table 3, next page).

Table 3 Population of selected major cities, their cycling modal shares, estimated number of jobs currently associated with cycling and number of potentially additional jobs created by increasing the modal share of cycling to that of Copenhagen

Country	City	Population (millions)	Cycling modal share (%)	Estimated existing cycling-related jobs	Estimated potentially additional cycling-related jobs
Albania	Tirana	0.80	3 ^a	150	1 150
Andorra	Andorra-La-Vella	0.022	3 ^a	17	133
Armenia	Yerevan	1.12	3 ^a	875	6 709
Austria	Vienna	1.77	7	1 058	2 872
Azerbaijan	Baku	2.12	3 ^a	1 655	12 691
Belarus	Minsk	1.89	0	98	12 645
Belgium	Brussels	1.08	4	230	1 479
Bosnia and Herzegovina	Sarajevo	0.31	3 ^a	238	1 825
Bulgaria	Sofia	1.17	1	304	7 605
Canada	Ottawa	1.24	2	644	7 732
Croatia	Zagreb	0.79	5	1 031	4 329
Cyprus	Nicosia	0.055	3 ^a	43	329
Czech Republic	Prague	1.24	1	323	8 071
Denmark	Copenhagen	0.55	26	3 712	0
Estonia	Tallinn	0.40	4	417	2 294
Finland	Helsinki	0.60	7	1 084	2 941
France	Paris	2.23	3	1 743	13 360
Georgia	Tbilisi	1.17	3 ^a	911	6 982
Germany	Berlin	3.50	13	11 836	11 836
Greece	Athens	2.48	2	905	10 860
Hungary	Budapest	1.74	2	1 049	10 809
Iceland	Reykjavik	0.12	3 ^a	92	706
Ireland	Dublin	0.53	3	412	3 155
Israel	Tel Aviv	0.40	9	947	1 788
Italy	Rome	2.76	0	287	18 380
Kazakhstan	Astana	0.66	1	172	4 301
Kyrgyzstan	Bishkek	0.89	3 ^a	694	5 320
Latvia	Riga	0.65	3 ^a	507	3 890
Liechtenstein	Vaduz	0.0052	3 ^a	4	31
Lithuania	Vilnius	0.55	1	144	3 588
Luxembourg	Luxembourg-Ville	0.01	3 ^a	78	597
Malta	Valletta	0.0062	3 ^a	5	37
Monaco	Monaco City	0.036	3 ^a	28	217
Montenegro	Podgorica	0.18	3 ^a	141	1 081
Netherlands	Amsterdam	1.07	33	9 170	0 ^b
Norway	Oslo	0.60	5	779	3 272

Table 3 (continued)

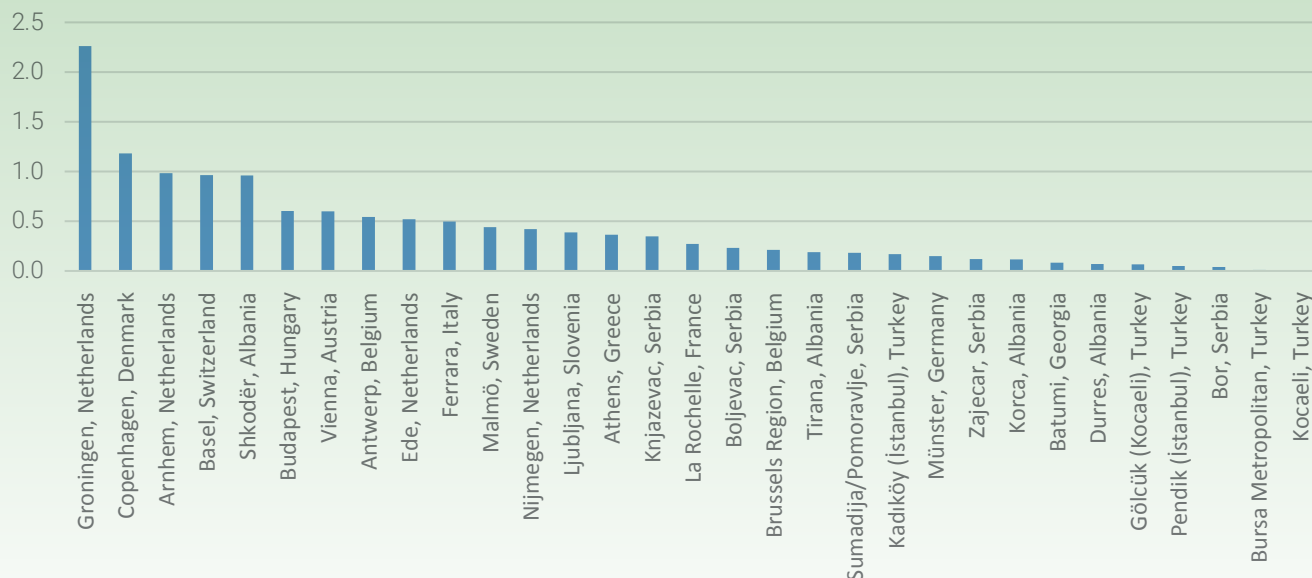
Country	City	Population (millions)	Cycling modal share (%)	Estimated existing cycling-related jobs	Estimated potentially additional cycling-related jobs
Poland	Warsaw	1.71	5	2 134	9 426
Portugal	Lisbon	0.47	1	123	3 086
Republic of Moldova	Chisinau	0.79	3 ^a	616	4 721
Romania	Bucharest	1.94	1	504	12 593
Russian Federation	Moscow	11.54	3 ^a	9 002	69 015
San Marino	San Marino	0.0045	3 ^a	3	27
Serbia	Belgrade	1.64	1	426	10 657
Slovakia	Bratislava	0.41	3 ^a	321	2 463
Slovenia	Ljubljana	0.28	10	110	176
Spain	Madrid	3.27	1	849	21 223
Sweden	Stockholm	0.86	1	225	5 618
Switzerland	Berne	0.12	11	356	485
Tajikistan	Dushanbe	0.70	1 ^a	183	4 576
The former Yugoslav Republic of Macedonia	Skopje	0.32	3 ^a	247	1 895
Turkey	Ankara	4.89	3 ^a	3 815	29 248
Turkmenistan	Ashgabat	0.64	3 ^a	497	3 809
Ukraine	Kyiv	2.77	1 ^a	721	18 023
United Kingdom	London	7.83	3	6 104	46 799
United States of America	Washington, DC	0.62	3	482	3 696
Uzbekistan	Tashkent	2.30	1 ^a	597	14 927
Total					435 480

^a For these cities, no information on the actual modal share for cycling was identified. Thus, in most cases, a low modal share of 3% was assumed. This is probably overestimated, as only about one quarter of the cities for which information was identified had cycling modal shares greater than 3%. A modal share of 1% was assumed for three cities that had no information on the actual modal share for cycling.

^b No additional cycling-related jobs are projected in Amsterdam, as its cycling level is already higher than that of Copenhagen.

Source: Authors, based on Abramov (2013), Akimov and Banister (2011), Belarussian Association of Experts and Surveyors Transport Scientific and Production Private Unitary Enterprise (2011), City of Copenhagen (2011), City of Copenhagen (2013), European Environment Agency and UNEP (2007), Dutch Cycling Embassy (2012), European Metropolitan Transport Authorities (2012), European Platform on Mobility Management (2014), Government of the Republic of Tajikistan, GEF and UNDP (2010), Land Transport Authority Academy (2011), Siemens (2009), Spicycles (2009), United Nations Economic Commission for Europe (2013), UNSTAT (2016b) and Urban Planning Institute of the Republic of Slovenia (2013).

Figure 4 Jobs per 1,000 inhabitants for each city (excluding cities with a large share of jobs in tourism and design/manufacture)



Notes:

- 1) Figure 4 excludes the cities for which jobs in design and manufacture and tourism were particularly important (see Sections 3.4 and 3.5). Figure 9 contains the same information as Figure 4, with the addition of the cities excluded as a result of their high number of jobs in design and manufacture and tourism.
- 2) Data on the number of cycling jobs underlying the numbers presented were provided by those submitting information for the purpose of this report, except for Brussels and Copenhagen (see Table 1, p. 13, for the source of the information for these cities). The job numbers represent the total number of jobs provided for each city; no adjustments have been made.
- 3) The population estimates presented were provided by those submitting information for the purposes of this report. Where data was not provided, population estimates were taken from a United Nations database (UN, 2016b).

3.3 Investing in cycling increases the number of cycling jobs

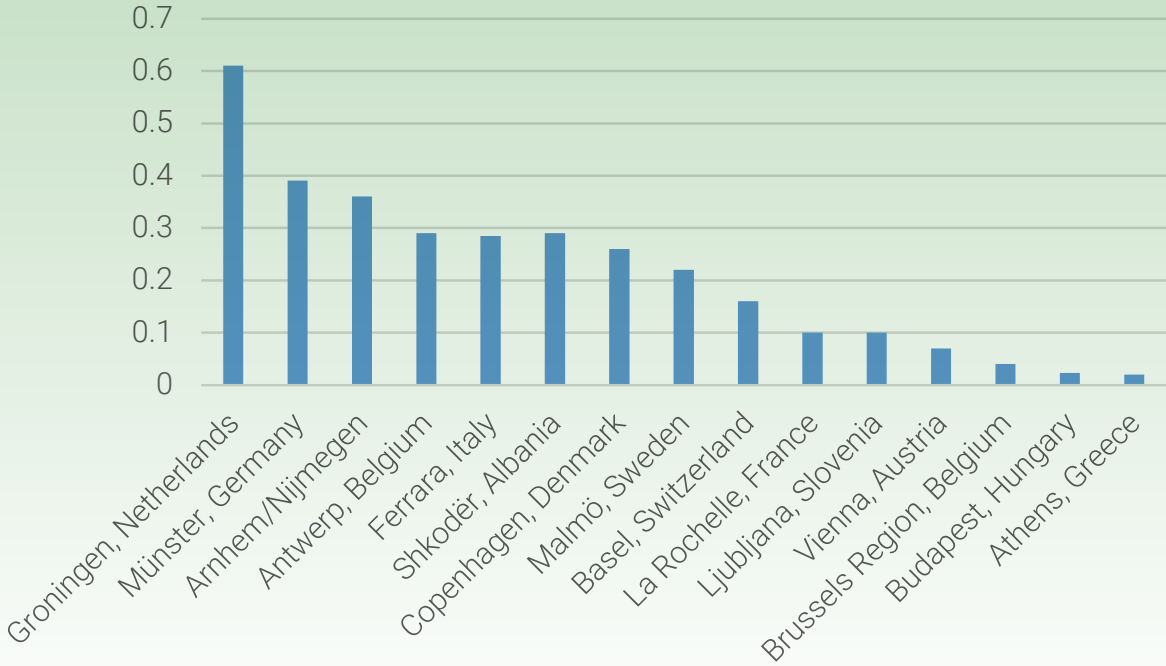
Investment in cycling by public authorities will help to encourage and facilitate cycling and to contribute to the development of a more cycling-friendly transport culture in a city. As the amount of cycling increases, the demand for bicycles and their accessories will increase, so will the demand for maintenance and repair services. The increase in the popularity of cycling will also encourage entrepreneurs to set up related businesses and to develop additional services.

Two studies undertaken two years apart in Portland, USA, suggest an increasing trend over time (see Figure 3). This increase occurred at the same time as an increase

in the amount of cycling in Portland, a trend which has continued since 2008 (Portland BOT, 2014).

Figure 3 also demonstrates that the number of jobs per 1,000 people can vary significantly by location. As cycling is a mode of transport most suitable for urban environments, it is not surprising that two of the three cities - Copenhagen and Portland had a relatively high number of cycling jobs per 1,000 people. However, this is also dependent on the level of cycling in these cities (i.e. Brussels). It is important to note that the estimates for the EU and Austria, as well as that for France, include cycling tourism jobs, which can be substantial, whereas the other estimates do not (see Section 3.5 for further discussion of tourism jobs).

Figure 5 Modal share of cycling in the cities (where available)



Notes:

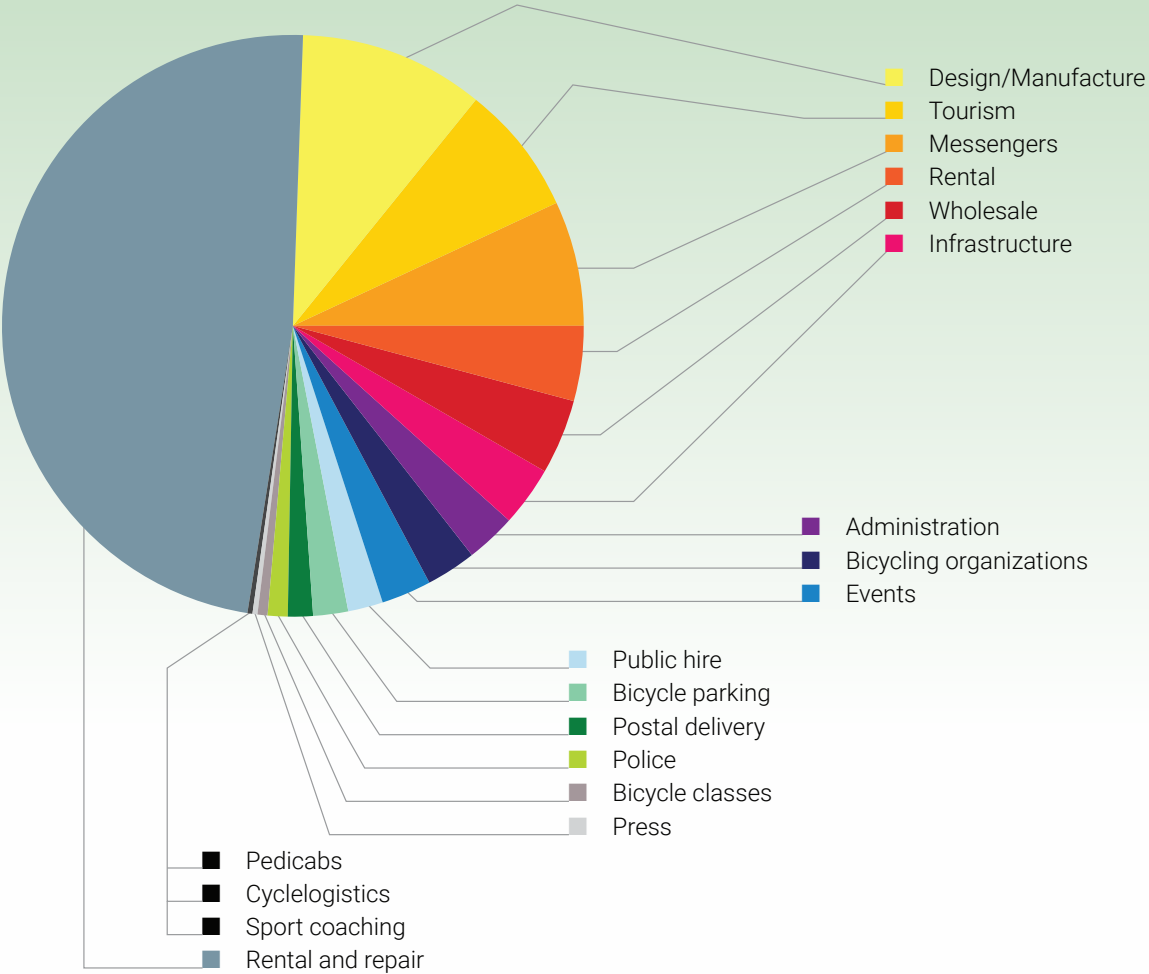
- 1) Modal share figures were not available for many cities, which cities are not included in Figure 5.
- 2) Data on cycling modal share were taken from the information provided for this report. Where such information was not provided, it was taken from EPOMM's modal split tool (EPOMM, 2016), where available. A joint figure for cycling modal share was provided for the city region of Arnhem/Nijmegen, Netherlands.

The potential implication of including induced jobs in the estimate of the total number of jobs associated with cycling is also evident from Figure 3. As noted in Section 2.3, the study on Austria was the only one which considered those jobs that occur when the level of spending in the economy rises as a result of increased employment. In their case, it was estimated that induced jobs could account for 40% of the total number of jobs associated with cycling. Including these jobs in the estimate increases the number of jobs associated with cycling in Austria to 2.2 per 1,000 people, which is higher than the upper estimate for Portland and nearly as high as the estimate for the Dutch city of Groningen that was provided for this report (see Figure 4).

The data for Groningen also underline that cities with a high cycling modal share are

likely to have a high number of cycling jobs. The Dutch city has one of the highest number of cycling jobs per 1,000 people and the highest cycling modal share of those cities for which data was available (see Figures 4 and 5, respectively). In these figures, many of the other cities with a high number of cycling jobs also have a high cycling modal share. It is important to note that a number of cities with a high number of jobs in either the design and manufacture of bicycles or tourism have been excluded from Figure 4 as these jobs can be significant and require a separate discussion (see Sections 3.4 and 3.5, respectively).

Figure 6 Cycling jobs identified by category in 36 cities



Notes:
 1) Figure 6 does not include the jobs in Vienna, Copenhagen and Münster, as no breakdown was provided by job category for these cities; only the total number of cycling jobs was provided.
 2) For most cities, data was provided by those submitting estimates for the purposes of this report; the exception is for Brussels, where data was taken from TML and Pro Vélo (2014b).

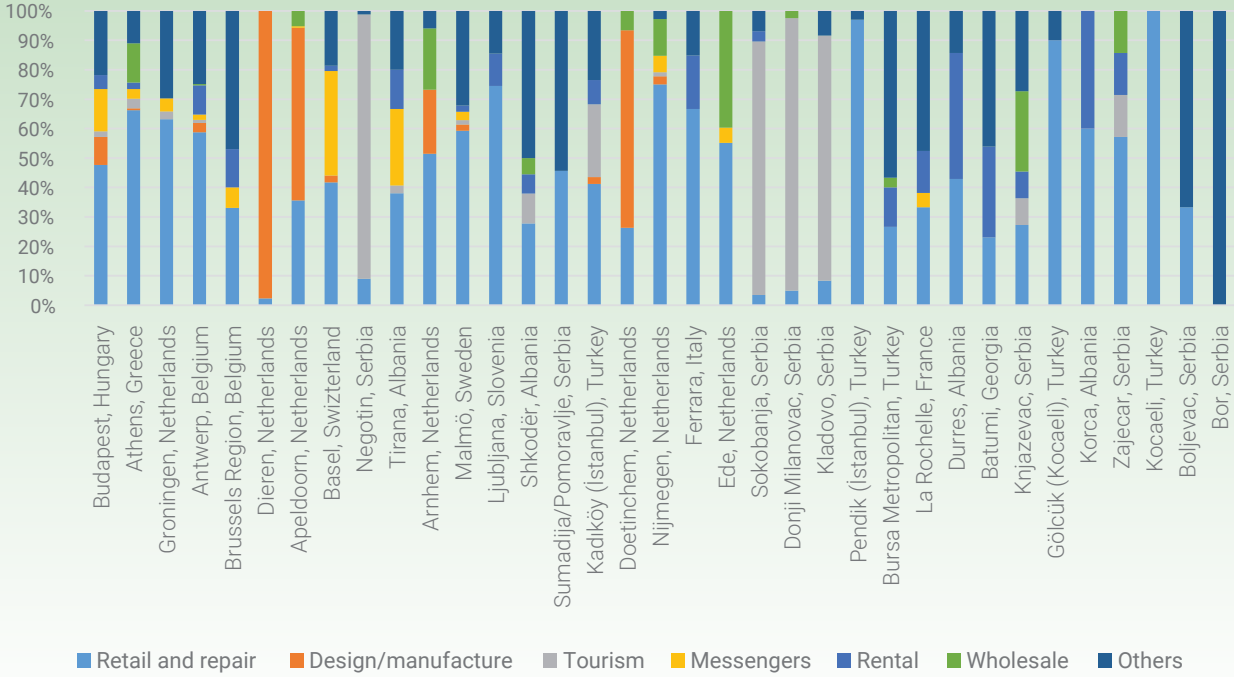
3.4 Cycling jobs are varied and more cycling creates new types of jobs

The type of cycling job, and the skills needed to do that job, are varied. There are jobs that require different levels of technical knowledge, such as those involved with the design and manufacture of bicycles, and those that involve servicing and maintenance of bicycles. Jobs involved with the selling of bicycles and their accessories, either

wholesale or retail, require different skill sets. While technical knowledge can clearly be a benefit for such jobs, sales skills will also be important.

Jobs in the retail and repair of bicycles contributed nearly half of the total number of jobs identified by the cities, which provided information for this report, while those in the design and manufacture of bicycles contributed a further 10% of the total (see Figure 6).

Figure 7 Cycling jobs breakdown by city, by 'main' categories of job



- Notes:
- 1) The cities are presented in the order of the number of jobs in each city, i.e. the cities with the higher numbers of jobs are to the left of the graph, with the number of jobs declining as you move to the right.
 - 2) Figure 7 does not include the jobs in Vienna, Copenhagen and Münster, as no breakdown was provided by job category for these cities; only the total number of cycling jobs was provided.
 - 3) 'Others' represents the total number of jobs in those categories that were included in Figure 6, but which are not presented explicitly in , i.e. all of those categories between 'infrastructure' and 'sport coaching' in Figure 6.
 - 4) For most cities, data was provided by those submitting estimates for the purposes of this report; the exception is for Brussels, where data was taken from TML and Pro Vélo (2014b).

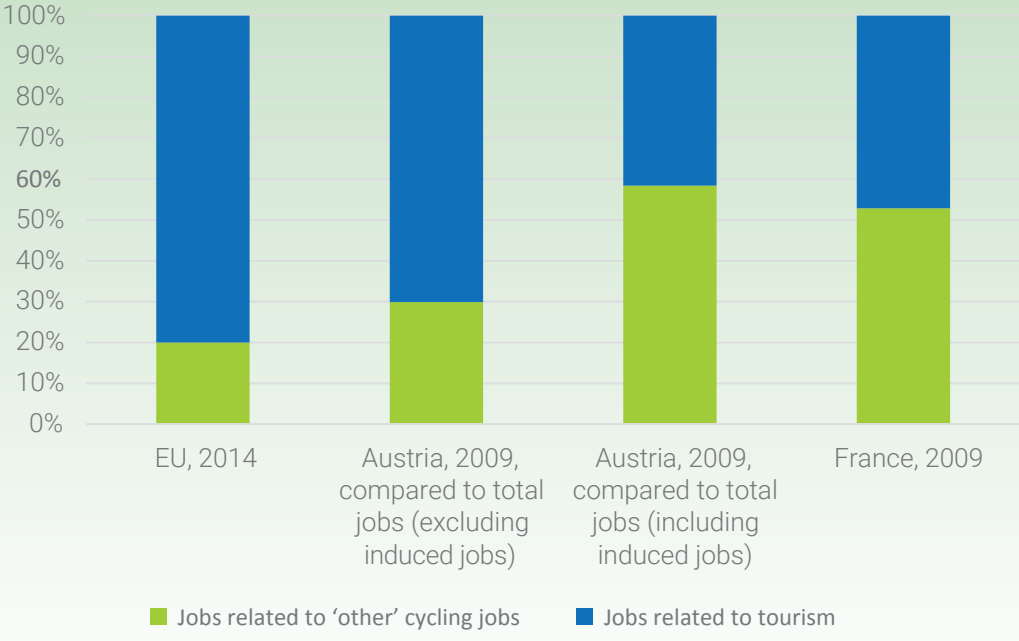
Jobs in cycling wholesale contributed a further 4%. The importance of jobs in the design and manufacture of bicycles is particularly evident from the data for the Dutch cities of Dieren, Apeldoorn and Doetinchem for which the vast majority of cycling jobs are in the design and manufacture of bicycles (see Figure 7).

Jobs associated with cycling are also found in the public administration and construction sectors. These are related, as public policy sets the framework for the development of transport infrastructure. Thus, the more prominence cycling is given by public administration, the more cycling jobs there will be in construction. The construction work could be undertaken by the public authority itself, or sub-contracted to the private sector.

Such jobs are potentially more difficult to identify as they could be part of larger tasks, such as general transport planning in public administration, or projects such construction of roads that includes infrastructure for cycling. Each of these two job categories contributed only 3% of the total number of jobs identified (see Figure 6), although this could be an underestimate as a result of the potential difficulty of separating such jobs from more general jobs in each respective area.

As cycling is facilitated by more and better infrastructure and the development of a more cycle-friendly culture in a city, other opportunities for cycling jobs could arise. The categories having the fourth and fifth highest

Figure 8 Cycling jobs in tourism compared to 'other' cycling jobs



Sources: See Table 1, p. 13.

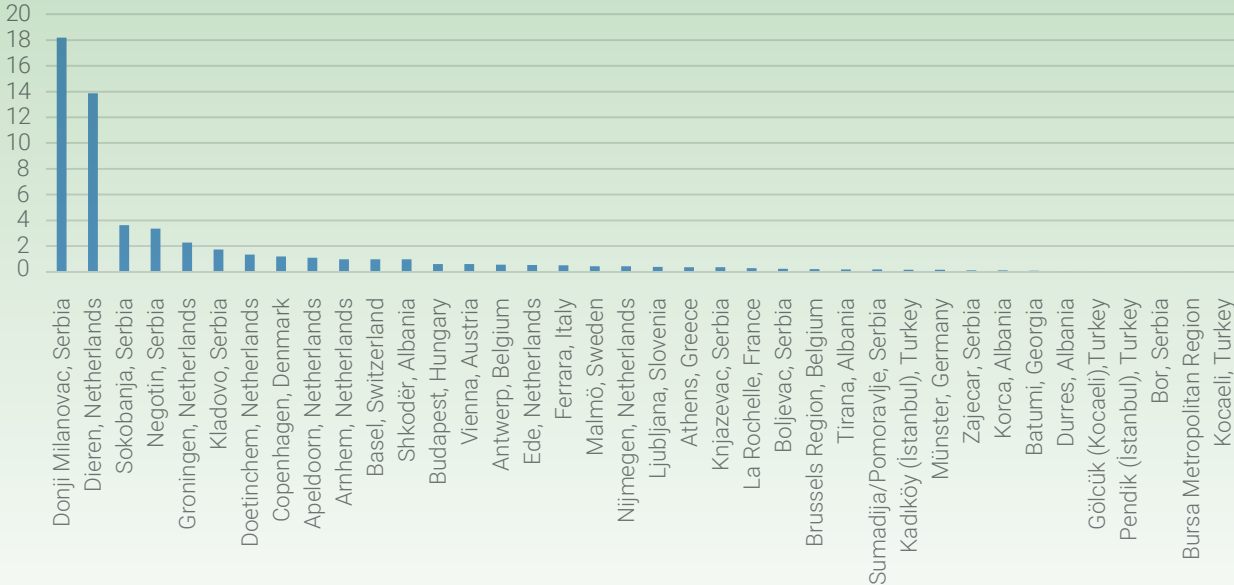
number of cycling jobs among the cities that provided data for this report, i.e. bicycle messengers and bicycle rental (see Figure 6), are both services that will benefit from such changes. Other services that also have the potential to benefit from an increased policy focus on cycling include bicycle taxis and the use of bicycles for logistics (often referred to as 'cyclelogistics'). Such jobs require not only cyclists, but also people to set up and manage the necessary organization or business. In some cities, the potential for job creation of new types of cycling jobs is clearly demonstrated: over 10% of the total number of cycling jobs in both Antwerp and Ljubljana were in 'public hire' schemes, while over 20% of the jobs in Groningen were associated with 'bicycle parking'.

3.5 Cycling-related jobs and tourism outside cities

The importance of tourism jobs in some of the estimates of cycling jobs from other studies (see Section 3.3), which included the number of jobs associated with cycling tourism, tourism jobs contributed between 42% and 80% of the total number of jobs (see Figure 8). The lowest figure indicated Austria, but the total in this case included the number of induced jobs (see Figure 3), which were not taken into account in the other studies. If the number of induced jobs is excluded from the total number of cycling jobs in Austria, then the proportion of jobs that relate to tourism is 70% (Miglbauer et al., 2009; Miglbauer, 2013).

The finding that tourism can be a particularly important source of cycling jobs was reinforced by data provided by some cities. On average, across all of the cities for which information was collected, 'tourism'

Figure 9 Jobs per 1,000 people for each city*



* Figure 9 includes all of the same information as Figure 4, but also includes all of the cities for which jobs in tourism and design and manufacture were particularly important.

Notes:

- 1) Data on the number of cycling jobs underlying the figure were provided by those cities submitting information for the purpose of this report, except for Brussels and Copenhagen (see Table 1, p. 13, for the information sources for these cities). The job numbers represent the total number of jobs provided for each city; no adjustments have been made.
- 2) The population estimates underlying this information were provided by those submitting information for the purposes of this report. Where data was not provided, population estimates were taken from the United Nations Statistics Division (UNSTAT, 2016b).

accounted for only 7% of the jobs identified (see Figure 6). However, in some cities, the proportion of tourism jobs was much higher. For example, in the Serbian cities of Donji Milanovac, Sokobanja, Negotin and Kladovo, more than 80% of the jobs related to tourism (see Figure 7), which gave these cities a higher number of jobs per 1,000 people compared to many other cities (see Figure 9). Figure 9 also highlights the importance of jobs in bicycle design and manufacture, in particular for the Dutch city of Dieren, as mentioned in Section 3.4.

In their data submissions, some respondents highlighted the difficulty of separating cycling tourism jobs from other types of tourism job, choosing instead to report on, for example, the number of people employed in providing bicycle tours. This underlines the challenges

of estimating the exact number of tourism jobs. Many cycling tourism jobs are indeed ‘indirect’ jobs created in other sectors of the economy, such as in the hospitality and food/catering sectors, as a result of cycling. It is more challenging to identify the appropriate proportion of such jobs whose existence is related primarily to cycling.

Taken together, the information gathered for this report suggests that, while cycling jobs relating to ‘tourism’ can be important in some cities and regions, there are also many cycling tourism jobs outside of the cities.

3.6 The number of jobs identified is only indicative of the real potential

It is important to underline that, for various reasons, the number of jobs identified in this report should only be interpreted as being indicative.

Firstly, while a template and guidance note were produced and circulated with the aim of improving the consistency and comparability of the information received, it is still likely that the approach used for the data collection varied. The collation of the information that would enable a good quality estimate of the number of jobs associated with cycling is not straightforward and will be time consuming. In order to estimate the number of jobs in Brussels and Copenhagen, external reports were commissioned (see Table 1). In both of these reports, data collection was undertaken by a small team of individuals that could ensure that their assumptions were as consistent as possible.

On the other hand, the approach taken for this report was to effectively devolve the data collection exercise to representatives of different authorities. Even with the best intentions, and following the guidance note completely, different people will have had to make different assumptions as to how many jobs of a particular type could be considered to be a cycling job. From the comments that were included on the various responses received, it is clear that some of the figures provided were rougher estimates than others.

Secondly, as a result of the resources available to different cities and regions, some estimates will be more comprehensive than others. The information provided for some cities was taken from existing statistics,

rather than being estimated for the purpose of this report. Even when such information covers 'cycling', the extent to which it covers all of the jobs that might be considered to be a cycling job will depend on the definitions of the data collected for each set of statistics. Where information was collected for the purpose of this report, it was clear that for some estimates information was brought together from a number of different sources covering most of the specified categories, whereas in other cases the range of sources used and amount of categories covered was more limited.

For some of the cycling job categories it will also be more difficult to collect data than for others. For categories such as 'retail and repair', 'design/manufacture' and 'public hire', identifying the number of jobs with confidence is more straightforward: it is a case of identifying the number of relevant companies or organizations and contacting them about the number of jobs. Even this will be easier for smaller cities than for larger ones, as there will be fewer organizations and companies to identify and contact.

At the same time, making distinctions can be difficult as a number of respondents indicated that it was not possible, for example, to separate 'wholesale' cycling jobs from those in 'retail and repair'. Categories that caused particular problems were 'infrastructure' and 'tourism'. For 'infrastructure', a contributor noted the difficulty of separating out jobs relating to cycling, as cycling infrastructure projects were usually part of larger project. Hence, only information on the jobs associated with planning and designing cycling infrastructure were included, which was also the implicit approach taken by a number of other respondents.

As noted in Section 3.5, EU and national studies have suggested that 'tourism' can account for up to 80% of the total number of cycling jobs, while other studies/respondents made no attempt to estimate a figure for the number of cycling jobs associated with tourism, underlining that it was simply not possible to reliably disaggregate these from larger data sets. In other cases it was explicitly stated that the 'tourism' jobs identified were only those associated with bicycle tours. On the other hand, 'tourism' jobs were identified as being a significant proportion of jobs associated with cycling in a number of cities and regions, particularly those in Serbia. Three of the Serbian cities with a high number of jobs in 'tourism' are on a trans-European cycle route, EuroVelo 6, which follows the route of the Danube in the country.⁷ Consequently, cycling tourism plausibly plays an important role in the economies of these towns. This discussion again highlights the impacts of different approaches used by the various contributors, as noted above.

Thirdly, when relating the number of jobs to other data, such as a city's population and particularly its cycling modal share, it is important to note that this data might also have been estimated differently. For the previous report, data on the population of the cities was taken from the database of the United Nations Statistics Division (UNSTAT 2016b), while information on modal share was taken from EPOMM's modal split tool (WHO, 2014; UN, 2016b; EPOMM, 2016). Using information from existing databases provides some degree of confidence that the information is from well researched sources, but even for these databases, a range of sources will have been used.

For the purpose of this data collection exercise, all cities were asked to provide information

on their population and cycling modal share. Where information was not supplied, the same databases were used to fill in the gaps. In several cases, it was not possible to identify a figure for the modal share of cycling (as is evident from the relatively low number of cities and regions included in Figure 5). Where information on population and modal share were provided, there is still a risk that this information is not comparable. Information on population will have been estimated at different points in time and potentially with different definitions as to what constitutes the city or regional boundary. For cycling's modal share, the number of variables is even greater. The modal share of cycling in a city will vary depending on its location, i.e. there is likely to be a larger modal share in the centre of a city than in outer areas, the length of a trip (for most people cycling will be more appropriate for shorter trips) and journey type. Some respondents explicitly noted that the figure provided for cycling's modal share was for the centre of the city, whereas in other cases the figure was either explicitly or implicitly for the whole city.

Even though this report focused on collecting information from as many cities as possible in a standardised way through representatives of city authorities, it might not have succeeded at ensuring that the information was collected in a consistent manner. Given the different sizes of the cities for which data was collected, and the different administrative cultures of these cities, obtaining data that is more consistent would require a higher level of engagement of local expertise, and potentially of local stakeholders, as well as detailed follow-up and data cleaning.

⁷ See: <http://www.eurovelo.com/en/eurovelos/eurovelo-6/countries/serbia>

4 Cycling jobs can be important and significant: Summary, research needs and policy recommendations

4.1 Summary

This report represents the first attempt to collect evidence on the number of cycling jobs from different cities in the pan-European region using a standardised approach. It provides further evidence and insights into the number of cycling jobs in cities. The report used strengthened evidence to re-estimate the potential number of additional cycling jobs that might be generated, if 56 major cities of the pan-European region achieved the same cycling modal share as Copenhagen. Whereas the previous report had estimated that around 76,600 additional cycling jobs would be created, the new estimate is 435,000 additional cycling jobs.

Increasing the amount of cycling will increase the number of cycling jobs. Two studies for Portland, Oregon in the USA suggest that the number of cycling jobs in the city has increased at the same time as the amount of cycling increased. Data collected for this report suggests that those cities with high cycling modal shares also have a number of cycling jobs per 1,000 inhabitants. The cycling jobs that can be created are varied and require different skill sets, from technical expertise in the manufacture and maintenance of bicycles, to the people skills needed for retail and other services. Investment in cycling by public authorities can help to contribute to the development of a more cycling-friendly transport culture in a city, which in turn encourages entrepreneurs to set up related businesses and to develop additional

services. The number of new cycling jobs, such as those associated with public bicycle hire schemes and bicycle parking, can be significant.

The number of jobs in the design and manufacture of bicycles and in tourism can be particularly important. For example, the high number of cycling jobs per 1,000 inhabitants in the Dutch city of Dieren is due to the presence of a cycling manufacturer. Evidence from other studies, which cover a wider geographical scale (i.e. either the EU or at national levels), and for some Serbian cities that was collected for this report, suggest that jobs in cycling tourism can also make up a significant proportion of the total number of cycling jobs in some locations. This leads to the suggestion that the number of cycling-related jobs in tourism could be much higher than suggested by the information even in this latest report. The findings also suggest that many jobs associated with cycling tourism are along inter-urban routes, and are therefore outside of cities.

There are also implications of increased levels of cycling expenditure on the wider economy, which are also often overlooked. The jobs created as a result are referred to as “induced jobs” (WHO, 2014), and have not been estimated for the data collected for this report. The study on Austria was the only study reviewed that considered induced jobs and estimated that these could account for 40% of the total number of jobs associated with cycling (Miglbauer et al., 2009). Using this multiplier, the above estimated number

of additional cycling jobs in 56 major cities in Europe could even be as high as 725,000.

4.2 Research needs

While the report provides an important step forward towards better understanding the evidence for the creation of cycling jobs, various areas would benefit from further research.

Although the review of the different methodologies used in other reports demonstrated that there is no common methodology that is used for estimating the number of cycling jobs, this is not necessarily a problem. The approach taken for a particular study is likely to depend on a number of factors, not least data availability and the resources that can be devoted to the data collection. The objective of the study will also be important, as a method based on bottom-up data collection is likely to be of more relevance to city authorities than top-down estimates, as it would help to provide a clearer picture of the current and potential employment benefits of cycling in the city. The more studies that are undertaken in this area, the more interest will grow in improving the quality of the data and in making this accessible. The methodologies used will also develop over time, as new studies develop approaches used previously.

The relationship between a city's population, its cycling modal share and the number of cycling jobs is complex. While some of the differences might be due to the way in which the data was collected, it appears that it is not simply the case that a large city with a high cycling modal share will have a comparatively higher number of cycling jobs. It is likely that the relationship between an increasing population and/or an increasing modal

Understanding the quantity and diversity of cycling jobs in cities will enable policymakers to better design and implement measures to stimulate their further growth.

share of cycling to the number of cycling jobs in a city is not linear. In small cities with low levels of cycling, there may be little in the way of job creation associated with cycling. However, in cities with high levels of cycling and a culture where cycling is an important means of everyday transport, new services will develop. Higher levels of cycling will also facilitate the creation of new types of jobs, such as those associated with bicycle parking and public hire schemes. A transition between these two situations is not likely to be linear, as certain thresholds will probably need to be reached in order for certain services to become viable and for certain types of jobs to be needed. Further research on this relationship over time might be able to provide insights on the job creation benefits of increasing cycling.

The findings in relation to the jobs associated with cycling tourism raise some questions. While for some cities it was difficult to estimate the number of such jobs, for others, these were found to be significant. Other reports, which have used models and surveys to estimate the number of tourism jobs at

the national or EU level, have concluded that tourism jobs are a significant proportion of the total number of jobs associated with cycling. This information suggests that most cycling tourism jobs are outside of cities. This makes cycling promotion also attractive for areas where cycling might not be perfectly suitable for transportation for the local population but could be attractive for tourists. It would be useful to understand more about where such jobs are and how they are created, given their apparent importance, in order that public authorities can focus on creating the conditions that enable such jobs to be generated.

4.3 Policy recommendations

a) Integration of cycling into broader urban transport systems

Cycling delivers a range of benefits to cities, including reduced carbon dioxide emissions, improved air quality, gains in human and environmental health, as well as reduced road congestion. The development of infrastructure and facilities for cyclists must therefore be an integral part of multi-modal transport systems and policy frameworks of municipalities. This involves not only promotion of cycling safety (via dedicated paths, parking, signage, measures for safe crossing of intersections and proximity of maintenance services), but also a greater focus on the connections between cycling and existing public transportation networks.

In addition, information campaigns which advertising the health and economic benefits of cycling (particularly directed at car drivers), as well as distribution of thematic bicycle maps, can also contribute to the promotion of cycling and its associated social, economic and environmental benefits.

b) Monitoring cycling activity to inform future decision-making

As cycling activity increases, its needs will change, and it is important to ensure that cities review and amend their transport strategies and infrastructure accordingly. This requires monitoring of the existing levels of cycling (e.g. via a network of automated cycle traffic counters, bike hire usage statistics, video surveys and/or cycle parking surveys) and understanding the barriers and opportunities to increasing levels of cycling (e.g. through surveys on cycling habits and cyclist profiles, road traffic collision data, public information events, pilot infrastructural projects and mapping of cycle-friendly areas in the city). The more that the current role and the potential of cycling is understood in a city, the easier this can be taken into account in the appraisal and planning of transport policies and infrastructure. In other words, accurate, bottom-up collection of cycling data (as opposed to top-down estimates) is essential for empowering local decision-makers to increase and/or maintain cycle usage.

c) Effectively collecting and using information on the employment benefits of cycling

As demonstrated in this report, cycling holds tremendous potential to create and maintain an array of “greener” jobs – ranging from design, manufacture and retail, to services such as bicycle hire schemes or transportation of passengers and/or commodities. In this respect, cycling can be viewed as not only a transport, but also as a job-creation strategy. However, as seen in Section 3.6 of this report, it is often difficult to gain an accurate assessment of the current (and future) role that cycling plays in the job market – largely because data on cycling-related jobs is routinely aggregated with

other employment statistics. City authorities are therefore encouraged to update their employment-statistics collection methods to include jobs that benefit directly and indirectly from cyclists.

What is more, the relationship between a city's population, cycling modal share and its employment-generation potential is highly complex, and most probably city/region specific. This means that further research and outward communication of the job creation potential of cycling should be done by individual city authorities, avoiding the use of one-size-fits-all models and extrapolations across different sectors. Future data collection and analysis should also focus on monitoring the profile of employees in cycling-related industries, including their gender, age and level of education. For example, disaggregating data by sex to identify how many men and women work and benefit from cycling-related jobs, could inform future efforts to stimulate employment and the broader culture surrounding cycling.

Understanding the quantity and diversity of cycling jobs in cities will enable policymakers to better design and implement measures to stimulate their further growth. Similarly, dissemination of data on cycling-related jobs can in turn strengthen the public image, the political will to further develop cycling infrastructure/services/jobs, as well as the attractiveness of such industries/businesses/projects for investors.

d) Understanding the contribution of cycling to tourism

One particularly under-researched aspect of cycling is the contribution that it can make towards tourism. Indeed there is strong evidence to suggest that favourable cycling conditions and infrastructure, particularly

along longer inter-city routes, can have “spill-over” benefits for jobs and growth in other economic sectors, such as hospitality and catering. Authorities are encouraged to look deeper into where and how cycling can induce jobs, and to create enabling conditions for such businesses to flourish. It is safe to say that the promotion of cycling should not be limited for the use of local, inner-city populations – and can indeed also be integrated into national/regional strategies for sustainable tourism.

e) Positioning cycling and a means of achieving multiple SDGs

Cycling must be acknowledged as an excellent way to make regional and national strides towards achieving the Sustainable Development Goals (SDGs). For example, as cycling promotes healthy, non-polluting lifestyles, improves road safety, is affordable, and can significantly increase people's access to jobs and services without the need for complex technology (ECF, 2016), it is therefore directly linked to achieving SDGs 3 and 11 (on ensuring healthy lives and promoting well-being for all at all ages; and on making cities and human settlements inclusive, safe, resilient and sustainable).

The job creation potential of cycling (as discussed in this report) also offers opportunities for achieving SDG 8 (on inclusive and sustainable economic growth and productive, decent employment).

Lastly, by using renewable human power, cycling enables to lower the carbon footprint of transporting goods and people, thus contributing to SDG 12 (on ensuring sustainable consumption and production patterns), as well as to SDG 13 (on combating climate change) (ECF, 2016).

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Annex 1 Review of methodologies used for other studies

This Annex sets out in more detail the approach taken by the studies reviewed for this report, the summary of which is presented in Section 2.2.

The EU level study focused on top-down approaches supplemented by scaling up regional and national information in order to reach its estimate (ECF, 2014). A top-down approach was used to estimate the number of jobs associated with manufacturing, retail and investment. The turnover of the respective manufacturing and retail industries was identified from industry figures and then multiplied by the respective job/turnover ratio found in Eurostat's Structural Business Statistics. In many cases, it was not possible to identify statistics that only related to cycling; often statistics referred to a wider range of industries or activities. In these cases, it was necessary to adjust the statistics accordingly to make sure that they represented cycling only.

The starting point to identify the number of jobs associated with infrastructure was national data on investment in cycling per person, which was converted to jobs using a ratio of employment to investment. The latter was only available for 'road construction', so this figure was adjusted to represent cycling infrastructure investment. The study estimated the number of jobs associated with the sale of accessories and bicycle repair by scaling up evidence from TML and Pro Velo (2014a) and those associated with public bicycle hire schemes and cycle logistics services by scaling up the numbers of jobs associated with selected schemes.

For bicycle tourism, which was the largest contributor to the jobs total, a demand model produced for another report was used as the basis of the estimates (see Figure 8 of the main report).

National statistics were used to identify the number of jobs in bicycle manufacturing in France (Mercat, n.d.) and the UK (Ekosgen, 2010).⁸ For the other two comprehensive national studies, the numbers of jobs in manufacturing were estimated using companies' own records for Spain (Avilés Palacios et al., 2010) and on the basis of interviews with relevant companies for Austria (Miglbauer et al., 2009).⁹ Different data sources were also used to identify jobs associated with retail and distribution, including an industry source for the UK, interviews with companies in Austria and evidence for a region (Catalonia) being scaled up to the county as a whole (for Spain).

Estimates of jobs relating to the provision of infrastructure tended to take as their starting point the respective levels of investment by companies and/or local authorities and convert these into the number jobs using relevant ratios (Austria, France and the UK), in a similar way to the approach taken for the EU by ECF (2014; see above). Figures for cycling sports events were based on relevant surveys, i.e. for France, or on interviews with

⁸ A report from the London School of Economics (Grous, 2011) included an estimate of the number of jobs associated with cycling in the UK, but the figures that it used were based on those estimated by Ekosgen (2010).

⁹ Subsequent references to national studies in this section refer to these same sources.

event organisers (Austria). National estimates for jobs associated with public cycle hire schemes were based on the number of jobs associated with schemes in selected cities, which were then scaled up to the national level (France and Spain).

Surveys were the main source of information relating to bicycle tourism (France and Austria). Other national studies (Spain and the UK) do not estimate the number of jobs associated with cycling tourism.

Differences in the approach to the estimation of tourism jobs were also evident in the regional studies. For example, the estimate for Wallonia covers related jobs in the hotel and food sector, whereas that for Brussels does not (neither do the two job estimates for the cities of Copenhagen and Portland). Differences in coverage can also be found for other categories of job. For example, sporting events are explicitly covered in some estimates (Austria, France, Wallonia and Portland), while public administrations are explicitly covered in others (Brussels). On the other hand, the number of jobs associated with the manufacture, sale and maintenance of bicycles is included in most estimates.

The approach taken in the study on Canada was very different to the other national studies. It focused on the impact of changes to expenditure in different industries on a regional economy. It then scaled these up to the country as a whole, based on figures relating to one Canadian city, Victoria (Campbell and Wittgens, 2004).

The difference in approach between similar studies can clearly be seen from the two studies on Belgian regions, which were undertaken by the same organizations, and even some by the same authors, in a similar

timeframe. For the larger region Wallonia, TML and Pro Vélo (2014a) estimated the number of jobs based on identifying relevant economic data, such as turnover or sales, and then multiplying these figures by a relevant ratio to estimate the number of jobs. For the smaller Brussels region, which effectively equates to what might be considered to be the Brussels metropolitan area, the estimate was based largely on engagement with the relevant local companies and organizations (TML and Pro Vélo, 2014b).

Even at the city level, it is possible to use publicly-available data to support an estimate of the number of jobs associated with cycling, where these are available. The estimate for Copenhagen was based on publicly available data, supported by some engagement with companies (City of Copenhagen, 2015). For the city of Portland, the estimate was based on data collected in surveys and in interviews with local businesses and sporting promoters (Alta, 2006).

Annex 2 Methodology used in this report

In order to facilitate the data collection exercise and to ensure a degree of consistency in the responses, a 'data collection template' in the form of a spreadsheet and a 'data collection guidance note' were developed. The data collection template explicitly set out the type of cycling jobs on which data was to be collected (see Annex 3). It also provided space for respondents to explain the data collection methodology used and to provide any other relevant comments, e.g. on the challenges they faced in collecting the data. The categories within the template were based on those used in the various reports discussed in the previous section. The guidance note provided background to the project and suggested how the data for each category of jobs might be collected (see Annex 4). Prior to their finalisation, both documents were shared with the European Cyclists' Federation (ECF) for their comments in order to draw on their experience, particularly with the production of their report (ECF, 2014).

The template and note were distributed to cities using a number of different routes, including via:

- WHO's Healthy Cities Network coordinators;
- UN Environment's Covenant of Mayor's focal points;
- UNECE's network of Baltic cities;
- ECF's 'Cities for Cyclists' network; and
- The city networks of POLIS and ICLEI.

In addition, more than 50 cities that are noted for their approach towards and/or level of cycling were identified and contacted directly via their respective websites, or through personal contacts where these were available. In all cases, initial contact was followed up with reminders. All information received was checked for anomalies and followed up, as necessary.

Annex 3 Data collection template

The template was provided in the form of a spreadsheet, which contained the following text.

This spreadsheet should be completed with reference to the accompanying note, "THE PEP's work on 'Jobs associated with cycling' under the PJGHT: Data collection guidance note" (see Annex 4). It has been developed to improve the evidence base with respect to the jobs associated with cycling as part of a project being undertaken within THE PEP's PJGHT in collaboration with ECF.

Further information on the project, and on THE PEP's PJGHT more generally, can be obtained from [name and e-mail address of the responsible officers in UN Environment, UNECE and WHO].

Please return the completed spreadsheet to Ian Skinner (ian.skinner@tepr.co.uk) by 31 August 2015. If you have any questions about the data collection process, please also contact Ian Skinner.

Aim: To identify the number of jobs related to cycling in selected cities.

Instructions:

- 1) For each of the categories of cycling activity below, identify the number of jobs in your city (insert numbers in the respective yellow box).
- 2) We are looking for direct 'Full time equivalent (FTE)' jobs. For example, two people working two and a half days a week should count as 1 FTE job.
- 3) For each category for which you have identified a number, please briefly state the source of the number or the method used to estimate it (in the respective green box).
- 4) If it is not possible to identify a number please state why (in respective green box), e.g. 'no relevant activities', 'no relevant data', 'not possible to estimate', etc.

Data collection template

City		
Population (and year of estimate)		
Country		
NUMBER OF FULL-TIME EQUIVALENT JOBS IN	METHOD/SOURCE/REASON FOR NO NUMBER	
Shops selling and/or repairing bicycles and/or selling accessories*		
Wholesale bicycle dealers		
Companies that design and manufacture bicycles		
Bicycle rental companies		
Bicycle messenger companies		
Bicycle taxis or 'pedicabs'		
Companies or public bodies that design, construct and maintain infrastructure for bicycles**		
Bicycling administration in local authorities		
Public bicycle hire schemes (if separate from 'administration')		
Bicycling tourism, i.e. hotels or restaurants on touristic cycle routes		
Bicycling organizations, i.e. cyclists groups		
Bicycle events, i.e. sporting events		
Other (please specify)		

* Includes dedicated cycle shops, and bicycle departments in larger shops

**Includes cycling paths, and cycle parking facilities

Additional comments, e.g. on challenges faced, potential alternative approaches, etc.	
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Annex 4 Data collection guidance note

The guidance note was provided in the form of a pdf file, which contained the following text.

THE PEP Partnership on Jobs in Green and Healthy Transport

The Transport Health and Environment Pan-European Programme (THE PEP) was set up in 2002 with the aim of contributing to achieving more sustainable transport patterns and a better integration of environmental and health considerations into transport policy in the pan-European region.¹⁰ In this way THE PEP contributes to the development of a green economy by highlighting the links between transport, health and the environment, and the need to take better account of these interactions in policy making. However, there is currently a lack of information on the economic dimension of this relationship, particularly in relation to the number of jobs that might be generated by an increased focus on green and healthy transport. In order to strengthen the evidence base, in 2011 THE PEP launched a Partnership on jobs in green and healthy transport (PJGHT). One of the aims of the PJGHT is to explore the job creation potential of greener, safer and more efficient transport.

Jobs associated with cycling

In 2014, the PJGHT produced a report that reviewed the evidence for the job creation potential of public transport, cycling and

walking. Additionally, as the evidence was better for cycling, the report estimated, using a simple methodology, that around 76,600 cycling jobs could be created if 56 selected major cities in the pan-European region achieved the same cycling modal share as the Danish capital Copenhagen. This figure was considered likely to be an underestimate, as it only covered one city per country, and only a small proportion of the jobs that could contribute to making transport greener, safer and more efficient.¹¹

New data collection

The review undertaken to inform the previous report demonstrated that there is little quantitative information on the number of jobs associated with, and therefore jobs that might be created by, cycling. The current project, also being undertaken within the framework of the PJGHT and also with the collaboration of the European Cyclists' Federation,¹² aims to further improve the evidence base with respect to the jobs associated with cycling by engaging directly with city authorities to identify the number of jobs associated with cycling in their city. This could also help cities to find out more about employment in innovative and sustainable transport in general and provide an evidence base that can be used for policy development.

¹¹ World Health Organization Regional Office for Europe "Unlocking new opportunities: Jobs in green and healthy transport", April 2014.

¹² <http://www.ecf.com>, the relevant contacts at the ECF are Benedicte Swennen (b.swennen@ecf.com) and Holger Haubold (h.haubold@ecf.com).

¹⁰ <http://www.thepep.org/>

As the project aims to contribute to the development of the evidence base for jobs associated with cycling, its approach aims to be comprehensive, but it is recognised that this is likely to be challenging. Hence, it is also important to understand the challenges that are faced in identifying the number of jobs associated with cycling in order to inform future evidence-gathering activities under the PGHJT.

In order to ensure a consistent approach, a spreadsheet¹³ has been developed into which cities are able to enter the number of jobs associated with various cycling activities. This document sets out some suggestions as to how such numbers might be identified. The following are the categories of jobs associated with cycling that would contribute to identifying the total number of cycling jobs, i.e. those jobs in:

- Shops selling and/or repairing bicycles and/or selling accessories, including dedicated cycle shops, and bicycle departments in larger shops;
- Wholesale bicycle dealers;
- Companies that design and manufacture bicycles;
- Bicycle rental companies;
- Bicycle messenger companies;
- Bicycle taxis or 'pedicabs';
- Companies or public bodies that design, construct and maintain infrastructure for bicycles, including cycling paths and cycle parking facilities;
- Cycling administration in local authorities;
- Public bicycle hire schemes (if separate from 'administration');
- Cycling tourism, i.e. hotels or

- restaurants on touristic cycle routes;
- Bicycling organizations, i.e. cyclists groups; and
- Bicycle events, i.e. sporting events
- Other, which is to be added by the respondent, as necessary.

Ideally, information for all of the above categories should be identified. However, it is recognised that this might be challenging, so the aim should be to identify as much of the requested information as possible. Many of the jobs in the categories listed above will be in private companies and, in a small number of cases, public administrations. Hence, the following approach might be used to identifying the numbers of jobs associated with cycling:

- **Identify a long-list of the relevant companies (and public administrations, if necessary).** A long-list of relevant companies might be identified from a number of different sources, e.g. registers of companies operating in a city, city-based (or even national) business groups or trade associations, directories of contact details, web searches or engagement with local cycling groups. The extent to which it will be necessary to include other public administrations will depend on the way in which cycling policy is organised within the city.
- **Identify the number of jobs associated with cycling in each company and administration.** It is important to identify the number of 'full-time equivalent (FTE)' jobs, i.e. two people working two and a half days a week, should count as one FTE job. Depending on the way in which information is collected and stored in your country, it may be possible to identify some relevant information from publicly-accessible data sources. Otherwise, it

¹³ 'THE PEP's work on 'Jobs associated with cycling' under the PJGHT: Data collection spreadsheet', which was circulated with this note.

is likely that the best way of identifying the number of jobs associated with cycling for each company (or public administration) will be to contact the relevant company/administration. For companies that only operate in one of the above categories, i.e. a cycle repair shop or a bicycle rental company, the number of jobs associated with cycling will be the number of employees in the company. For public administrations and companies that have wider business interests, e.g. sale of bicycles, might be only part of the company's business, it will be important to identify (or estimate) the number of FTE jobs directly associated with cycling.

- **On the basis of the information received, estimate the total number of cycling jobs in the city associated with each category.** It will probably only be possible to identify the number of cycling jobs from a selection of the companies (and public administrations) contacted. Hence, it will be necessary to estimate the total number of cycling jobs in the city on the basis

of the numbers received. In column D of the accompanying spreadsheet, please insert a description of the data collection and estimation process (or, if it was not possible to identify a number, please state the reason for this).

- **Insert the number identified into the accompanying spreadsheet.** Once you have been able to identify as many jobs associated with cycling as you can, please enter the numbers into the spreadsheet and return this to Ian Skinner (ian.skinner@tepr.co.uk). Please note that we have extended the deadline for receiving the estimates to 15 February 2016.

If you have any questions about the data collection process, please also contact Ian Skinner (ian.skinner@tepr.co.uk). Further information on the project, and on THE PEP's PJGHT more generally, can be obtained from [name and e-mail address of the responsible officers in UN Environment, UNECE and WHO].

Riding towards green economy: Cycling and green jobs – A joint report by UN Environment-WHO-UNECE presents the results of a study undertaken by the Transport, Health and Environment Pan-European Programme (THE PEP). It builds on the 2014 publication, *Unlocking new opportunities – jobs in green and healthy transport*, by reviewing the methods used in other studies to estimate the number of jobs associated with cycling in 37 cities and regions in 15 member countries of the United Nations Economic Commission for Europe (UNECE).

Based on the cycling modal share of Copenhagen, the study finds that a potential of up to 435,000 additional jobs can be created, if 56 cities had the same modal share of cycling. Published as a joint report by the UN Environment, the World Health Organization (WHO) and UNECE, the study seeks to inform city authorities and provide a stark picture of the current and potential benefits of cycling by presenting evidence collected on the number of cycling-related jobs from cities using a standardized approach in the pan-European region.

In terms of its contribution to the achievement of Sustainable Development Goals, cycling has a direct impact on the improvement of the quality of transport, better health, cleaner environment and greater social cohesion, better health, cleaner environment and greater social cohesion.