

Cycling Scotland INTERNATIONAL COMPARATOR STUDY

Final Report
November 2015

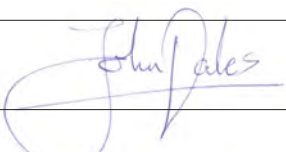


**CYCLING SCOTLAND - INTERNATIONAL COMPARATOR STUDY
FINAL REPORT**

**TEAM:
URBAN MOVEMENT
EUROPEAN CYCLISTS' FEDERATION**

**PROJECT DIRECTOR:
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00 INTRODUCTION

Cycling Scotland is committed to encouraging and enabling more people to cycle more often, to help realise the vision of the Cycling Action Plan for Scotland (CAPS) that, by 2020, 10% of everyday journeys in Scotland will be bike. In pursuit of this vision, Scotland seeks to follow the examples of other European countries that have achieved significant cycling mode share over time.

In keeping with Cycling Scotland's commitment to an evidence-based approach to growing cycling, this study was tasked with identifying and then disseminating the evidence from other countries concerning the implementation of initiatives that helped achieve growth in cycling. The headline aim of the study was:

“to identify the progress over time that key European comparator countries made to increase their cycling mode share, the implementation of key plans, policies and programmes which contributed and to help identify precedents that will help achieve the 10% vision for Scotland.”

Evidence from a total of five countries was to be obtained, with two of these required to be the Netherlands and Denmark. The other three would be drawn from Sweden, Norway, Belgium, Germany, France, Switzerland, Austria, Spain and possibly a non-European example, if one was considered appropriate.

An initial, high level review of available data and the relevance of countries and cities to Scotland, established which three other countries would be most suitable for the purposes of this study. As agreed with Cycling Scotland, the list of study countries is:

- Netherlands
- Denmark
- Germany
- Spain
- Austria

In summary, the purpose of this study was to learn lessons about cause-effect relationships, in terms of cycling trends, that will help guide future policy and action in Scotland. Put more simply, the research is intended to let the evidence and data speak for itself in revealing an understanding of:

- (a) what has changed, and
- (b) what could have caused this change.

The study brief contained two lists of the types of evidence that should be sought:

- evidence of change over time; and
- identification of national/local policies and programmes during the period in question.

Effects - evidence of change

- a. Data on cycling mode share and usage (at a national level and for key cities/regions; and, if possible, for different journey purposes).
- b. Bike ownership levels (by country/city).
- c. Data on the age and gender of people cycling.
- d. Data on exposure to injury while cycling (the number of injuries per unit distance cycled, by severity of injury, where possible).

Causes - evidence of policy/action

- a. Pro-cycling policies backed by budget allocation/funding programmes (at national level and for key cities/regions).
- b. Provision of cycling infrastructure (including cycle tracks and traffic management measures).
- c. Provision of cycle training.
- d. Programmes and events intended to support cycling to schools and workplaces, and to promote cycling to the general public.

Although our work is the most comprehensive of its kind that we have seen, it makes no claim to being exhaustive. Limits on the resources available for the study make it inevitable that we will have failed to find some data that might have been useful. Nevertheless, we think it unlikely that further research would significantly alter the key findings and lessons for Cycling Scotland.

'Effects' and 'Causes', in this order, are used as the titles for chapters 01 and 02 of the report. Although it is conventional to consider causes and then effects, the nature of this study is such that significant effects need to be identified first, in order for it to be worth exploring the potential causes.

Rather than consider each country in isolation, this report is structured to bring together (in chapter 01) the evidence of change that occurred in the five countries at different times over the past 50 years. It then presents (in chapter 02) the evidence of policy and action that occurred across those countries in that time so that reasonable conclusions about the causes of change can be drawn.

Based on the following conclusion from Pucher and Buehler's 'City Cycling' -

"Most policies that increase cycling and make it safer are implemented at the local level. National governments, however, influence cycling through national cycling policies, dedicated funding, traffic regulations, roadway and bikeway design standards, and dissemination of cycling expertise."

- we anticipated that there would be more to learn at the city (and possibly regional) level. However, we agreed on the importance of also exploring the national level, because it here that some of the 'big moves' - which ultimately result in local action - are likely to have started (e.g. in terms of policy and associated funding).

For this reason, we adopted a sequential process for chapters 01 and 02, whereby, for each of the five countries, we explore data at the following levels, in turn:

- Nation
- Region
- City/Town

The relationship between national initiatives and regional/city action can be investigated further in due course, building on previous work by Transform Scotland and Sustrans Scotland.

<http://transformscotland.org.uk/what-we-do/research/civilising-the-streets/>

Note that the decision was taken to focus examination of Dutch data on the National level only. This was partly because the Netherlands was considered the best country to study at this level; and partly because of the challenges of selecting from a large body of regional/city/town data with the practical constraints of this study.

Following chapters 01 and 02, chapter 03 presents a distillation of common trends across all countries; similar patterns of cause and effect that are observed in different nations, regions and cities.

Finally, chapter 04 seeks to establish the main lessons arising for Scotland.

Overall, we have considered it essential to let the data speak for itself and to avoid being explicit about a direct relationship that cannot be proved. The weight of evidence should be the key determinant of the strength of any given relationship, and we trust that the report is faithful to this approach.

Disclaimer:

Concerning the reliability of the figures and dates quoted in this report, it should be noted that data has often been obtained from foreign language documents (or others' translations of such documents) and there may be errors in translation. Note also that the dates for some figures are not always made specific in their source (e.g. they are written in the sources as relating to the 'present' situation but may in fact come the most recent survey, a year or more previously). Finally, while official documents have been used almost exclusively (i.e. rather than commentary or quotation from other observers), the original source (i.e. survey or political instrument) is rarely obtainable. The figures used in this report are presented in good faith.

01 EFFECTS: Evidence of Change

Netherlands

National Level

a. Cycling mode share and usage

From around 1950 the bicycle share in the total number of trips and kms travelled started to decline and the decline accelerated after 1960. The total number of kms cycled declined after 1960, as the bicycle began to be replaced more and more by the motorised bicycle and subsequently by the passenger car. The number of passenger cars rose from 139,000 in 1950 to 3.4m in 1975. From 1950 to 1975, the bicycle was almost entirely excluded from the national transport vision. The reason for this was because there was a really rapid increase in car ownership.

Following a protests at the number of cycling casualties, and also the 1970s oil crisis, cycling started to become more popular again. Between 1976 and 1983 the total number of kms covered by Dutch cyclists grew by 35%. The detailed data shows that the number of Dutch cycle trips increased considerably from 1980 to 1990 and the cycling mode share also increased (see table opposite). In 1980, 26% of all trips were made by bike and this number increased to 27% in 1986 and to 28% by 1990. The table on page 8 shows that trip distance has a noticeable effect on mode share. IN this 1980-1990 dataset, the bike is the main mode of transport for trips of between 1km and 2.5km.

The bicycle continued to strengthen its position in terms of mode share: in 2007 34% of all trips up to 7.5km long were made by the bike (26% of all trips, regardless of length). According to a 2014 Eurobarometer, 36% of Dutch people said that their most often used mode of transport on a typical day was the bicycle, making the Netherlands Europe's (and possibly the world's) no.1 cycling country. As the table below shows, however, there are significant differences in the cycle mode share between cities and regions.

Municipality	Cycle share
Groningen	38%
Zwolle	37%
Leiden	33%
Ede	32%
Veenendaal	32%
Lelystad	19%
Capelle aan den IJssel	18%
Sittard-Geleen	17%
Rotterdam	16%
Heerlen	10%

Table 1. Percentage of bicycle use in 2005 in a number of Dutch cities with more than 50,000 inhabitants (Source: CBS)

In 1990, 56% of trips to school were by bicycle, with the corresponding figures for shopping and commuting trips being 33% and 27% respectively. In 2009, 49% of primary school children cycled to their school.

According to other data, two-thirds of Dutch children under the age of 12 walk or cycle to school, while for students between the ages of 12 and 18, around 77% cycle to school (2008 data). One of the main reasons for this high number is that Dutch school students typically live close to school (less than 5km). In the Netherlands, you must be 18 to drive a car and 16 to ride a moped.

Table 4.1 The development of the average number of trips* per person per day by main mode of transport and purpose

	1980						
	<i>Van en naar werk</i>	<i>Zakelijk bezoek</i>	<i>Winkelen</i>	<i>Onderwijs</i>	<i>Sociaal/recreatief</i>	<i>Overig</i>	<i>Totaal</i>
	<i>To and from work</i>	<i>Business visits</i>	<i>Shopping</i>	<i>Education</i>	<i>Social/recreational</i>	<i>Other</i>	<i>All purposes</i>
Fiets Bicycle	0,16	0,04	0,20	0,12	0,22	0,11	0,85
Bromfiets Moped	0,02	0,01	0,01	0,01	0,02	0,01	0,07
Lopen Walking	0,05	0,02	0,18	0,03	0,22	0,09	0,58
Auto Car	0,33	0,17	0,26	0,02	0,50	0,23	1,51
Openbaar vervoer Public transport	0,04	0,00	0,03	0,02	0,04	0,01	0,15
Overig Other	0,01	0,03	0,00	0,00	0,01	0,00	0,06
Totaal All modes	0,61	0,27	0,67	0,20	1,00	0,45	3,21
	1986						
Fiets Bicycle	0,15	0,03	0,27	0,12	0,28	0,12	0,96
Bromfiets Moped	0,01	0,01	0,01	0,01	0,01	0,00	0,06
Lopen Walking	0,04	0,03	0,20	0,02	0,24	0,09	0,62
Auto Car	0,31	0,22	0,36	0,03	0,55	0,24	1,70
Openbaar vervoer Public transport	0,04	0,00	0,04	0,03	0,05	0,01	0,18
Overig Other	0,01	0,00	0,00	0,00	0,02	0,00	0,04
Totaal All modes	0,57	0,28	0,88	0,20	1,14	0,47	3,55
	1990						
Fiets Bicycle	0,17	0,03	0,31	0,10	0,29	0,15	1,06
Bromfiets Moped	0,01	0,00	0,01	0,01	0,02	0,01	0,05
Lopen Walking	0,04	0,03	0,21	0,02	0,26	0,10	0,64
Auto Car	0,34	0,18	0,36	0,03	0,57	0,27	1,76
Openbaar vervoer Public transport	0,04	0,00	0,03	0,03	0,05	0,02	0,18
Overig Other	0,01	0,00	0,00	0,00	0,01	0,00	0,03
Totaal All modes	0,62	0,25	0,93	0,18	1,19	0,54	3,72

* De randtotaal komen niet overeen met de randtotaal van de tabellen 4.2 en 4.3 vanwege de zogenaamde veelvuldige verplaatsingen The column and row totals do not match with the tables 4.2 and 4.3 because of the so-called frequent trips

Tabel 4.2 De ontwikkeling van het aandeel van de hoofdvervoermijden (in %) naar aantal verplaatsingen per afstandklasse (in km)

Table 4.2 The development of the shares of the main modes of transport (in %) by number of trips per distance category (in km)

	1980										Onbekend Unknown	Totaal Total
	0-<7	1-<2,5	2,5-<5	5-<7,5	7,5-<10	10-<15	15-<20	20-<30	30-<50	> 50		
Fiets Bicycle	29,2	43,5	33,9	22,8	18,8	12,1	8,9	4,0	2,0	10,2	22,9	27,5
Bromfiets Moped	0,7	1,6	2,9	3,2	3,6	3,1	3,1	1,9	0,6	0,2	2,1	2,0
Lopen Walking	59,2	21,9	7,5	4,1	2,2	1,3	0,4	0,1	0,1	0,1	25,5	18,8
Auto Car	10,5	31,8	50,3	63,1	64,1	71,8	75,7	77,6	82,7	80,8	26,5	45,7
Openbaar vervoer Public transport	0,1	0,9	4,5	6,1	11,8	10,5	12,6	15,3	13,5	15,6	19,0	5,2
Overig Other	0,3	0,5	1,0	0,7	1,4	1,2	1,3	1,1	0,9	2,3	4,0	0,9
Totaal All modes	100	100	100	100	100	100	100	100	100	100	100	100
Gemiddeld p.p.p.d. Average per person per day	0,53	0,78	0,50	0,34	0,13	0,21	0,11	0,13	0,09	0,10	0,03	2,98
	1986										Onbekend Unknown	Totaal Total
	0-<1	1-<2,5	2,5-<5	5-<7,5	7,5-<10	10-<15	15-<20	20-<30	30-<50	≥ 50		
Fiets Bicycle	30,8	44,3	35,2	22,5	21,4	12,0	8,3	6,7	0,0	0,0	25,0	27,8
Bromfiets Moped	0,0	1,1	1,9	2,5	0,0	4,0	0,0	0,0	0,0	0,0	0,0	1,5
Lopen Walking	59,6	21,6	7,4	5,0	0,0	0,0	0,0	0,0	0,0	0,0	25,0	17,5
Auto Car	9,6	31,8	51,9	65,0	71,4	76,0	83,3	80,0	81,8	84,6	31,3	47,1
Openbaar vervoer Public transport	0,0	1,1	3,7	5,0	7,1	8,0	8,3	13,3	18,2	15,4	12,5	5,3
Overig Other	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	6,3	1,2
Totaal All modes	100	100	100	100	100	100	100	100	100	100	100	100
Gemiddeld p.p.p.d. Average per person per day	0,27	0,88	0,29	0,41	0,14	0,25	0,14	0,14	0,07	0,10	0,15	3,42
	1990										Onbekend Unknown	Totaal Total
	0-<1	1-<2,5	2,5-<5	5-<7,5	7,5-<10	10-<15	15-<20	20-<30	30-<50	≥ 50		
Fiets Bicycle	32,1	45,8	36,2	24,4	15,4	11,1	7,1	6,3	0,0	0,0	36,4	28,7
Bromfiets Moped	0,0	1,0	1,7	2,4	0,0	3,7	0,0	0,0	0,0	0,0	0,0	1,4
Lopen Walking	58,9	20,8	6,9	4,9	0,0	0,0	0,0	0,0	0,0	0,0	18,2	17,1
Auto Car	8,9	30,2	51,7	63,4	76,9	77,8	78,6	81,3	84,6	85,7	36,4	47,1
Openbaar vervoer Public transport	0,0	1,0	3,5	4,9	7,7	7,4	14,3	12,5	15,4	14,3	9,1	5,0
Overig Other	0,0	1,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,8
Totaal All modes	100	100	100	100	100	100	100	100	100	100	100	100
Gemiddeld p.p.p.d. Average per person per day	0,56	0,96	0,58	0,42	0,14	0,27	0,15	0,16	0,14	0,14	0,12	3,63

Bron Source: CBS

b. Bike ownership levels

Estimates are that between 1950 and 1960 there were between 5-6m bikes in the Netherlands. By 1970 this number had risen to 7.3m, and in 1975 it reached 8.6m. In 1990 there were almost 12m bikes in the Netherlands, and in 1993 four out of five people had bikes.

Many Dutch people have more than one bike: e.g. one for work and one for touring. Therefore, the number of actual bikes in the Netherlands in 1990 could have been around 14-15m, more than one per head of population. The bike/person ratio reached 1.1 in 2004, which meant that there were probably around 17.9m bikes in the country. This number climbed to 22.5m at the end of 2014, which meant that each Dutch person had, on average, 1.3 bicycles.

Bike sales were 365,000 in 1951 and with a steady increase it reached 1.35m in 1990. The figure was 1.2m in 2005 and 1m in 2014.

The table below presents interesting statistics regarding ownership by age and gender.

Tabel 3.4 Vervoermiddelenbezit naar geslacht en leeftijd in 1990 (in %)

Table 3.4 Vehicle ownership by sex and age in 1990 (in %)

<i>Mannen Men</i> <i>Leeftijd Age</i>	<i>Fiets</i> <i>Bicycle</i>	<i>Bromfiets</i> <i>Moped</i>	<i>Auto</i> <i>Car</i>	<i>Motor</i> <i>Motorcycle</i>	<i>Geen</i> <i>No vehicles</i>
0 -<5	17,7				82,3
5 -<10	96,6				3,4
10-<15	98,9				1,1
15 -< 18	94,3	24,5			0,3
18-< 19	88,3	20,6	9,9	1,2	2,1
20 -< 25	83,1	5,4	43,0	3,3	4,4
25 -< 30	82,0	1,9	60,9	3,1	2,4
30 -< 40	83,5	0,9	74,2	1,1	1,6
40 -< 50	83,1	1,6	79,0	0,5	1,6
50 -< 60	83,0	1,0	84,5	0,2	1,4
60 -< 65	79,2	1,1	80,2	0,0	3,8
≥65	72,7	3,6	50,9	0,1	13,3
Totaal All ages	79,9	3,3	51,0	0,9	8,6
<i>Vrouwen Women</i> <i>Leeftijd Age</i>	<i>Fiets</i> <i>Bicycle</i>	<i>Bromfiets</i> <i>Moped</i>	<i>Auto</i> <i>Car</i>	<i>Motor</i> <i>Motorcycle</i>	<i>Geen</i> <i>No vehicles</i>
0 -<5	18,3				81,7
5 -<10	97,9	0,1			2,1
10-< 15	97,8				2,1
15 -< 18	95,3	13,8			0,9
18-<20	90,7	16,7	3,3	0,0	4,7
20 -< 25	89,5	5,1	25,4	0,5	4,7
25 -< 30	92,7	2,0	28,9	0,4	3,1
30 -< 40	92,7	1,0	38,2	0,2	1,9
40 -< 50	91,3	1,7	32,5	0,1	3,6
50 -< 60	89,7	0,7	29,5	0,1	5,2
60 -< 65	81,9	0,3	22,3	0,0	13,3
≥65	58,9	1,1	8,7	0,0	38,1
Totaal All ages	82,6	2,4	20,2	0,1	13,8

Bron Source: CBS

c. Age and gender of people cycling

No information obtained.

d. Exposure to injury while cycling

As motorisation increased in the post-WW2 period, traffic safety deteriorated. In 1950 the total number of traffic fatalities was 1,021 while 19,500 casualties were registered. Share of cyclists was 33% and 42% respectively. Fatality and casualty numbers peaked in 1972: 3,264 fatalities and 70,000 casualties occurred of which 17% and 32% respectively were cyclists.

The away from the bicycle and towards motorised transport, and of an increase in associated cycling casualties, only began to be arrested in the 1970s when Dutch people took to the streets to protest against the high number of child deaths on the roads (over 500 children were killed in car accidents in the Netherlands in a single year). This protest movement came to be known as the Stop de Kindermoord (literally 'Stop the Child Murder'). The success of this movement - along with other factors, such as the oil shortages of 1973–74 - turned Dutch government policy around and the country began to restrict motor vehicles in its towns and cities and direct its focus on growth towards other forms of transport, with the bicycle being seen as critical in making Dutch streets safer and towns and cities more people-friendly and liveable.

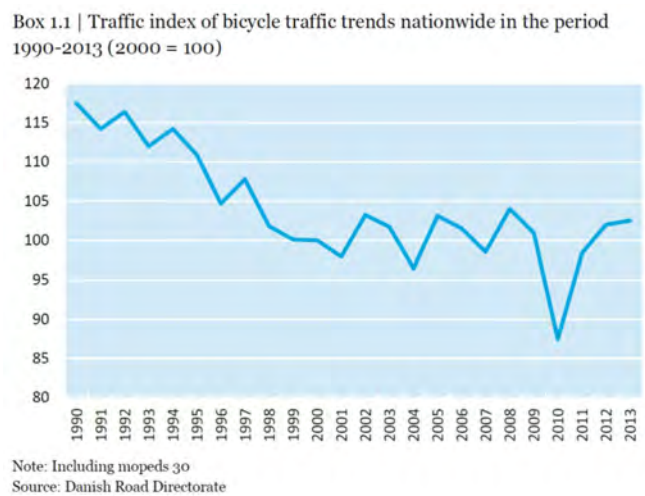
Denmark

National Level

a. Cycling mode share and usage

During the 1970s, reportedly due to energy crises, speed limits, environmental consciousness, etc., there was a national increase in the amount of cycling, with the cycle mode share for commuting trips growing as follows: 1971 = 24%; 1975 = 31%; 1979 = 34%

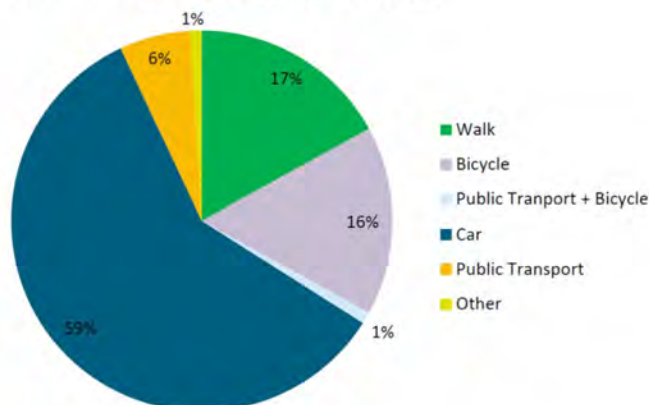
Subsequently, however, there was a fairly steady decline in km cycled nationally during the 1990s, as shown by the two graphs below. The first is from the Danish Cyclists' Union, and the second from the 2014 National Bicycle Strategy.



The decline in the amount of cycling in Denmark in the 1990s is also evidenced by a dataset showing a drop in the cycle mode share of all trips from 23% in 1993 to 19% in 1998; and by the Danish Roads Directorate reporting a 17% decrease in the amount of cycling between 1990 and 2008. That said, both the graphs above show something of a stabilisation in cycling levels during the 2000s (N.B. 2010 had a particularly harsh winter).

The 2010-2013 National Travel Survey (as reported in the 2014 National Bicycle Strategy) puts the latest national figure for the cycle mode share of all trips at 16% (see chart below).

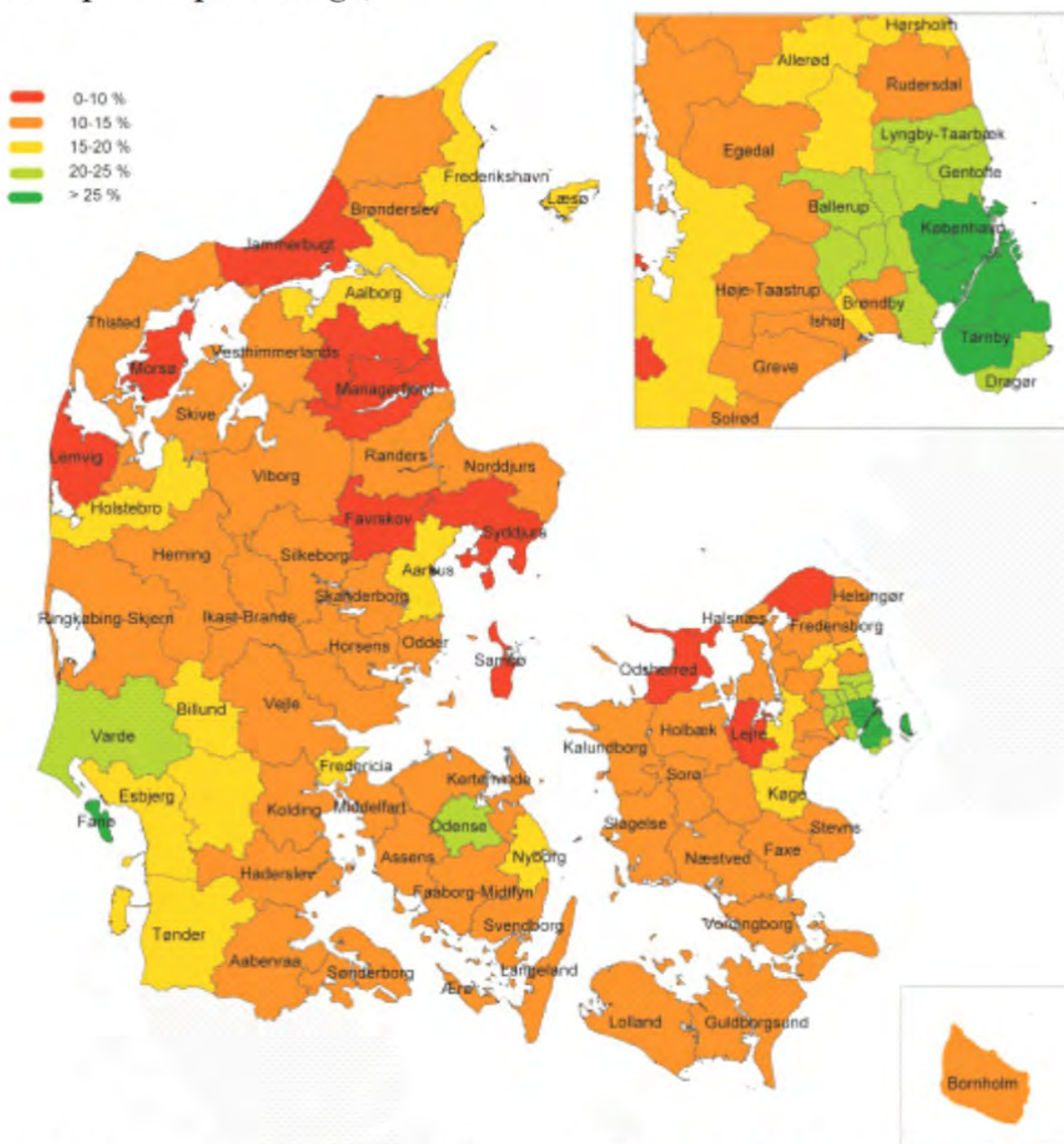
Box 2.3 | Trips for all purposes distributed by main means of transport plus the combination of public transport and bicycle (%)



Source: The Danish National Travel Survey 2010-2013

In so far as this national picture of decline in cycling in Denmark (even if arrested since the turn of the century) seems at odds with the country's reputation, the map below and the graph on the following page (both also from the 2014 National Bicycle Strategy) reveal that this is because the national reputation is sustained by the performance of Copenhagen and a small number of other cities.

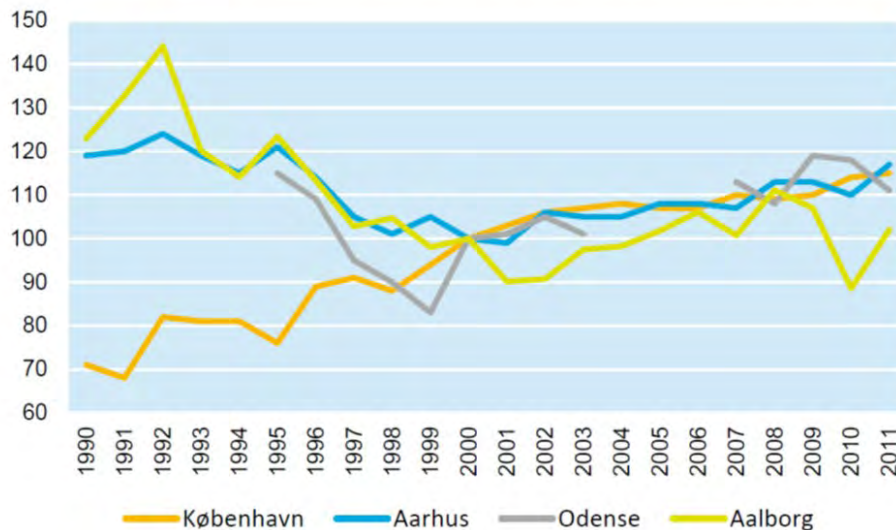
Box 2.1 | Proportion of cyclists in the country's municipalities (bicycles used for trips as a percentage)



Note: The uncertainty is greater for smaller samples. The figures for the proportion of cyclists in the smaller municipalities must therefore be treated with caution.

Source: The Danish National Travel Survey 2010-2013 (map illustration by the Danish Road Directorate)

Box 1.2 | Traffic index of bicycle traffic trends in the period 1990-2011 (2000 = 100)



Note: There is no usable data for Odense for the period 2004-2006
Source: The Danish Road Directorate and the municipalities

The 2008 Copenhagen Bicycle Account states that, "According to Statistics Denmark, the number of km cycled in Denmark as a whole dropped by 23% over the course of the past 15 years (1993-2008). In comparison, the number of km cycled in Copenhagen in the 12 years from 1996-2008 rose by 26%".

The 2014 National Bicycle Strategy states that the map below is evidence that "It pays to invest in more cycling because it makes a real difference", implying that the parts of the country where levels of cycling are highest are those where investment in cycling has been greatest. Chapter 02 on Causes explores this. National data on cycling by journey purpose is sparse. One dataset shows that, in 1998, around 50% of 10-15 years-olds and around 30% of 16-19 years-olds around cycled to places of education. According to 2010 data, 46% of all Danish school children cycle to school. The 2014 National Bicycle Strategy states that, in 2007-2012, an average of 'only' 44% of 10-16 year-olds cycled to school.

b. Bike ownership levels

In the mid-1990s there were 4.5m bicycles in Denmark, 0.3m being for children under six years old. 82% of all households had at least one adult bike.

According to 2010 data, 9/10 Danes owned a bicycle.

Approximately half a million bicycles are currently sold in Denmark each year.

c. Age and gender of people cycling

No information obtained.

d. Exposure to injury while cycling

No information obtained.

Regional Level

All the information in this section is for Denmark's Capital Region. While Copenhagen is at its centre, information for the city itself is presented in the following section.

a. Cycling mode share and usage

The historic cycling mode share in the Greater Copenhagen region was as follows:

1975 = 23%; 1981 = 27%; 1986 = 28% (mechanised modes only)

1975 = 17%; 1981 = 21%; 1986 = 22% (of all modes, including walking)

The same source describes 1955-1970 as a period of declining bicycle use, and then 1970-1995 as a period of limited increase in bicycle use (may refer to Copenhagen only).

More recently, the Regional Cycling Report of the Capital Region of Denmark provides data from each year from 2007 to 2012. For the Region as a whole, and its different parts, the cycling mode share of all trips for these years was as shown in the top part of the table below.

	2007	2008	2009	2010	2011	2012
Cycling's percentage of all trips, by geographical location						
- Capital Region	20.3%	22.1%	22.1%	20.9%	21.7%	21.6%
- Copenhagen and Frederiksberg	29.0%	31.0%	30.6%	30.3%	31.9%	31.6%
- Suburbs	17.5%	19.2%	18.6%	17.0%	17.9%	19.2%
- Other	12.3%	14.6%	14.6%	12.8%	12.5%	10.0%
Cycled km per year, by geographical location (mill. km)						
- Capital Region	1,016	1,096	1,271	1,149	1,162	1,269
- Copenhagen and Frederiksberg	520	576	680	661	655	707
- Suburbs	368	331	386	328	371	397
- Other	129	188	205	160	136	165

As can be seen there was growth from 2007 to 2012, apart from in the 'Other' parts of the Region. The growth is not year-on-year, but this may have something to do with the reported very harsh winter of 2010. This general pattern is also broadly repeated for the number of km cycled each year (see bottom part of the table), although there is also growth for the 'Other' areas when 2012 is compared with 2007.

Overall, the report states that the number of bicycle trips in the Region increased by 9% in the period 2007-2012. There are significant differences within the region, however. Growth in Copenhagen-Frederiksberg was 19% over the period, compared with 9% growth in the suburbs and a 22% decrease in the region's other municipalities.

(Note that these three datasets – mode share; km cycled; and no. of cycling trips – tell different stories. This has general implications for interpreting data of this sort, because, for the same place and time period, it can be possible to tell story of apparent growth with one dataset and while another tells a story of decline. Mode share is considered the most reliable indicator of growth in the amount of cycling across any given population)

01 EFFECTS

b. Bike ownership levels

No information obtained.

c. Age and gender of people cycling

No information obtained.

d. Exposure to injury while cycling

No information obtained.

City/Town Level

a. Cycling mode share and usage

In **Copenhagen**, motorisation increased in the 1950-1970s, but cycling figures did not decrease as much as in other European cities (a third of the adult population used the bike regularly).

Following demonstrations for improvements in cycling conditions in the 1980s, the mode share of bike commuters Copenhagen was 30% in 1989, and this increased to 34% in 1995.

Copenhagen has conducted a bi-annual 'Bicycle Account' since the mid-1990s. The following table summarises key data from the Bicycle Accounts since 1996.

	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014
Cycle mode share (all trips)									26%	30%
Mode share (all trips excl walk)								33%	33%	36%
Cycle mode share (work/edu)	30%	30%	34%	32%	36%	36%	37%	35%	36%	45%
Cycle mode share (work/edu) Copenhageners only							55%	50%	52%	63%
Cycled km (mil./weekday)	0.93	0.92	1.05	1.11	1.13	1.15	1.17	1.21	1.27	1.34
Cycled km between serious casualties (millions)	1.2	1.8	2.4	2.4	3.0	4.0	3.2	4.4	4.2	4.9

At the simplest level of analysis, this table shows that the number of km cycled per weekday in Copenhagen increased by 44% in the 18 years from 1996 to 2014. This can be read against a 22% increase in the length of cycle tracks in the city over the same period, and much greater proportional growth in the smaller number of km of cycle lanes, green routes and the new Cycle Super Highways (see 'Infrastructure' under 'Causes').

The proportion of people who cycle to work or study was 30% in 1995 and 45% in 2014. If we take Copenhagen residents only, this proportion is even bigger: 63% in 2014, up from 55% in 2008. The dip in 2010 is attributed to there being an especially harsh winter that year.

Around 55% of school children biked to school regularly alone or with a parent in 2010. 30% of children in pre-school are transported by cargo bike or trailer.

In **Odense** during the Cycle City project, overall cycling levels increased by 20%. Overall growth in cycling trips was 25,000/day. The share of cycling was 24% in 2010 and there is a plan to increase this to 33% by 2020 (currently it still stands at 24 percent). Approx. 43% of children in Odense went to (primary school) by bike according to a publication in 2000.

b. Bike ownership levels

Copenhagen's 550,000 residents own 650,000 bicycles, which equals 1.2 per resident. 96% of school children in Copenhagen have a bike. It is estimated that one in six families with children have cargo bikes.

c. Age and gender of people cycling

No information obtained.

d. Exposure to injury while cycling

No information obtained.

Germany

National Level

a. Cycling mode share and usage

The first graphic below presents data on the national changes in mode share. The 1982 data is for West Germany only, with the 2002 and 2008 for the unified nation. The second graphic, from the Dresden University of Technology, suggests that cycling's mode share has been gradually increasing in East, West and unified Germany since the 1970s (altogether, between 22 and 25 cities were surveyed).

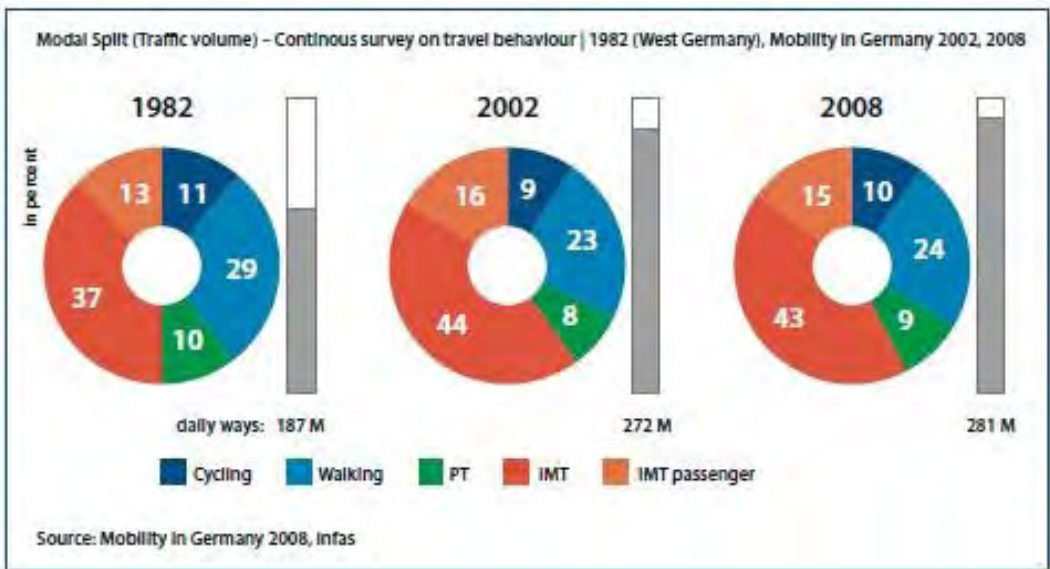
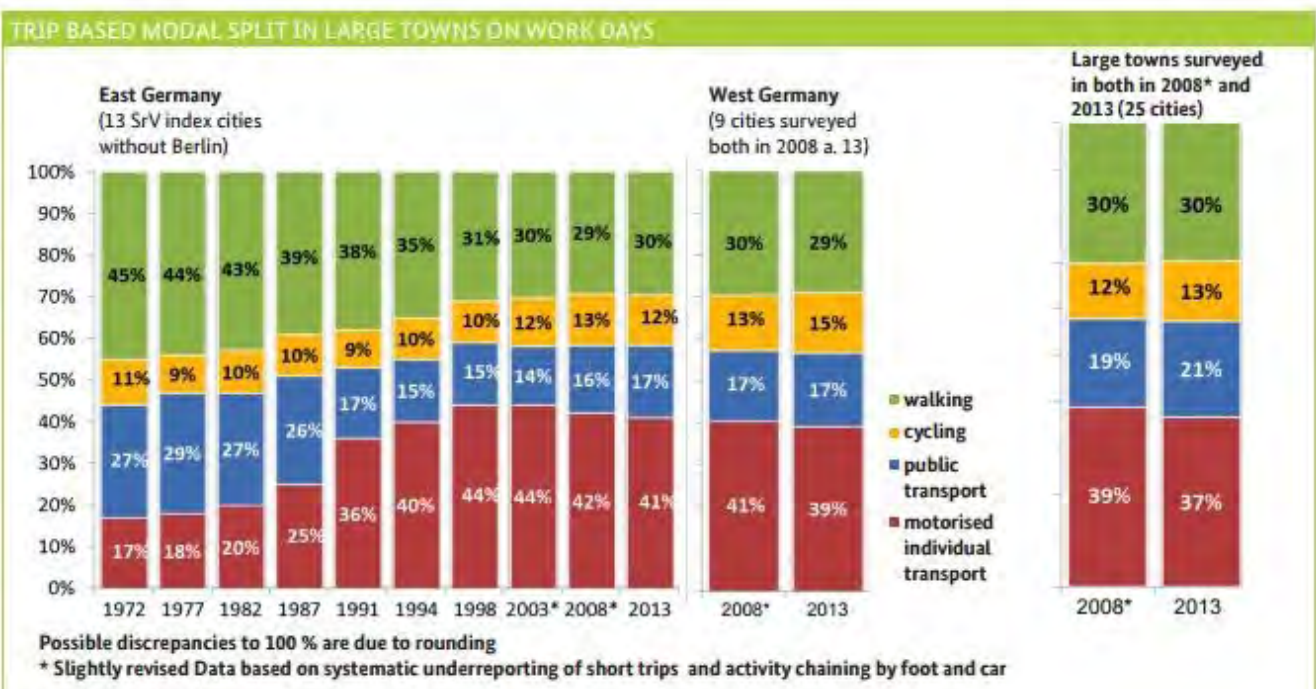


Figure 3
Trend of the Modal Split in Germany.
Source: Adapted from Mobility in Germany, 2008



The 2013 survey (the whole project has been the longest running German time series study on urban mobility behaviour since 1972) also found that in regard to kms travelled (measured as the total distance travelled by the average person in one day), cycling showed the greatest increase: 11%. Motorised individual transport decreased by 2%, while public transport and walking both decreased by 11%.

Regarding earlier data from West Germany, the first table below highlights the mode share changes of several big cities and for all urban areas. In addition, in the second table below, we have data from 2000 where many European countries were taken into account and Germany was scoring in top positions on that list.

**Increases in Bicycle Modal Split over Last Two Decades
in Selected German Cities**

City	Time Period	Change in Bicycle Modal Split Share	Percentage Increase in Bicycle Share
Munich	1976 to 1992	6% to 15%	+150%
Nuremberg	1976 to 1995	4% to 10%	+150%
Cologne	1976 to 1992	6% to 11%	+83%
Freiburg	1976 to 1992	12% to 19%	+58%
Essen	1976 to 1990	3% to 5%	+67%
Bremen	1976 to 1994	16% to 22%	+38%
Muenster	1976 to 1994	29% to 32%	+10%
Average for all urban areas in Western Germany	1972 to 1995	8% to 12%	+50%

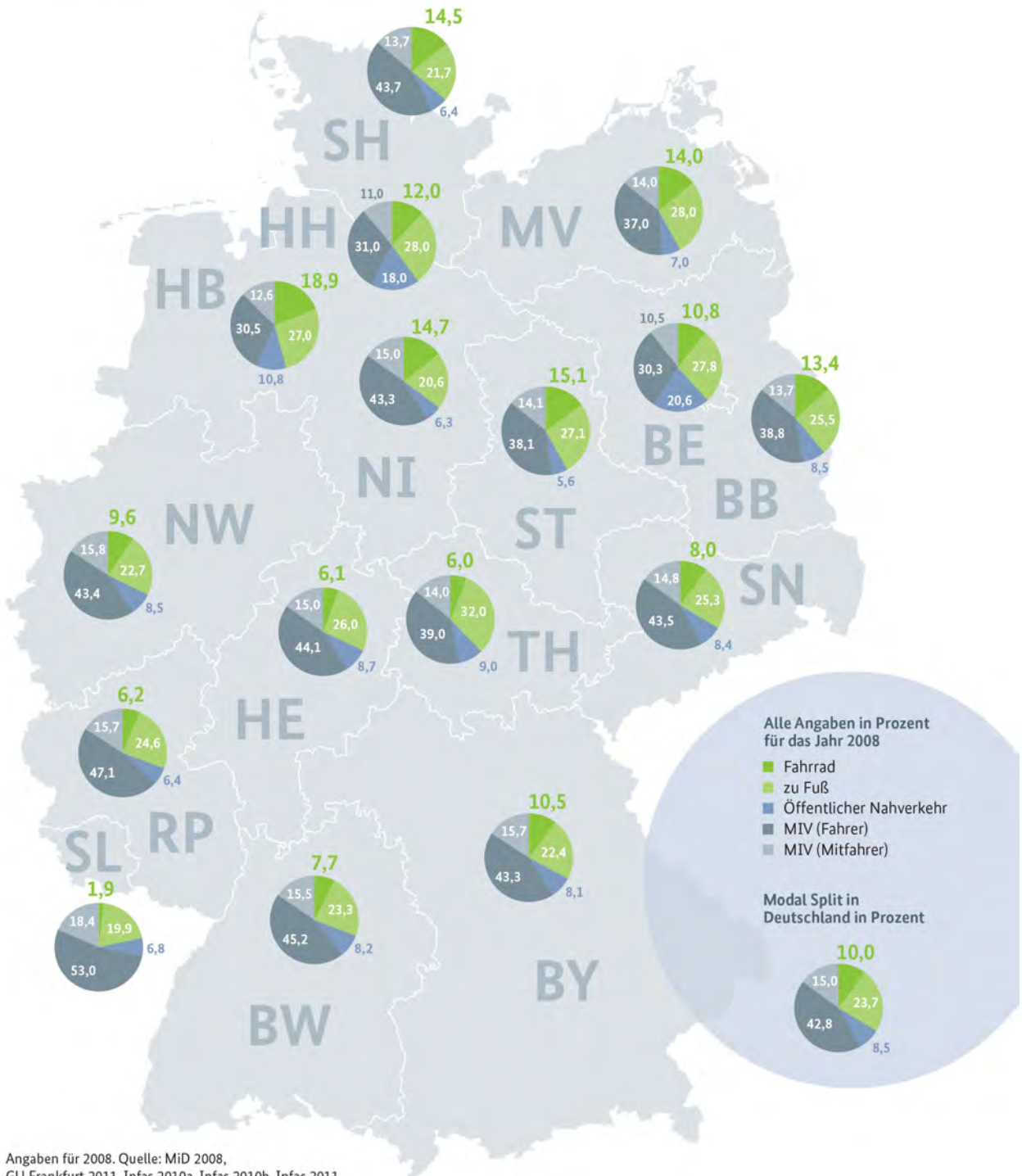
Table 1.2. Cycling per person and per day (kilometres) and modal share (number of trips)

Country	Cycling per person and day in kilometres (2000)	Modal share as a % of number of trips
Netherlands	2.3	27
Denmark	2.6	18
Sweden	0.7	12.6
Germany	0.8	10
Belgium	0.9	10
Finland	0.7	7.4
Ireland	0.5	5-6
Austria	0.4	5
Italy	0.4	4
France	0.2	3
UK	0.2	2
Luxembourg	0.1	1.5
Greece	0.2	1
Portugal	0.1	1
Spain	0.1	0.7
Norway		6
Switzerland		9
USA		0.7
Japan		14

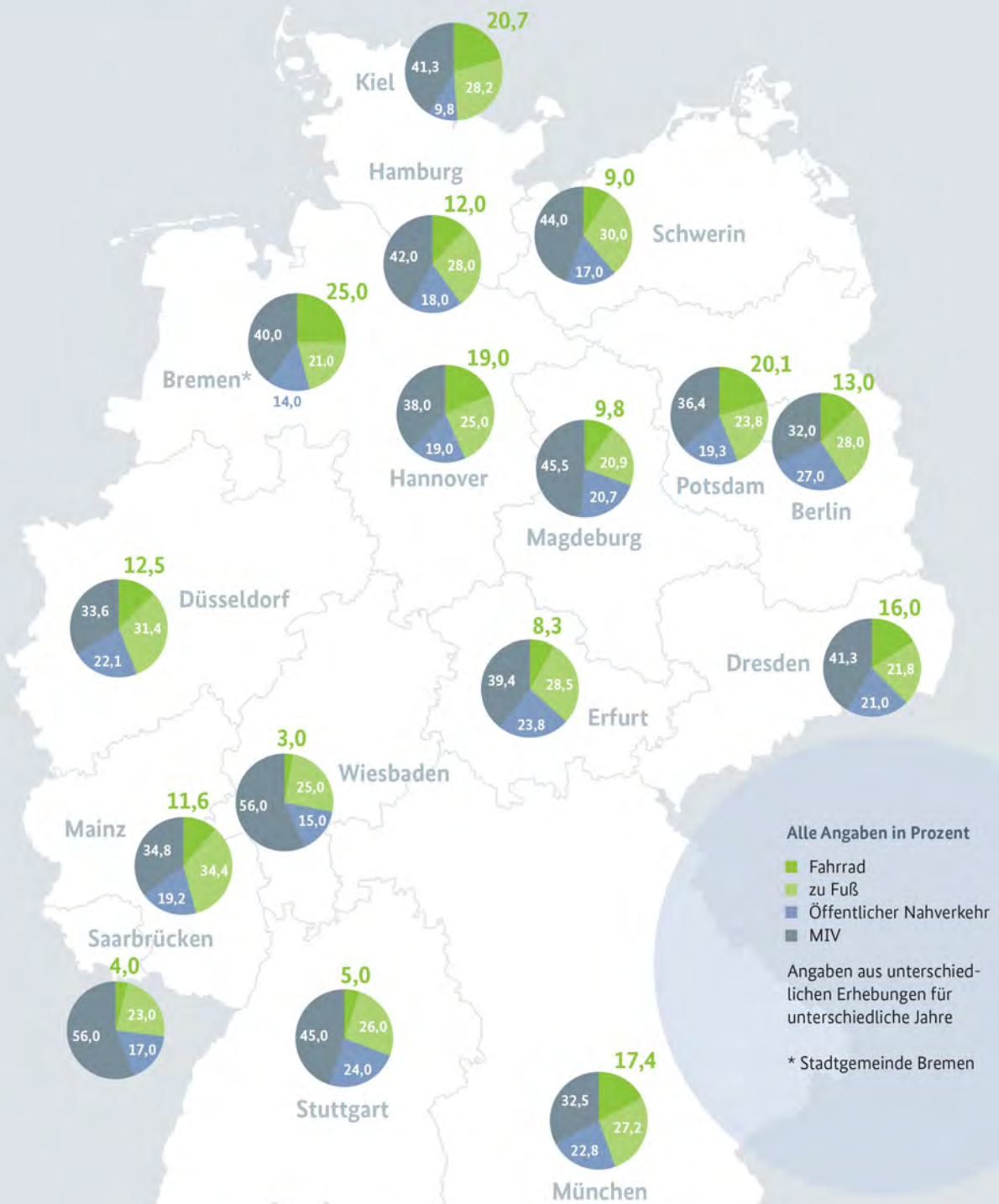
Source: EU Energy and Transport in Figures Statistical pocketbook, 2002.
EU Transport in Figures Statistical Pocketbook 2000.

According to a 2014 Eurobarometer, 12% of German people said that their most often used mode of transport on a typical day was the bicycle, putting Germany mid-range in the EU. There is also 2008 regional data available on mode share, shown in the table below, and (mostly) 2013 mode share data from major cities around Germany (opposite page).

Modal Split in den Bundesländern



Modal Split in den Landeshauptstädten



Quelle: Befragung der Landeshauptstädte im Oktober/ November 2013, TU Dresden 2009, TU Dresden 2010, Infas 2011.

In 2008, 17% of primary and secondary school students went to school by bike and 12% of other students (above secondary school) went to school by bike. According to data found in the National Cycling Plan 2020, school children and young people used their bikes for around 20% of their journeys.

b. Bike ownership levels

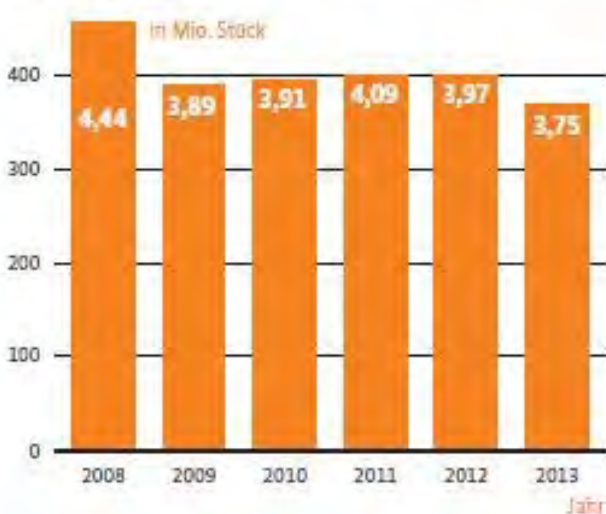
The National Cycling Plan 2020 states that there were 67.3m bicycles in German households in 2011. At the beginning of 2013, this figure had risen to 71.3 million bikes. The NCP states that more than 80% of all households have at least one bike; the figure having been 70% in the mid 1990s. 25% of all households have three or more bicycles.

The 2015 Yearbook produced by the Federal Statistical Office states that, in 2014, 81% of households owned at least one bicycle, compared with 77% owning at least one car.

In 2014 there were 4.1 million bikes sold in Germany.

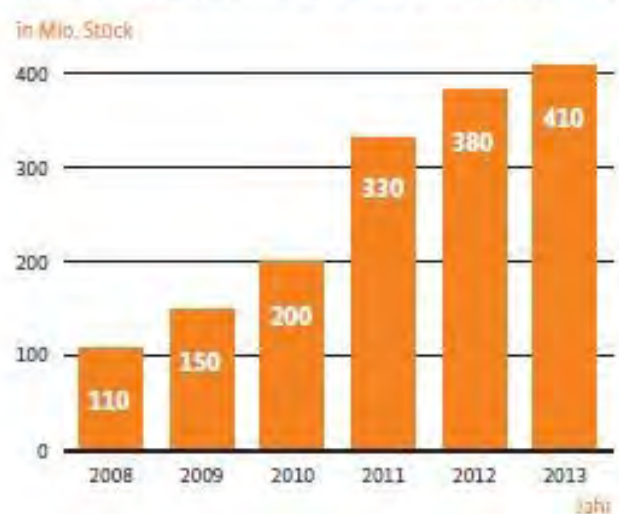
The following tables show recent bike sales in Germany (ordinary bikes on the left, pedelecs and e-bikes in the right).

Inlandsanlieferung von Fahrrädern in Deutschland***



Quelle: ZIV 2014.

Absatz Pedelecs und E-Bikes in Deutschland



Quelle: ZIV 2014.

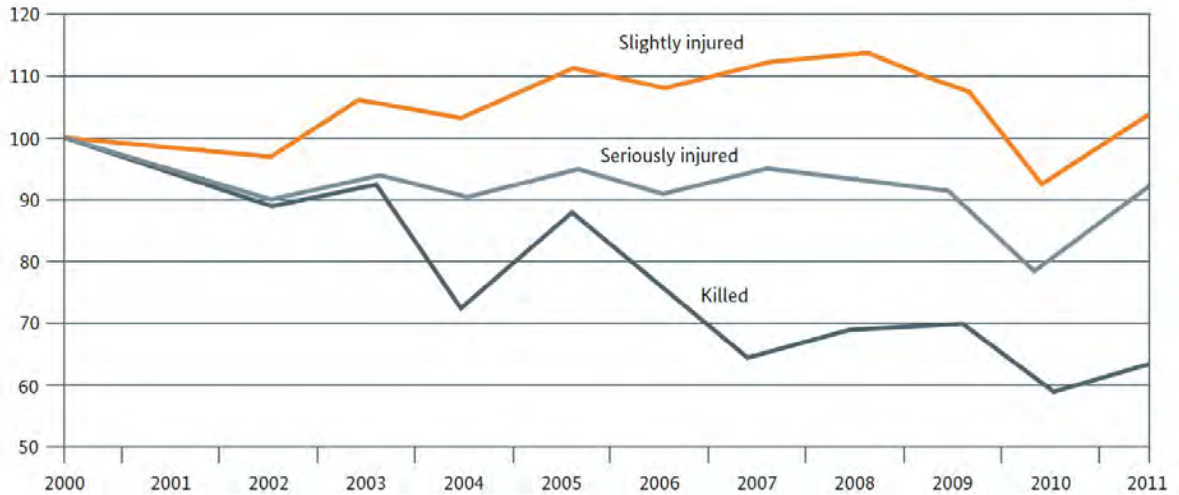
c. Age and gender of people cycling

No information obtained.

d. Exposure to injury while cycling

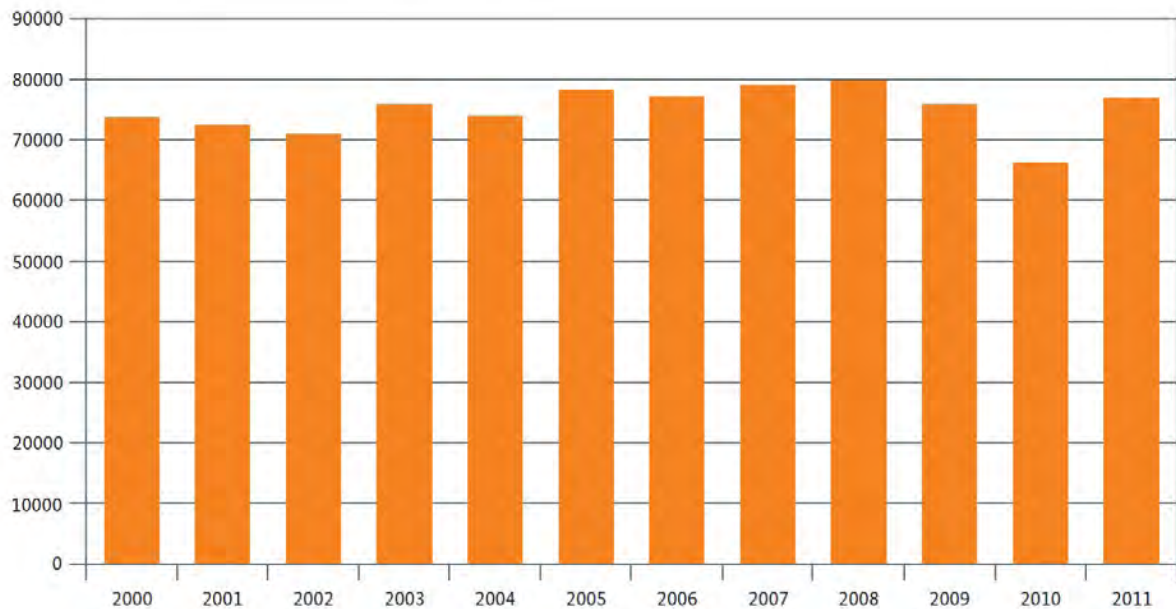
The charts on the opposite page show (top) the change in different categories of injuries sustained by cyclists in Germany over time from 2000-2011 and (below) the number of collisions involving cyclists in each year over the same period. Bearing in mind the record of growth in the number of km cycled annually in Germany (up by 11% in 2013 compared with 1972 - see above), these data suggest that the exposure to injury and, especially death, while cycling has reduced appreciably over time.

Number of cyclists killed, seriously injured and slightly injured compared with 2000
(2000 = 100 %)



Source: Federal Statistical Office, 2012a, own graph

Personal injury road accidents involving cyclists
(in absolute figures)



Source: Federal Statistical Office, 2012a, own graph

¹⁵ Federal Statistical Office: Verkehrsunfälle 2011, Wiesbaden, 2012.

¹⁶ Federal Statistical Office: Zweiradunfälle im Straßenverkehr, Wiesbaden, 2011.

¹⁷ Sinus Market and Social Research: Fahrrad-Monitor Deutschland, Heidelberg, 2011.

¹⁸ Federal Statistical Office: Verkehrsunfälle 2011, Wiesbaden, 2012.

01 EFFECTS

Regional Level

a. Cycling mode share and usage

See map of 2008 regional mode share data in national section above.

b. Bike ownership levels

No information obtained.

c. Age and gender of people cycling

No information obtained.

d. Exposure to injury while cycling

No information obtained.

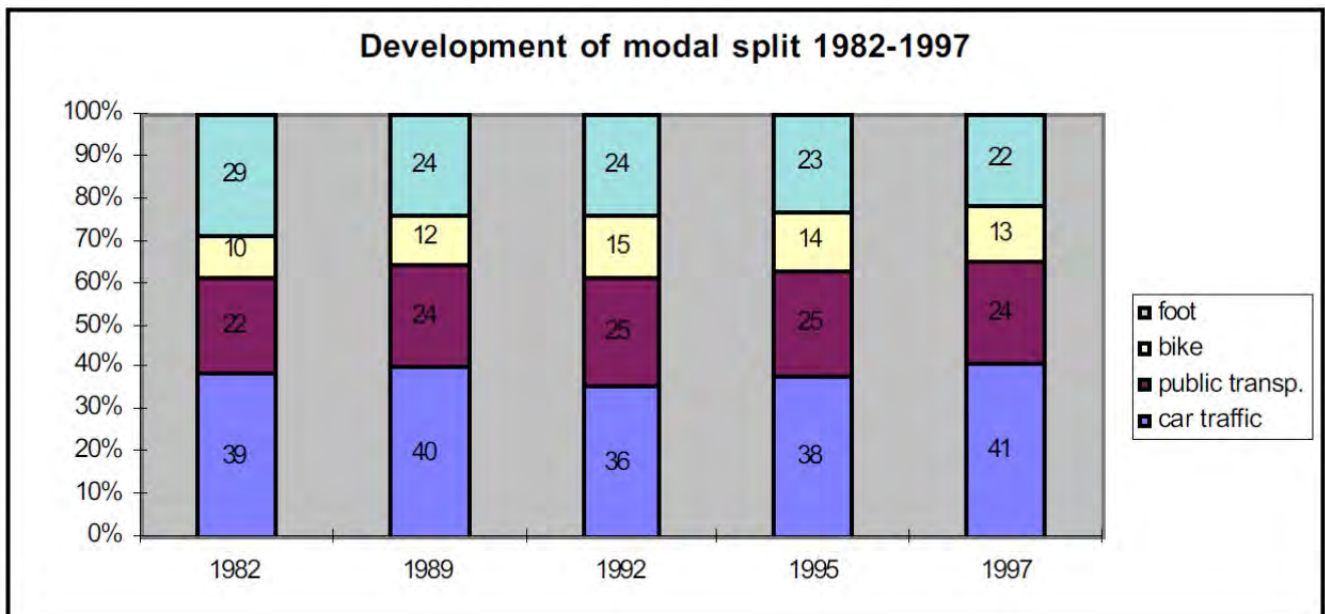
City/Town Level

a. Cycling mode share and usage

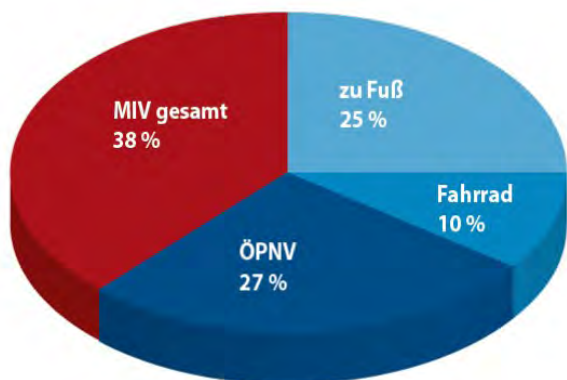
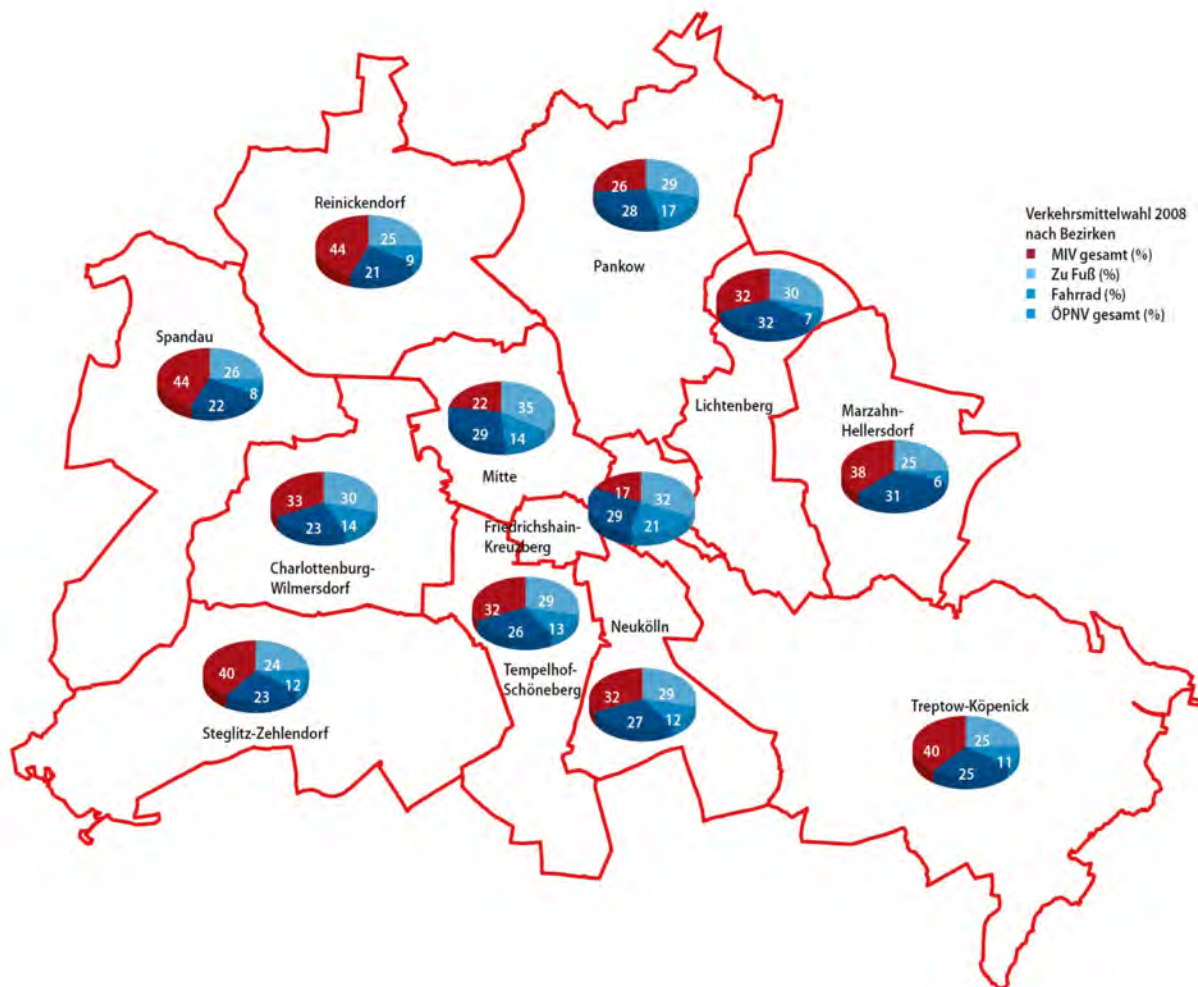
The following table shows the cycling mode share in **Munster** for several years from 1982-2007.

	1982	1990	1994	2001	2007
private car	38%	38%	37%	39%	36%
public transport	7%	7%	9%	11%	10%
bicycle	28%	34%	32%	34%	36%
walking	24%	21%	20%	13%	15%
other	3%			3%	3%
total	100%	100%	100%	100%	100%

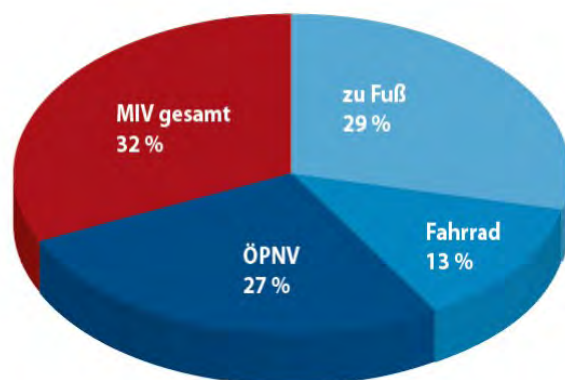
A 2013 presentation by **Munich** City Council's Mayor reported growth in the city's cycling mode as follows: 10% in 2002, 13.6% in 2008, and 17.4% in 2011. This data would appear to be somewhat at odds with the following graph (from a 2000 paper by a City Council officer) which indicates the mode share in the city had already been consistently higher than 10% from 1989-1997. It is possible that cycling did decline from 1997 to 2002, or that the original sources are different. Certainly, the figures quoted by the Mayor (and since by Council officers) can be considered official, with the National Cycling Plan 2020 asserting that the cycling mode share in Munich grew from 6% to 17% over the period 1996 to 2011.



The graphics below show (top) the 2008 mode share in **Berlin** by each of its constituent boroughs and (below) the mode share for the city as a whole in 1998 and 2008. The former shows a range from 6% to 21%, while the latter show growth from 10% to 13% over that decade.



Verkehrsmittelwahl 1998

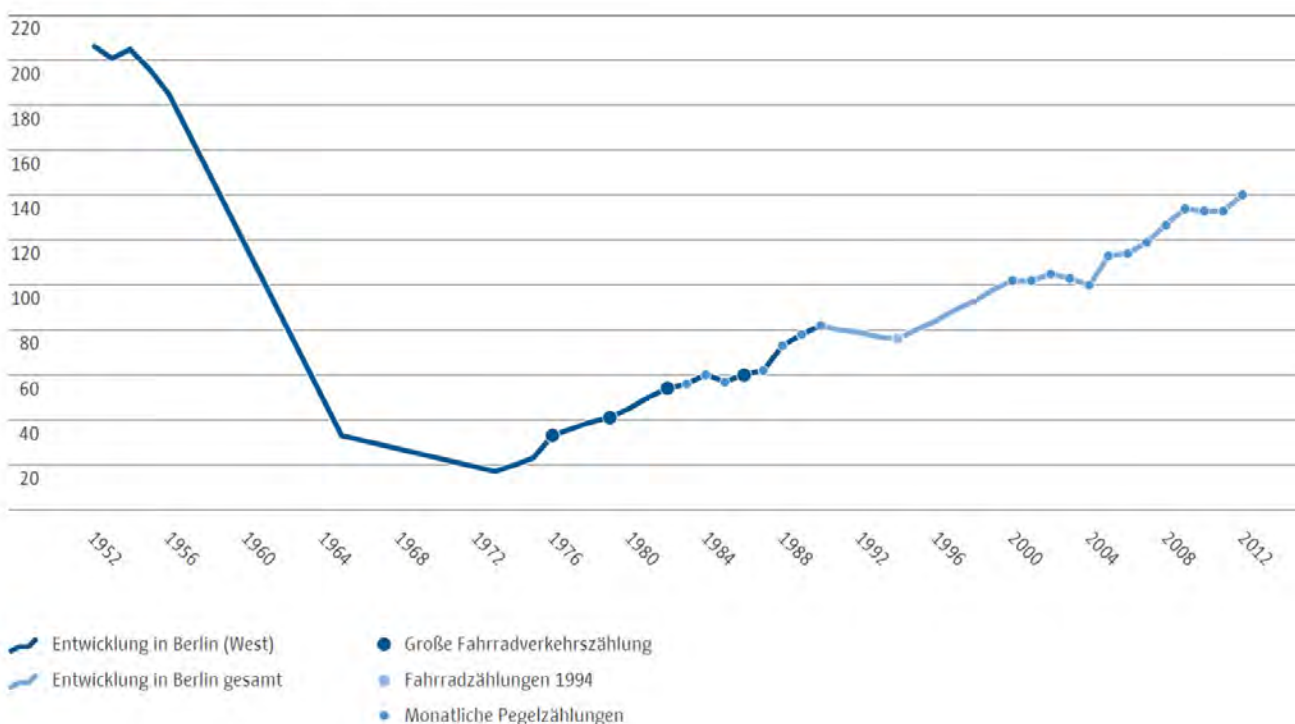


Verkehrsmittelwahl 2008

The first chart below shows the decay and growth in the amount of cycling traffic in **Berlin** between 1952 and 2012, with the level in 2004 used as the datum (figures up to 1989 are for West Berlin only). The second graph below shows change in cycle traffic from 2004-2012 for selected boroughs, again with 2004 as the datum.

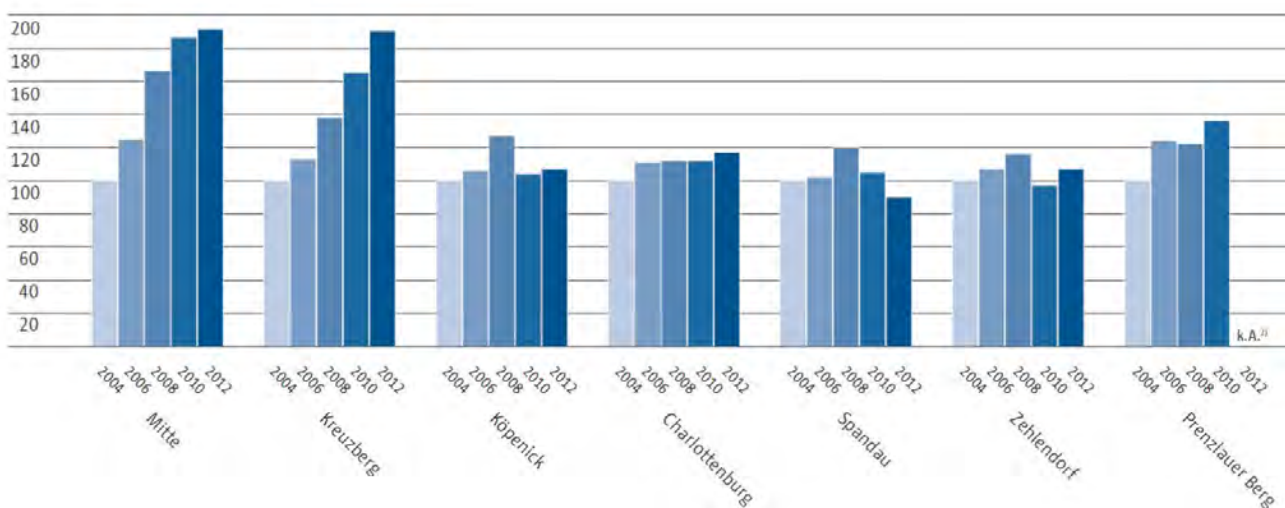
Entwicklung des Fahrradverkehrs seit 1951

Relative Veränderung in Prozent (2004 = 100%)



Entwicklung des Fahrradverkehrs an ausgewählten Pegelpunkten¹⁾

Relative Veränderung in Prozent (2004 = 100%)



01 EFFECTS

Figures in the National Cycling Plan 2020 state that the cycling mode share in **Frankfurt** and **Rostock** grew in the decade from 1998 to 2008, from 6% to 14% and from 9% to 20% respectively.

b. Bike ownership levels

In 2013, 80% of **Munich** residents owned a bike.

c. Age and gender of people cycling

No information obtained.

d. Exposure to injury while cycling

No information obtained.

Spain

National Level

a. Cycling mode share and usage

The following table shows the 2000 cycling mode share (third column) for Spain alongside that for other European countries. It was less than 1%. Countries would be ordered differently if by the daily km cycled/person figure (second column). This highlights the importance of basing comparisons on the most appropriate data. Mode share is the most appropriate indicator for the relative popularity of cycling.

Table 1.2. Cycling per person and per day (kilometres) and modal share (number of trips)

Country	Cycling per person and day in kilometres (2000)	Modal share as a % of number of trips
Netherlands	2.3	27
Denmark	2.6	18
Sweden	0.7	12.6
Germany	0.8	10
Belgium	0.9	10
Finland	0.7	7.4
Ireland	0.5	5-6
Austria	0.4	5
Italy	0.4	4
France	0.2	3
UK	0.2	2
Luxembourg	0.1	1.5
Greece	0.2	1
Portugal	0.1	1
Spain	0.1	0.7
Norway		6
Switzerland		9
USA		0.7
Japan		14

Source: EU Energy and Transport in Figures Statistical pocketbook, 2002.
EU Transport in Figures Statistical Pocketbook 2000.

b. Bike ownership levels

No information obtained.

c. Age and gender of people cycling

No information obtained.

d. Exposure to injury while cycling

No information obtained.

Regional Level

a. Cycling mode share and usage

The cycling mode share in cities across the region of Andalusia can be read from the table below (cycle mode share in column fourth from right). The data can be read in conjunction with the mode share data from Andalusian urban regions in section 02. Note the following disclaimer on the table: "These data may differ from others provided in this document as they are derived from different sources and methodologies". This highlights the general difficulties of comparing data in the absence of knowledge about methodologies.

Table 11: Percentage of journeys on working days according to main means of transport. 2011.
(These data may differ from others provided in this document as they are derived from different sources and methodologies).

Urban region	Total journeys	On foot	Car driver	Car passenger	Motorcycle / Scooter	Bicycle	Public transport	Other transport	Motorised
Almería	1,099,878	32.1	47.2	11.8	1.7	1.6	4.0	1.5	60.8
Bay of Cadiz	2,176,140	28.6	42.4	13.5	8.1	1.3	5.6	0.4*	64.1
Campo de Gibraltar	541,212	24.8	49.1	15.8	4.8	0.6*	4.1	0.8*	69.7
Cordoba	902,612	33.3	40.9	11.0	5.4	2.1	7.2	-	57.4
Granada	1,382,297	31.8	43.0	9.2	5.2	1.5	8.2	1.1*	57.4
Huelva	959,108	30.1	44.8	14.7	3.1	2.5	4.8	-	62.6
Jaen	439,574	38.4	39.6	10.6	2.9	0.8*	7.6	0.1*	53.1
Malaga	2,775,480	30.4	45.8	10.5	6.5	0.5*	6.2	0.1*	62.8
Seville	3,405,252	24.0	48.1	13.6	3.3	1.9	9.2	-	65.0
Total	13,681,553	29.0	45.2	12.3	4.9	1.4	6.8	0.4	62.4

*The size of the underlying sample is less than 20 cases, so the statistical reliability of the estimate is small.
Source: Institute of Statistics and Cartography of Andalusia. 2011 Social survey: Mobility in the urban regions of Andalusia.

b. Bike ownership levels

No information obtained.

c. Age and gender of people cycling

No information obtained.

d. Exposure to injury while cycling

No information obtained.

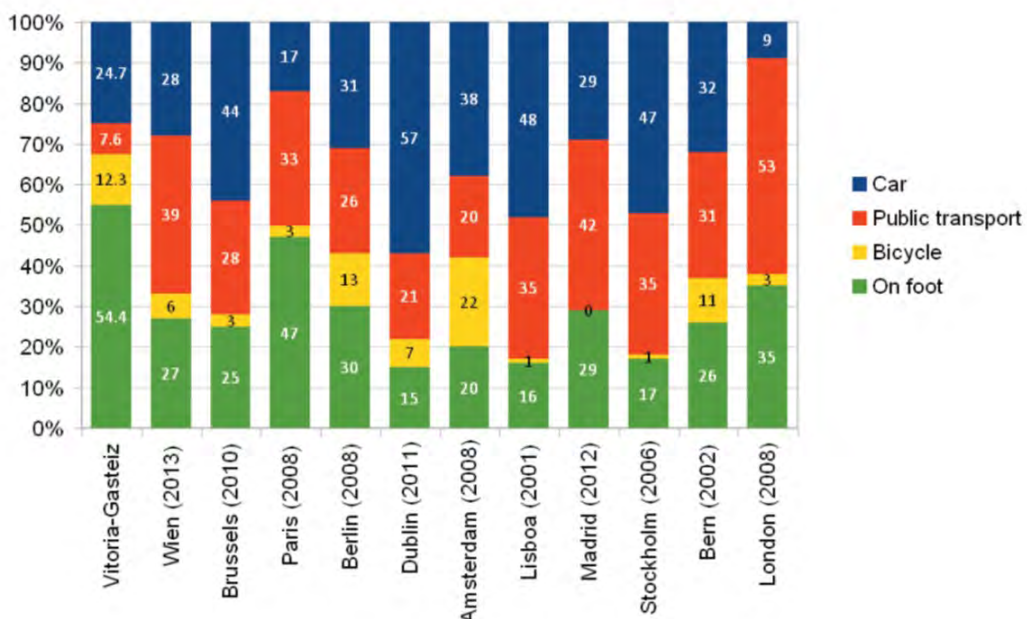
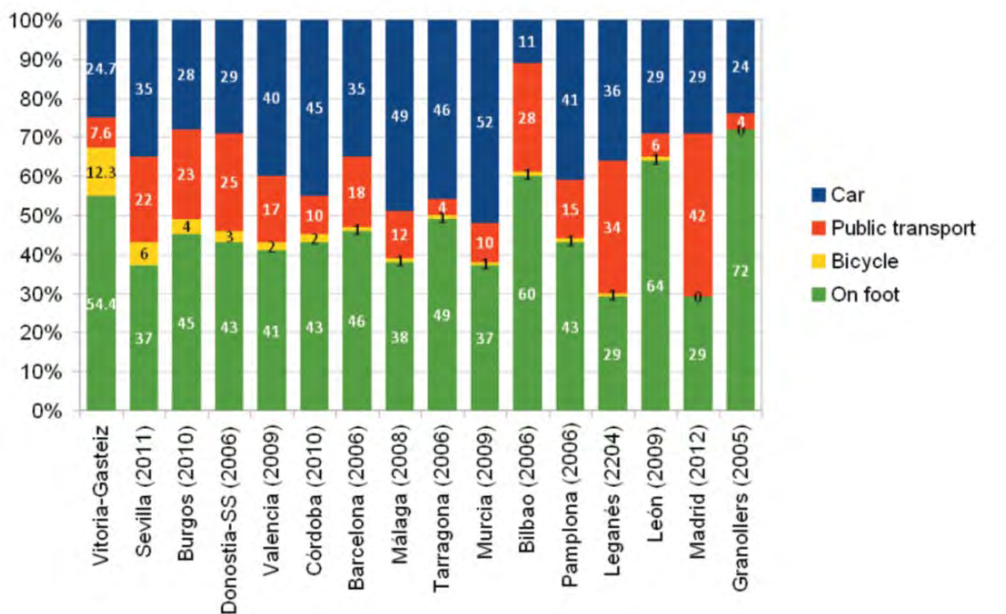
City/Town Level

a. Cycling mode share and usage

The Basque city of **Vitoria-Gasteiz** currently has the highest cycling mode share of any city in Spain - up to 12.3% in 2014 from 6.8% in 2011, from 3.3% in 2006, and from 1.4% in 2002. The mode share target is 15% by 2020.

In a city of around 240,000 inhabitants, around 112,000 trips/day were made by bike in 2014, up from around 56,000 trips/day in 2011 and 19,000 in 2006.

The following tables compare the mode share in Vitoria-Gasteiz with (top) other Spanish cities and (bottom) other European cities.



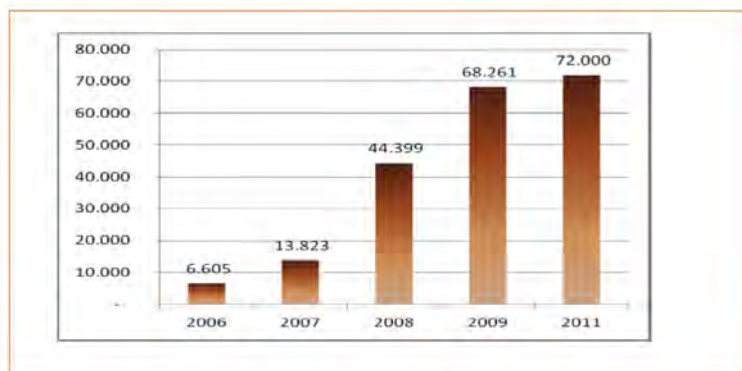
Surveys in 2006, 2011 and 2014 also reveal data on journey purpose. The proportion of all bike trips in Vitoria-Gasteiz there were to/from education has remained steady across all three years at 21-22%, while the proportion to/from work reduced in 2014 compared to the previous two surveys, due to growth in the proportion of cycling trips for a wide range of other journey purposes.

Seville experienced a significant growth in its cycling mode share from around 2004; although different sources give different figures for the scale of change. A 2007 Mobility Survey gave a figure of 3.2%, following which a 2010 'Study of Mobility on Bicycles in the City of Seville' put the figure at 5% of all trips and 6.6% of all mechanised trips. 'Research on the Use of Bicycles in the City of Seville' (2011) then had the figures at 5.6% of all journeys and 9% of all mechanised journeys. Other reports of the growth in cycling mode share include a jump from 0.2% in 2000 to 6.6% in 2009; and from 0.6% in 2006 to 8.9% in 2012. Despite differences in methodology, a clear picture of significant growth the Seville's cycling mode share from the period prior to 2006 to 2012 emerges.

(As stated elsewhere, as a general point, the inclusion/exclusion of walking trips from mode share data is often unclear. In addition, the walking mode share is often accounted for in different ways.)

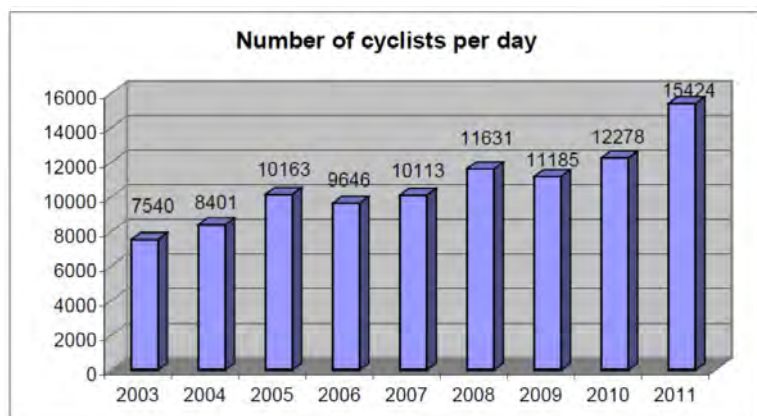
In terms of the growth of the numbers of people cycling in Seville, the following graph shows the number of trips cycled per weekday.

Graph 13: Evolution of number of bicycle users in Seville 2006-2011



Source: the authors. Figures from the Seville Bicycle Office, GMU and the University of Seville.

Donostia-San Sebastian has also reported appreciable growth in cycling during the first decade of the century. Data from the EU Civitas-Archimedes project put the 2011 mode share at 4.8%, with another report putting the 2006 figure at 3%. Growth in the number of bicycle trips per day is shown in the graph below.



In **Barcelona**, according to the 2013-18 Urban Mobility Plan, the cycling mode share has changed as follows in recent years:

2007 = 1.09%; 2008 = 1.39%; 2009 = 1.33%; 2010 = 1.37%; 2011 = 1.51%

While the 2011 share is 38.5% greater than the figure four years earlier, caution should always be exercised in talking about growth when the base figures themselves are small.

In terms of the numbering of cycled trips per day in Barcelona, City Council data indicates the following recent growth:

2007 = 86,406 trips
 2008 = 108,924 (+26.1%)
 2009 = 102,824 (-5.6%)
 2010 = 106,520 (+3.6%)
 2011 = 118,151 trips (+10.9%)

The source of the 2011 data indicates that the equivalent figure for 2005 was just 35,000 trips.

b. Bike ownership levels

In 2014, 70% of households in **Vitoria-Gasteiz** owned at least one bike; up from 64% in 2011 and 54% in 2006.

c. Age and gender of people cycling

The proportion of women cycling in **Vitoria-Gasteiz** has grown gradually in recent years: 31.5% in 2006; 33.4% in 2011; and 34.6% in 2014. As regards age, there was a significant jump in the proportion of cyclists aged 6-19 years from 2006 and 2011 (around 17%) to around 29% in 2014. The proportion of cyclists aged 65 years and older grew from almost 3% in 2006 and 2011 to 4.4% in 2014. (See tables below for more details.)

Cyclist mobility – Gender

	2006	2011	2014
Male	68.50%	66.60%	65.40%
Female	31.50%	33.40%	34.60%

Cyclist mobility – Age

Percentages	2006	2011	2014
6-19	17.40%	17.20%	28.60%
20-29	40.30%	24.10%	20.20%
30-49	34.40%	44.50%	34.50%
50-64	5.00%	11.60%	12.30%
>64	2.90%	2.70%	4.40%

The following table from **Donostia-San Sebastian** presents 2011 data for cyclists by gender at five cordon points. The overall picture is that around 58% of cyclists were male, and around 42% female. This shows a smaller gender gap than the equivalent in Vitoria-Gasteiz, and a much smaller gap than would be found in almost any UK town or city.

	Concha	Zurriola	San Marcial	Pt. M ^a Cristin	Pz. Euskadi	Total
MAN	16277	11173	8545	12808	13846	62649
WOMAN	11716	6600	7438	9722	9844	45320
TOTAL	27993	17773	15983	22530	23690	107969
MAN	58,15%	62,87%	53,46%	56,85%	58,45%	57,95%
WOMAN	41,85%	37,13%	46,54%	43,15%	41,55%	42,05%

d. Exposure to injury while cycling

The following table from Donostia-San Sebastian presents data for collisions involving cyclists in 2009, 2010, and 2011. It also includes a 'coefficient' of collisions relative to the number of cycling trips - see graph in sub-section (a) above - which gives a measure of exposure to the risk of injury for cyclists. Although the number of collisions increased from year to year, the rate per trip reduced.

KIND OF ACCIDENT	2009	2010	2011
Cyclist itself	18	24	33
Cyclist with pedestrian	11	8	10
Cyclist with cyclist	2	3	4
Cyclist with motorbike	12	7	9
Cyclist with car	25	28	26
Cyclist with bus	1	2	1
Cyclist with van/lorry	0	1	3
Cyclist with more than 1 vehicle	1	0	1
TOTAL	70	73	87
USERS	11.185	12.278	15.424
COEF(ACCIDENTS/USER) X 1000	6,26	5,95	5,64

Austria

National Level

a. Cycling mode share and usage

The following table and chart shows the cycling mode share for Austria alongside that for other European countries, in 2000 and 2007 respectively. This suggests an increase from 5% to 11% over the period. Noting that, for example, the Dutch mode share is shown to rise from 27% to 40% over the same period, there may be some differences between the two original data sources. According to a 2014 Eurobarometer 6% of Austrian people said that their most often used mode of transport on a typical day was the bicycle.

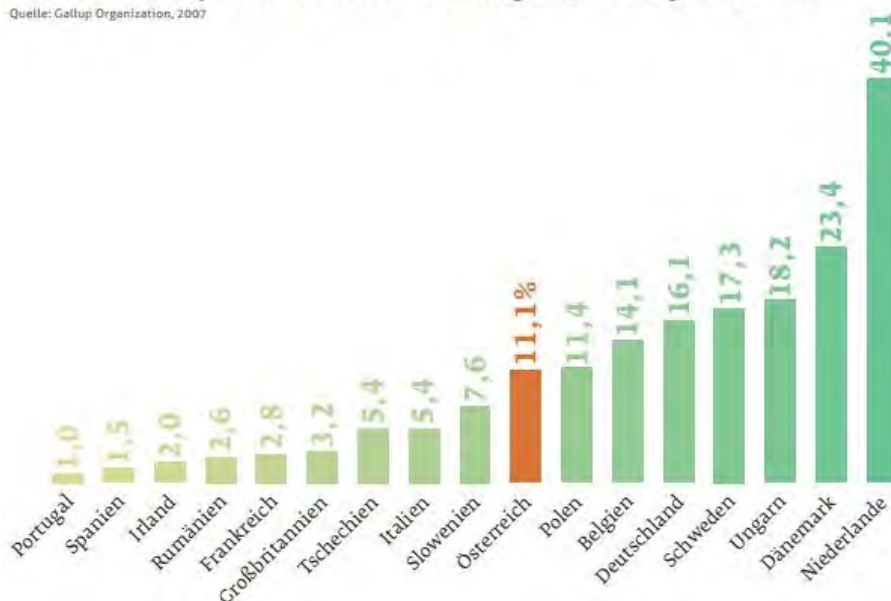
Table 1.2. Cycling per person and per day (kilometres) and modal share (number of trips)

Country	Cycling per person and day in kilometres (2000)	Modal share as a % of number of trips
Netherlands	2.3	27
Denmark	2.6	18
Sweden	0.7	12.6
Germany	0.8	10
Belgium	0.9	10
Finland	0.7	7.4
Ireland	0.5	5-6
Austria	0.4	5
Italy	0.4	4
France	0.2	3
UK	0.2	2
Luxembourg	0.1	1.5
Greece	0.2	1
Portugal	0.1	1
Spain	0.1	0.7
Norway		6
Switzerland		9
USA		0.7
Japan		14

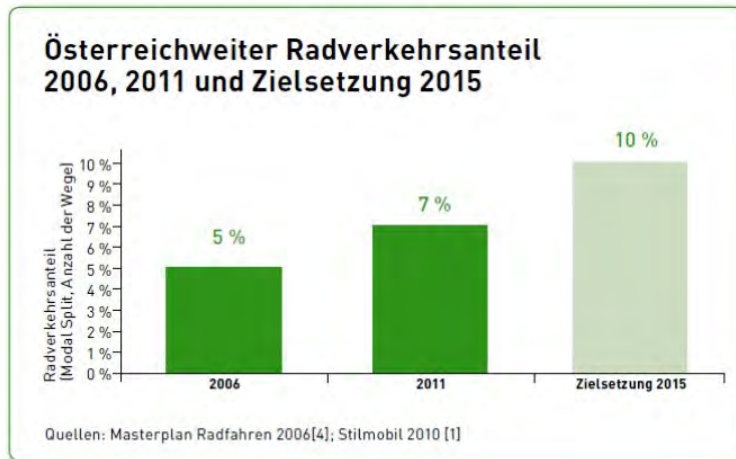
Source: EU Energy and Transport in Figures Statistical pocketbook, 2002.
EU Transport in Figures Statistical Pocketbook 2000.

Fahrrad als Hauptverkehrsmittel im Alltag, Ländervergleich, 2007

Quelle: Gallup Organization, 2007

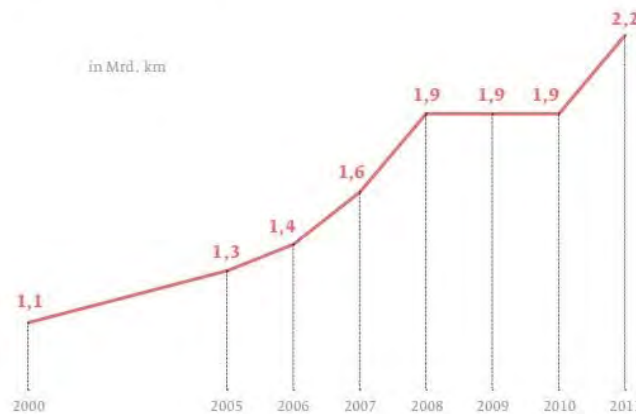


The graph below indicates that the national cycling mode share grew from 5% in 2006 to 7% in 2011, and that the 2015 target (in the 2011 Cycling Masterplan) was 10%.

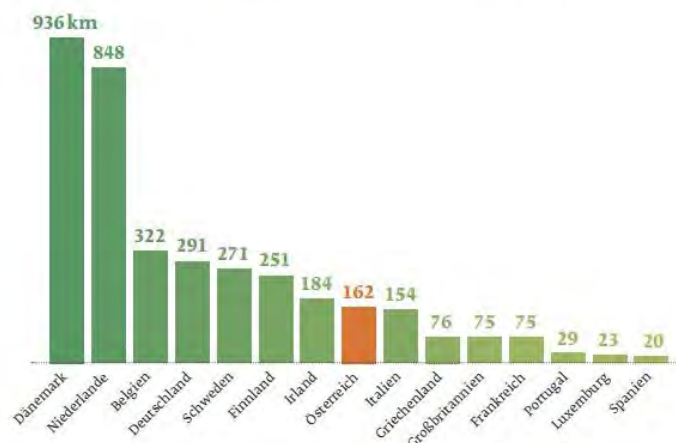


The first graph below shows how the annual distance travelled by bike in Austria changed from 2000 through to 2011 (figures in billion km). The second graph shows how the annual number of km cycled per person in Austria compared with other European nations in 2005.

Im Alltag mit dem Fahrrad gefahrene Kilometer, 2000–2011 Quelle: VCO, 2012

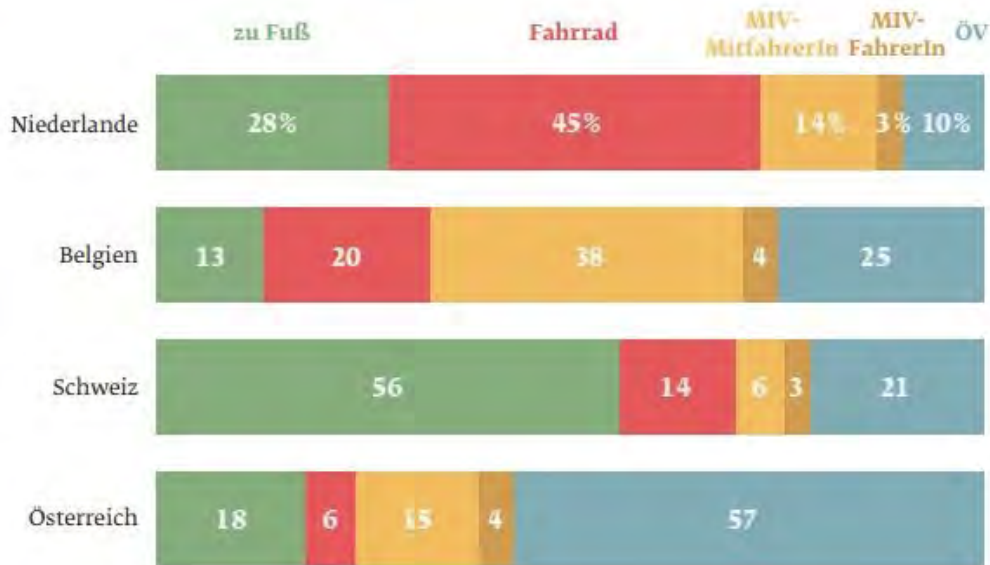


Zurückgelegte Fahrradkilometer pro EinwohnerIn und Jahr, 2005 Quelle: VCO, 2006



The mode share for cycling to school in Austria was 6%. The following table shows Austria compared with Netherlands, Belgium and Switzerland (cycling figure in red).

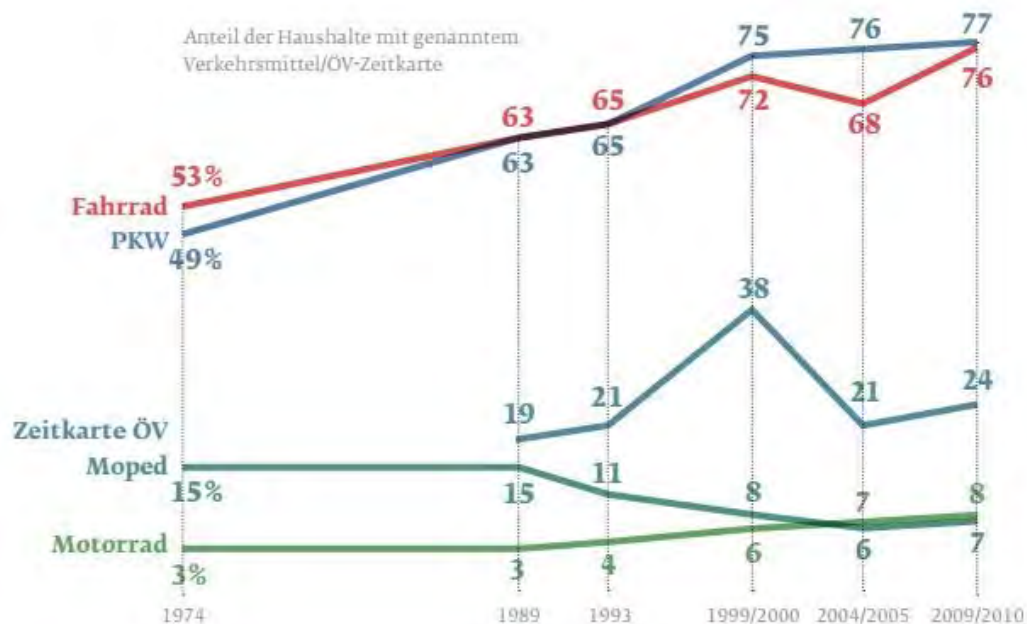
Modal Split von SchülerInnen in vier europäischen Ländern Quelle: COMPETENCE, 2005



b. Bike ownership levels

The following table shows the percentage of households with at least one bike (red line), from as far back as 1974 to 2009/10. The total number of bikes owned in Austria in 2009/10 was over 6.3 million (see chart for bike ownership by region, in following section).

Verkehrsmittelausstattung der Haushalte, 1974–2010 Quelle: Statistik Austria, 2011



c. Age and gender of people cycling

No information obtained.

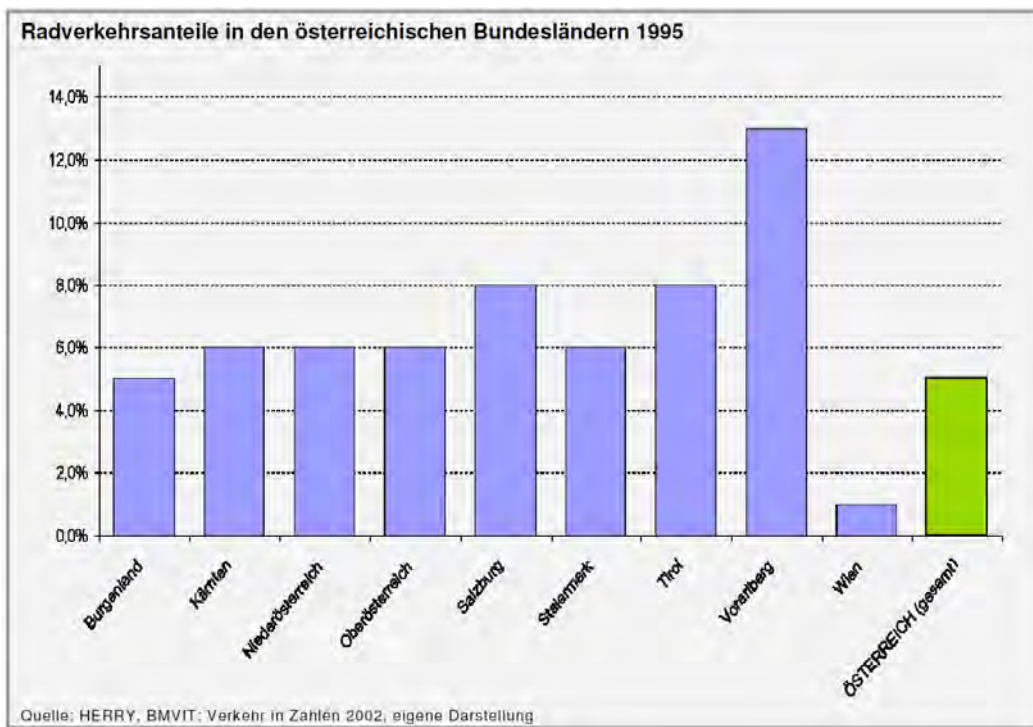
d. Exposure to injury while cycling

No information obtained.

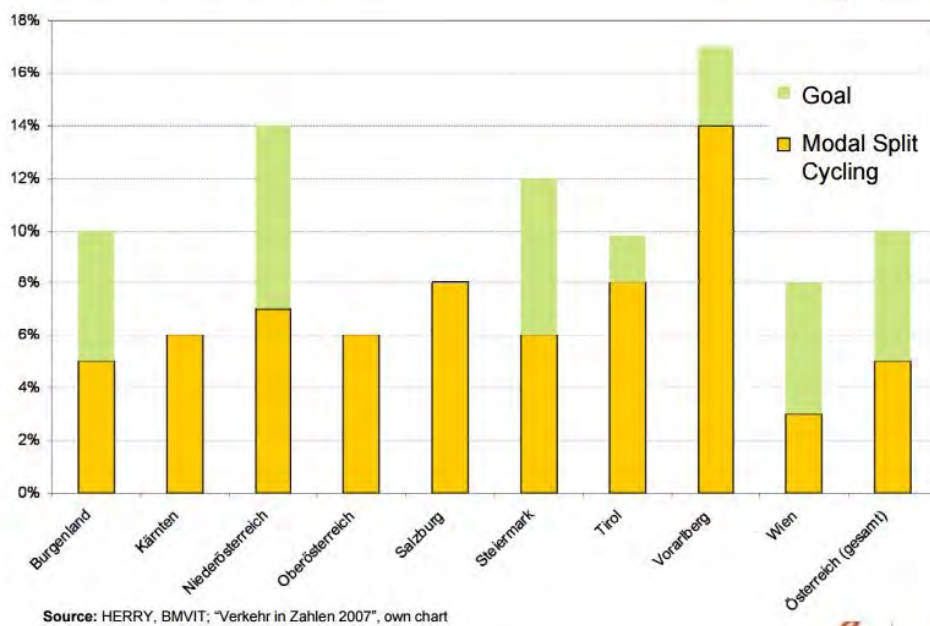
Regional Level

a. Cycling mode share and usage

The two graphs below show the regional cycling mode shares in Austria in 1995 and 2007 respectively. The range in 1995 is from around 1% to 13%, and in 2007 around 3% to 14%. There is little change over the period, either in the relative performance of regions or in the figures for each region.

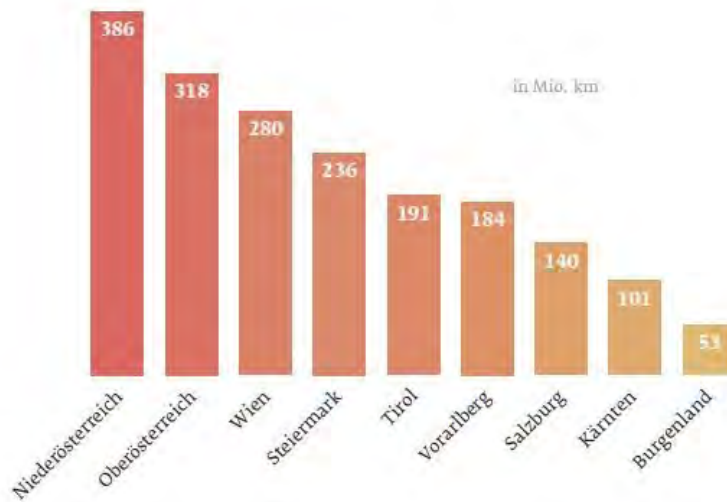


Regional cycling level



The graph below shows how the total distance cycled (million km/year) varied between regions in 2010. The comparison helps to show how different datasets tell different stories. Mode share is a more reliable indicator than distance cycled in assessing the relative popularity of cycling.

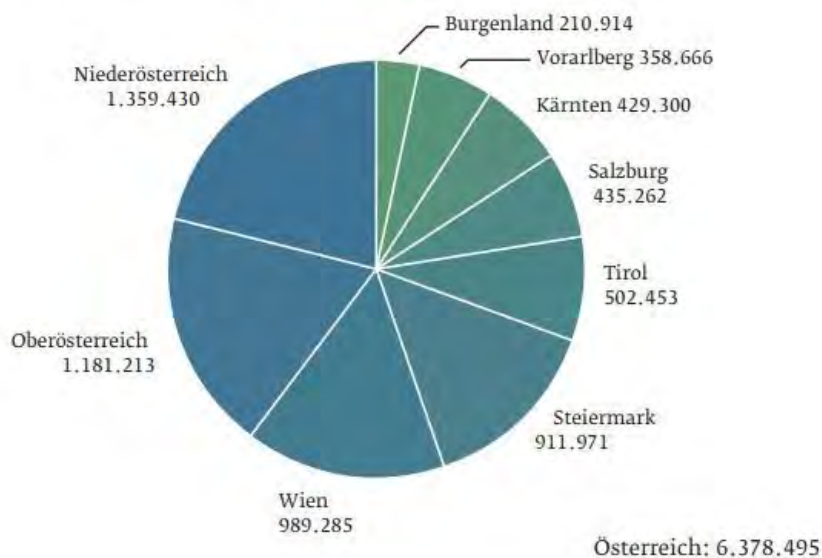
Radverkehrsleistung in den Bundesländern, 2010 Quelle: VCÖ, 2013; Statistik Austria, 2013; FGM, 2013



b. Bike ownership levels

The following chart shows the numbers of bikes owned by region in 2009/10.

Anzahl der Fahrräder pro Bundesland, 2009/10 Quelle: Statistik Austria, 2011



c. Age and gender of people cycling

No information obtained.

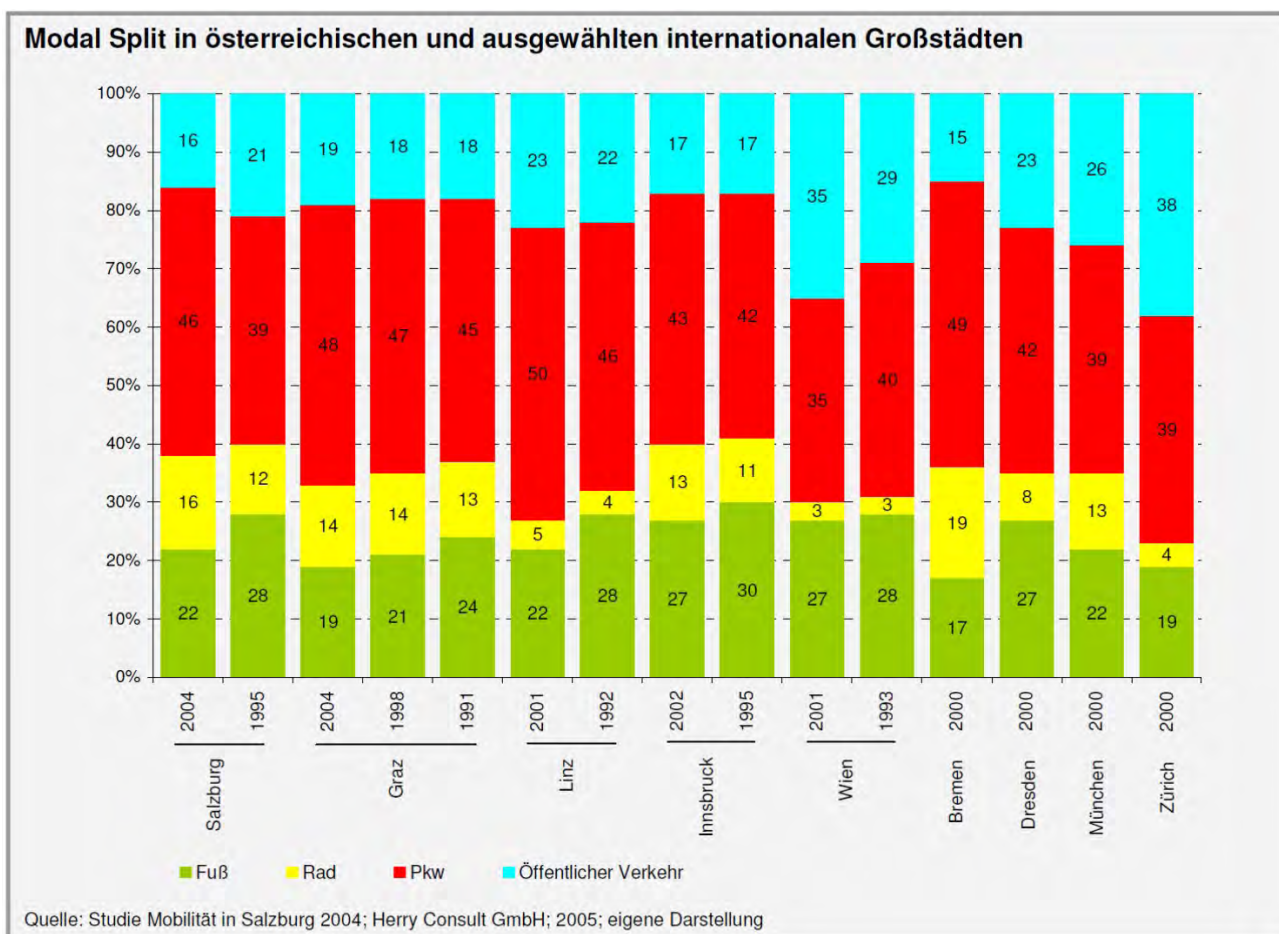
d. Exposure to injury while cycling

No information obtained.

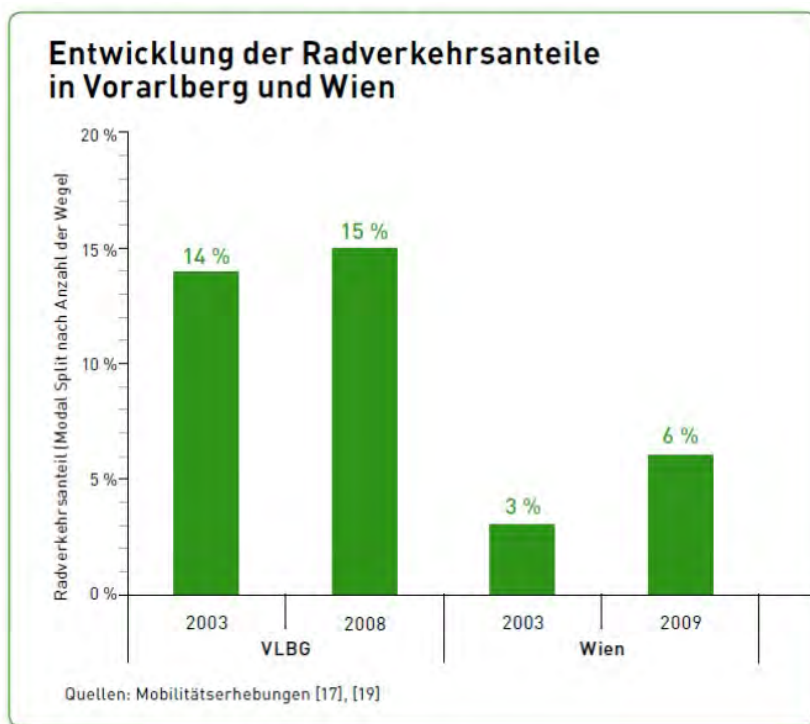
City/Town Level

a. Cycling mode share and usage

The following table shows the change in mode share (yellow segment) over time for **Graz, Innsbruck, Linz, Salzburg** and **Vienna**, compared with Bremen, Dresden, Munich and Zurich in 2000. The date of the Austrian datasets vary, being roughly mid-90s and mid-00s. They show no change or growth, the most impressive being from 12% to 16% in Salzburg between 1995 and 2004.



The table below indicates that the cycling mode share in Vienna doubled from 3% in 2003 to 6% in 2009. The graph also shows the 2003 and 2008 mode share for Vorarlberg, Austria's leading cycling region (see also the section above).



Other published reports state that, in 2009, the cycle mode share was 19% in **Salzburg** and 14% in **Graz**; and that, in 2013, the cycle mode share in **Vienna** was 5-6% (although the original sources for these data are unknown).

b. Bike ownership levels

No information obtained.

c. Age and gender of people cycling

No information obtained.

d. Exposure to injury while cycling

No information obtained.

02 CAUSES: Evidence of Policy + Action

Netherlands

National Level

a. Cycling policies + funding programmes

Up to the end of the 1970s, bicycle policy was mainly aimed at the traffic safety of the cyclist. From 1950 to 1975 the bicycle was almost entirely excluded from the government vision and until the early 1970s, attention to bicycle traffic was minimal. In the period 1960-1975, the construction of bicycle facilities lost much ground to the increase in car traffic which resulted in greater emphasis being placed on constructing facilities for cars. The increase in car traffic left little room for the cyclists, while very few new bicycle facilities were constructed. If new facilities were built they were concentrated around the safety issue: separate cycle paths with specific safety provisions were built at intersections.

In the following years, bicycle policy was gradually expanded (first at local and then subsequently at a national level). At first, attention was paid to high-quality bicycle tracks, such as in The Hague and Tilburg. Later it was realised that complete bicycle path networks – as can be found in Delft – improve the quality level of bicycle facilities even more.

In 1980 a gradual shift happened with the establishment of the Transport Structure Plan (SVV) which aims included to meet the demand for transport and goods but to take air pollution, environmental, socio-cultural, economic developments into account and limit the consumption of government resources. Even before this came the 1976-1980 Passenger Transport Plan, two contribution regulations in 1976 which provided government funds for municipalities if they would decide to build bicycle paths. The total budget for both regulation rose from NLG 25m in 1976 to NLG 53m in 1982. In 1988 a second SVV was launched but it still devoted few attention to the bicycle as an alternative for short and (in combination with public transport) long car trips.

Bicycle policy in 1990s and later was chiefly aimed at improving the competitive position of the bicycle in relation to the car. The Dutch bicycle policy in this time took shape within the framework of the 1999 Bicycle Master Plan (BMP). The objectives of the plane were manifold: to encourage people to switch from cars to bikes, to switch the car for public transport and bike, to have fewer cyclists fatalities, injuries and to lower bicycle thefts, increase parking.

In this respect, good facilities in terms of infrastructure and improvement of the options for safe road use are not enough. The way in which cycling links up with public transport services is an area where there is great emphasis. The policy also aims at the building of more and more anti-theft parking facilities for bicycles near residences, commercial premises, shopping areas, railway stations and other places where the public congregates

In 1991 and 1992, an estimated total of NLG 300-350m was spent annually in the Netherlands for constructing and reconstructing biking infrastructure. Municipalities were responsible for half of this amount, the provinces for 15 percent, the various ministries for the remainder.

The first table below, from The Dutch Bicycle Master Plan, shows how much funds in NLG millions were indicated to be spent in the policy document for the years 1991-1995. The second table below shows a detailed spending categorised according to project type (in NLG thousands) between 1990 and 1997.

In the Netherlands, cycling policy is part of the Mobility Management Plan, which provides an integrated management plan for all modes of transport. About €200m have been spent over a period of seven years to build and improve bicycle parking at railway stations (taken from a study published in 2004).

Table 10
The budgets for subsidizing the construction of bicycle facilities indicated in the *Bicycle Master Plan Policy Document, 1991-1995* (in millions of guilders).

1991	45.7
1992	50.0
1993	60.0
1994	40.2
1995	44.0
Total	239.9

Table 12
BMP spending categorized according to spearhead and project type, 1990-1997 in thousands of guilders).

Project types	Number	Car → bicycle	Car → PT + bicycle	Cyclist safety	Bicycle parking facilities	Total
Research projects	31	1.246	685	1.186	936	4.053
Pilot and model projects	41	6.305	3.623	683	3.361	13.972
Instrument development	18	2.428	122	303	728	3.581
Information exchange	22	837	0	98	211	1.145
Subtotal		10.816	4.430	2.270	5.236	22.751
General:						
- General BMP communication						1.736
- External support						4.508
- BMP evaluation						804
- Communication abroad						721
- Miscellaneous						2.094
Subtotal						9.863
Total	112					32.614

From 1990 to 2006, the Dutch central government contributed an average of €60m per year to various cycling projects, including €25m per year specifically for bike parking at train stations. In addition, the central government provides €1.8 billion a year for provinces to spend on transport projects, including cycling facilities.

In 2010 yearly government spending on cycling stood at €487m but this was not the total amount because workplace and residential bike-parking facilities constructions were not included (and cities were the main spenders, amounting to 75% of spending). In addition, €100m is going to be invested in cycle superhighways.

There is also a great emphasis put on bicycle-parking facilities. Cycle parking capacities at all 380 railway stations nationally are being increased through an ongoing €350m spending programme.

b. Provision of cycling infrastructure

In the 1970s the country has started to make city-specific, comprehensive traffic plans in which cycling and walking were taken into consideration as equal forms of transportation along with cars and public transport. In 1976 the Ministry of Transportation made a decision to pay the cities 80 percent of the building costs of cycle tracks built on city areas and 50 percent of the costs alongside roads. The combined length of the cycle tracks increased 73 percent during 1978-1988 and in 1988 there were altogether 16,100 kms of cycle tracks. The number of kms of bicycle paths and lanes increased between 1990 and 1996 by around 2,000 kms to 19,000 kms.

The table below provides data on bike paths from 1975 to 1992, while the table on the following page disaggregates the data on bicycle infrastructure into bicycle lanes and paths. The length of bicycle paths reached 17,000 km in 1996 and the number of bicycle lanes around 1,900 km.

The length of bicycle paths has since developed rapidly, reaching 35,000 km in 2012.

Tabel 3.6 De ontwikkeling van de lengte van verharde wegen (naar categorie), fietspaden en spoorwegen (in km) naar jaar

Tabel 3.6 The development of the lengths of metalled roads (by category), bicycle paths and railways (in km) by year

	1975	1978	1980	1983	1985	1988	1992
Weglengte Road length							
Totaal Total	86.354	90.569	92.525	95.146	97.189	100.893	104.831
waarvan of which							
Autosnelwegen Motorways	1.427	1.659	1.756	1.821	1.968	1.984	2.118
Buiten de bebouwde kom Outside built-up areas	51.544	52.567	53.222	53.848	54.078	55.096	56.028
Fietspadlengte (incl. stroken) Bicycle path length (incl. lanes).	.	9.282	10.840	12.343	14.486	16.060	18.175
Netlengte spoorwegen Track length railway	2.762	2.760	2.760	2.839	2.796	2.828	2.771

Bron Source: CBS

Tabel 3,7 De ontwikkeling van de lengte van fietspaden en fietsstroken (in km)
Table 3.7 The development of the length of bicycle paths and bicycle lanes (in km)

<i>Fietspaden bicycle paths</i>	<i>1978</i>	<i>1980</i>	<i>1983</i>	<i>1985</i>	<i>1988</i>	<i>1992</i>
Totaal Total	8.663	10.212	11.521	13.422	14.889	16.605
waarvan of which						
Langs verharde wegen Alongside metalled roads	5.856	7.005	7.747	9.008	9.915	11.139
Langs onverharde wegen Alongside unmetalled roads	1.082	1.168	1.193	1.226	1.220	1.312
Met eigen tracé Own infrastructure	1.724	2.040	2.581	3.188	3.755	4.154
Binnen de bebouwde kom Inside built-up areas	2.120	2.656	3.247	4.139	4.664	5.500
waarvan of which						
Langs verharde wegen Alongside metalled roads	1.682	2.087	2.480	3.071	3.475	4.020
Langs onverharde wegen Alongside unmetalled roads	22	33	9	17	16	22
Met eigen tracé Own infrastructure	416	536	758	1.051	1.173	1.458
Buiten de bebouwde kom Outside built-up areas	6.543	7.556	8.274	9.283	10.225	11.105
waarvan of which						
Langs verharde wegen Alongside metalled roads	4.174	4.918	5.267	5.937	6.440	7.119
Langs onverharde wegen Alongside unmetalled roads	1.060	1.135	1.184	1.209	1.204	1.290
Met eigen tracé Own infrastructure	1.308	1.504	1.823	2.137	2.582	2.696
<i>Fietsstroken Bicycle lanes</i>						
Totaal Total	619	628	822	1.064	1.171	1.570
waarvan of which						
Binnen de bebouwde kom Within built-up areas	476	445	640	880	975	1.306
Buiten de bebouwde kom Outside built-up areas	144	183	182	184	196	264

Bron Source: CBS

c. Provision of cycle training

In the Netherlands, education and training in cycling is part of a broad road safety curriculum and comes from the education budget, not directly from a 'cycling budget'. Up to a quarter of a million school children annually take the 'Verkeersexamen' (traffic test), the year before they start secondary school. All will have been taught about traffic rules since they were very young. On passing the test, pupils are awarded a 'Verkeersdiploma' (traffic diploma).

A typical pattern of cycle training for school-age children is the following, from Amsterdam, where the City Council considers traffic education to be a key element of its approach to growing and maintaining cycling levels: "When learned young, cycling will be a lifelong habit". While most Dutch parents teach their children to cycle at age 3 or 4, and most children in Amsterdam cycle to school on their own by the time they're 10, the city also invests €1m annually in training children from 4 to 18 years to ride safely.

From 0-4 years, 'playful education' takes place in nurseries and daycare centres, along with advice given to parents and carers. From then on, the school curriculum provides graduated cycling education and training. From 4-12 years, students are taught theory that gives them insight into traffic situations and responsible behaviour. From 7-12 years, both theory and practice is given to enable students to understand and deal with dangerous local traffic situations. From 9-12 years, students take exams designed for different local situations in the city; and from 11-12 years students are prepared to ride their new route to secondary school.

d. Programmes + events

Cycling has, since its invention, always played an important role in Dutch transportation, commuting, cycling to school and work (before World War II. there were more bikes than any other vehicles).

Everyday cycling promotion was visible in the 1970s with the display of good quality cycle infrastructure and the mass cycling of Dutch people. There were TV-spots in the 1980s and car free Sundays were introduced due to the effect of the oil crises. There were also tax breaks introduced in the Netherlands to buy a bike.

Like bicycle policy, cycling promotional activities in the Netherlands are highly decentralised, and are mostly carried out on the local level. An increase in the amount and quality of bicycle-parking facilities is one measure that has had a high emphasis in recent years. Cycling (with the combination of train commuting) is encouraged by increasing available bike-parking places and creating new ones, with many new innovative methods since public space might be limited in many Dutch cities.

Denmark

National Level

a. Cycling policies + funding programmes

From the 1950s until the beginning of the 1970s, the Danish road system underwent considerable expansion, and existing cycle tracks were expropriated to create room for the many new cars. In the mid-1970s the energy crises, introduction of speed limits and increasing environmental consciousness led to a rise in cycle traffic.

While Denmark has a long tradition for cycling, bicycle policy only came to the forefront in the 1980s. Increasing attention was given to cycling in traffic plans (like the 1993 'Traffic 2005' plan) and new measures were taken, such as the Odense National Cycling City project, which had a budget of around €2.5m over four years from 1999-2003 (the local authority and the Ministry of Transport each paid half).

In 2009 a new national mobility plan was published, in which cycling had a much clearer role than in the previous decade. This was needed to stem the decreasing trend in Danish bicycle use. The Government intended to spend some €22m annually on cycle policies over the next 6 years: several million/year for bike paths along national roads and more subsidies (in principle 30%) for local bicycle projects.

Most recently, in 2014, the Ministry of Transport adopted a new National Bicycle Strategy in which they set out how they want to achieve an increase in cycling nationally, how much they want to spend in support of this objective (e.g. the Bicycle Fund and Cycle Super Highway Fund)..

In terms of funding, it is hard to track exactly how much has been spent nationally on cycling in Denmark, and what this has achieved. The pattern is rather stop-start, but some trends emerge.

From 1982-2001 there was a national budget for building and maintaining cycle tracks and improving cycling conditions. Another source states that, from 1995-1999, around DKK 350m (~DKK 70m/year) was distributed on sustainable transport projects – a major part of the money being used to promote safer cycling.

In 1984, four cities received money for the purpose of constructing a proper bicycle route.

As Denmark's National Cycle City, Odense was granted a budget of DKK 20m for 1999-2003 (see further information for Odense, below).

State support for cycling projects in the municipalities then waned but, in 2009, the Danish Parliament set aside DKK 1bn for a national Cycling Fund. Over five years, the Fund supported 388 projects. If the municipalities' own funding is included, the Fund actually helped generate over DKK 2bn investment in cycling (~€270m). However, the five-year fund has been replaced with annual funds. In June 2014, the Danish government set aside an annual fund of DKK 180m for cycle super highways and better bicycle parking.

b. Provision of cycling infrastructure

No information obtained.

c. Provision of cycle training

Most Danish state schools also educate 10–12 year-olds in traffic rules, behaviour and regulations as a part of their regular curriculum.

As in the Netherlands, all school age pupils receive road safety classes that teach them how to negotiate traffic safely. In relation to cycling, the pupils are trained in techniques and skills and about their own awareness in relation to dealing with traffic. The classes deal with issues such as giving hand signals at the right time, comply with the right of way and appraising the traffic situation thoroughly before acting. Finally, the classes train the pupils' awareness of how much responsibility they have for their own and others' safety when they travel around in traffic on foot or by bicycle. A number of schools organise a cycling test for years 3 and 6 to test the pupils' skills and knowledge. They ride on a bicycle route, where they must deal with a number of challenges. In addition, there may be a small, theoretical test that the pupils complete on the internet.

d. Programmes + events

The first nationwide 'Cycle to Work' campaign was organised in 1997 with a few cities participating. The campaign was a success and, by 2000, 50,000 people participated in the annual event. Up to 110,000 employees now participate in the project (which usually runs during May).

The Cycling Embassy of Denmark was set up in 2009, to encourage cycling all over the world by sharing Danish know-how and expertise in the area of cycling.

Regional Level

All the information in this section is for Denmark's Capital Region. While Copenhagen is at its centre, information for the city itself is presented in the following section.

a. Cycling policies + funding programmes

Since 2009, the Capital Region has allocated more than DKK 40m to regional cycling projects which promote collaboration, development and innovation. Most projects aim to promote bicycle commuting and multimodal trips combining bicycle with bus/train.

b. Provision of cycling infrastructure

No information obtained.

c. Provision of cycle training

No information obtained.

d. Programmes + events

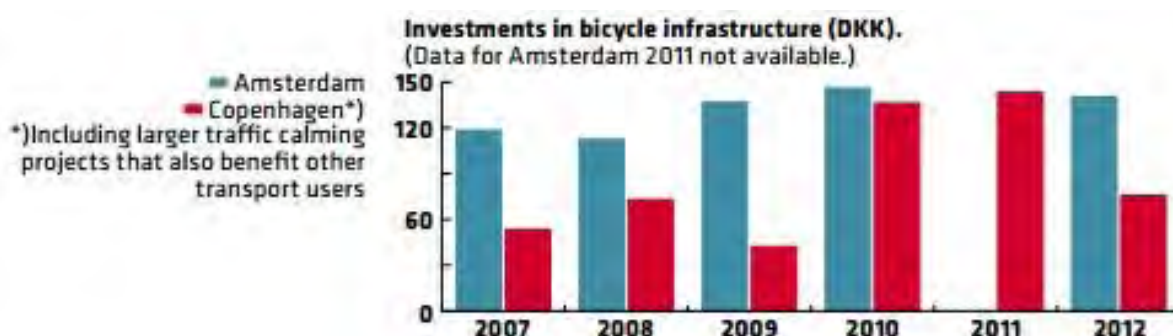
The Capital Region lends a large number of electrical bicycles to employees, to motivate them to cycle instead of driving a car to and from work.

City/Town Level

a. Cycling policies + funding programmes

Copenhagen's intent to grow cycling is evidenced by a number of policy documents and action plans, including the 2001 Cycle Track Priority Plan, the 2002-2012 Cycle Policy and, most recently its 2011-2025 bicycle strategy.

During 2006-2009, the city was allowed to use over €40m to improve cycling conditions; around €22/ resident each year. In 2010, there were more than DKK 150m allocated to cycling infrastructure in Copenhagen. The per capita investments in cycling in Copenhagen for 2007-2012 (compared with Amsterdam) were as follows:



The overall spending set out in the 2002-2012 Cycle Policy was €16m for cycle paths and cycle lanes (51 km of new infrastructure) and €100m was planned for new green cycle paths and cycle lanes (this is the budget for the whole network).

It is estimated that maintenance of cycle paths costs €1m/year.

The 2004 Copenhagen Bicycle Account set out the following annual investment in cycle track maintenance:

	1995	1996	1998	2000	2002	2004				
Cycle track maint (mil. DKK)	3.9	4.7	5.3	9.1	6.8	9.9				

In **Odense**, new policies for bicycle and general traffic were drawn up in 2009. Indeed, one of the most important changes was that bicycle policy was now integrated into wider traffic policies. During the four-year Cycle City project, the city received DKK 10m for the promotion of cycling. Money was used for developing the functionality and safety of junctions, for example.

b. Provision of cycling infrastructure

In **Copenhagen**, there were already 130km of paved cycleways by 1934. By the 1950s, almost half of the city's current (2012) cycleway network existed.

The following table shows data from the Bicycle Accounts since 1996. This table shows a 52% increase in the length of designated cycle infrastructure from 323km to 492.5km in the 18 years from 1996-2014.

	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014
Cycle tracks (km)	294	302	307	323	329	332	338	346	359	368
Cycle lanes (km)		6	10	12	14	17	18	23	24	28
Green cycle routes (km)	29	30	31	32	37	39	41	42	43	58
Cycle super highways (km)									17.5	38.5

Two examples of local cycling measures developed in Copenhagen:

- Traffic lights: synchronised to cyclists' speed, so that there is no need to stop if cycling at a speed of 20 km/h.
- Introduction of advanced stop lines: cyclists can go forward, cars are 5 metres back from the main traffic signal, at 117 intersections already.

In **Odense**, the first main cycling network plan was accepted in 1976 after which many new cycleways and recreational routes were built in the city. Odense had 350km of cycleways in the 1980s and 550km by 2010.

The city participated in a national pilot project of promoting cycling in 1984, with a high-quality bi-directional cycle track was built in the centre. Odense was then chosen as a 'Cycling Laboratory', and during 1999-2002 the city realised a four year-long Cycling City project (Cykelby).

Many innovative elements were realised in Odense, such as a green wave for cyclists, which enable cyclists to adjust their speed relative to up-coming traffic signals. Cyclists were also allowed to turn freely to the right in any traffic light intersections, even when the light is red.

In addition to the cycling projects, the development of a pedestrianised (car free) central area was begun in Odense in the 1970s. This area grew by 50% in 1998-2008. Buses are also banned from this area. A ring road was built in association with this project.

c. Provision of cycle training

No information obtained.

d. Programmes + events

Aarhus ran a campaign to get habitual motorists to cycle or take the bus for the journey to work and to keep travel diaries on their transport patterns. Free bicycles, bus season tickets, rain clothes etc. were used as inducements. The offer was made through the local press and in leaflets. Almost 10 times as many people applied as the 175 who were able to participate in the project. The travel diaries showed that the project increased the bicycle share of all trips by a factor of almost six in the summer and a factor of three in the winter. Car trips were more than halved. The changed travel patterns were reportedly maintained after the end of the project.

In **Copenhagen**, another campaign to increase cycling involved billboard advertising ('It's healthy to cycle all year around'), the distribution of company bikes to interested enterprises, and the distribution of breakfast and information in the morning peak hour. In addition, the introduction of the City Bikes bike-share programme in 1995 had huge publicity and a large advertising impact for sponsoring businesses. The effect on mode choice was uncertain.

The main idea behind **Odense's** 'Happy Bicycle School' initiative was that the bicycle can be integrated into and enrich the teaching processes and also increase opportunities to go on excursions. The measures at Ejerslykkeskolen included: training for teachers, including 20 as cycling instructors; Bicycle Play Day for 6th graders; 'Pimp My Bike' workshop; and cycling as an optional subject, with bicycle games, bicycle training and workshops etc. The number of children cycling to Ejerlykkeskolen rose from 37% to 40% in two years.

The Happy Bicycle School was one of nine projects co-funded from DKK 6.3m that Odense municipality received from the Bicycle Fund for 'Odense Bicycle City'.

Regarding cycling campaigns aimed at children, in Odense a “Cycling Duckie” goes around kindergartens teaching young children about cycling. In addition, there is a School Cycling Handbook, which provides guidelines on how to promote cycling to get children to cycle to school more safely and secure.

Germany

National Level

a. Cycling policies + funding programmes

The German federal government started to promote cycling back in the late 1970s with, among other things, the “Cycle-Friendly Cities” pilot project. In the 1980s, a programme for the construction of cycle tracks on federal highways was created as part of the budget item entitled “Renewal, refurbishment, upgrading and construction of federal highways”. At the local authority level, individual towns and cities started strategic cycling promotion in the 1970s (e.g. the “Cycle Tracks” task force in Bonn or the Cycle Tracks Commission in Freiburg). In the 1990s, they were joined by cities such as Kiel and Leipzig, then Karlsruhe, Frankfurt am Main and Berlin and districts such as Nienburg/Weser, Euskirchen and Ostvorpommern.

In April 2002 a National Cycling Plan 2002-2012 was submitted. The federal government decided to establish a coordinating function for bicycle promotion for the first time ever. The plan created an appropriate framework for all stakeholders (federal, state, municipalities, businesses, transport companies, health insurers, schools, the bike and tourism industries) to improve the future of cycling in rural and urban areas. The plan contains recommendations and shows new ways of implementing planning strategies to encourage cycling and increase bike traffic. According to this plan cycling should be an integral part of urban and regional mobility options.

The National Cycling Plan 2020 (published in 2014) is not just simply continuation of the previous national plan but rather an evolution as the promotion of cycling is now focused on the new transport and societal challenges. As part of an integrated transport and mobility policy, its aims go beyond the promotion of cycling and also encompass the strengthening of “ecomobility”, which comprises local public transport, walking and cycling. For details please check the National Cycling Plan 2020.

In addition, Germany – like Denmark or the Netherlands – is also keen on disseminating German know-how and expertise via its “Cycling Expertise Files” and bicycle portal.

As regards the budget for cycling, there is a great distinction in Germany between federal, state (regional), and municipality level. Between 1980 and 2000 the federal government in Germany contributed with €1.1bn to the extension of bikeways along federal highways.

In the National Cycling Plan 2002-2012, it was already mentioned that €100m was earmarked in 2002 for the construction and maintenance of cycle ways along federal roads which amount was double than in the previous year (and it was the first time that cycling has an explicit funding pocket). The cycling plan also mentions the €1.68bn yearly transport infrastructure fund from which resources could be used to develop cycling infrastructure (not all money from the fund, parts of it), as well as EU funds (up to 50 percent of cost measures to promote cycling could be covered from these sources). The cycling plan also highlighted other federal funds from where resources could be directed toward cycling infrastructure building.

In addition, between 2000 and 2004 €1m was allocated to support various research initiatives on cycling.

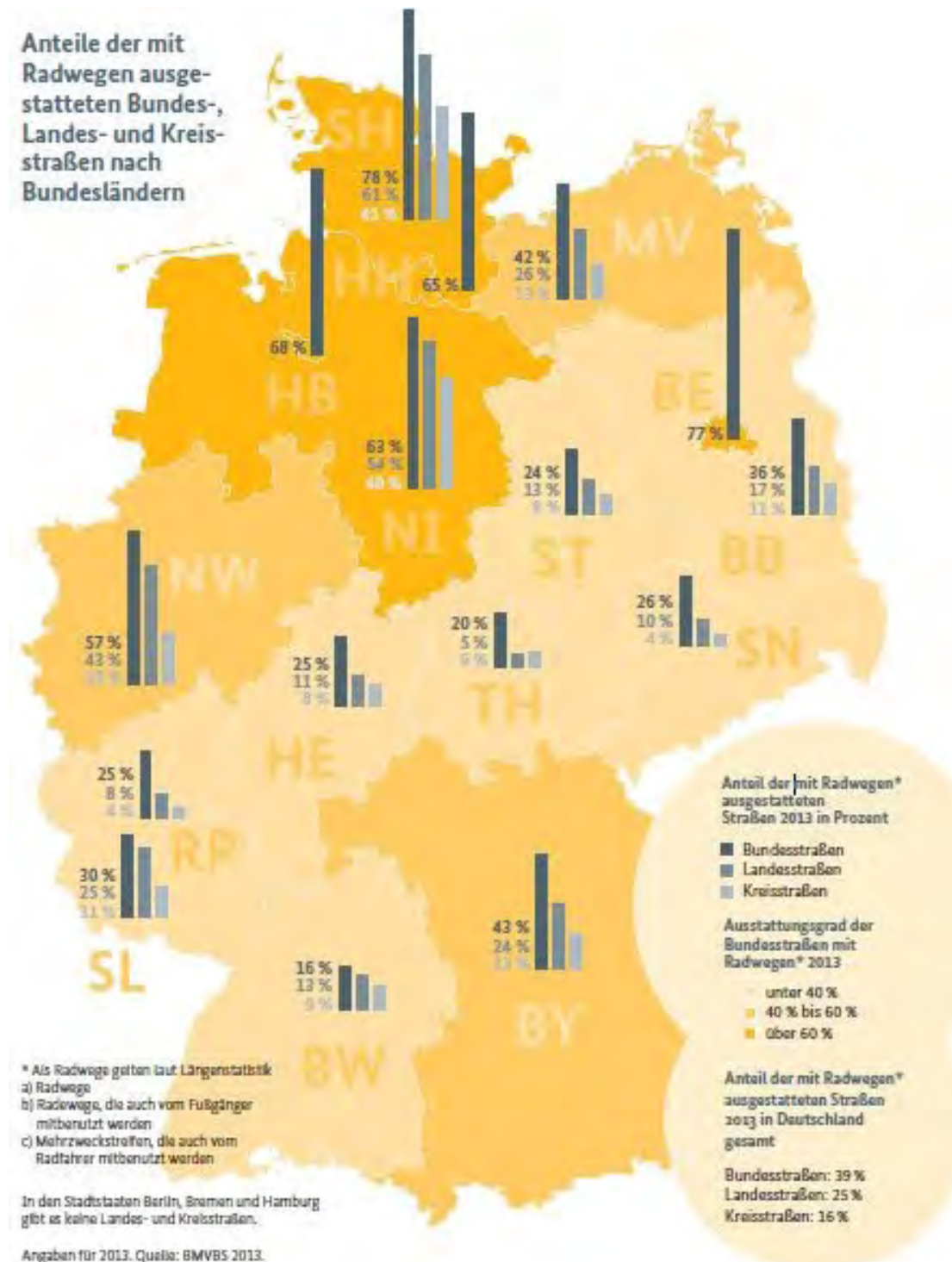
Between 2002 and 2012, €877m was spent on the construction and maintenance of federal highways. Between 2012 and 2020, €80m will be spent yearly on cycling by the federal government.

For each state it is hard to give exact numbers, but Bavaria for example will spend €200m for the next 5-year period.

b. Provision of cycling infrastructure

The map below shows detailed information what percentage of three categories of road (federal, state, county) are equipped with bike paths. In 2013, 39% of federal roads, 25% of state roads and 16% of county roads had bike paths.

In 2002, there were around 15,000 km of cycle paths along national trunk roads.



The table below presents data from as far back as pre-1981.

In 2012, there were 19,000 km of cycle tracks running along federal highways, with 25,000 km on regional roads and 16,000 km on district roads.

Table 6: Building cycle paths on federal highways within the Federal Government remit

Period	Distance built (kms)		Building cost (€ million)	
	old states	new states	old states	new states
Before 1981	8,000			
1981-1990	2,920		481	
1991	250		61	
1992	300	500 ¹⁾	61	
1993	300	170	51	15
1994	310	200 ⁶	1	26
1995	280	120	51	15
1996	240	110	46	15
1997	190	150	36	15
1998	170	140	36	15
1999	220	140	36	15
2000	210	140	31	15
Total 1991-2000	2,470	1,170 ²⁾	470	133
Total	13,390	1,670	951	133
Combined total	15,060			1,084

1) New states' initial stock = 500 kms.

2) 1993-2000

Source: BMVBW

c. Provision of cycle training

The RADschlag information portal is aimed at supporting the multipliers of cycling promotion by offering a pool of knowledge in the form of a database on the subject of cycling, with information, materials and activities. School travel maps – safe traveling by bike to school from a kid's perspective – are also obligatory in several German states. In addition, bike to school campaigns with several infrastructure development projects were also launched.

The National Cycling Plan 2002-2012 contains further details about traffic education initiatives.

d. Programmes + events

The National Cycling Plan 2002-2012 itself laid out in general the promotion of cycling as part of a sustainable, integrated transport policy and to promote modern, socially acceptable and environmentally friendly local mobility in line with the mission statement "city of short distances".

Under the National Cycling Plan 2002-2012, the federal government created an option for funding "non-capital measures" in the field of cycling that are especially innovative and transferable to other municipalities and stakeholders. For this purpose, annual appropriations totaling 2 million euros were initially provided, rising to 3 million in 2008.

Over one hundred cycling promotion programs, projects were funded ranging from competitions, pilot projects, publicity campaigns, research projects and action to raise public awareness to measures to improve road safety. It also includes feasibility studies on cycle superhighways. For a detailed good examples of cycling measures please see the annex of the National Cycling Plan 2002-2012 and National Cycling Plan 2020 documents.

Regional Level

a. Cycling policies + funding programmes

No information obtained.

b. Provision of cycling infrastructure

No information obtained.

c. Provision of cycle training

No information obtained.

d. Programmes + events

No information obtained.

City/Town Level

a. Cycling policies + funding programmes

Munich City Council approved a Bicycle Masterplan in July 2009, and this established the following objectives: cycling mode share of all trips in the city to increase by at least 17 % by 2015; the number of cyclists killed and seriously injured to decrease despite the increasing annual cycle traffic volume; and, by 2015, provision of 2,000 additional bicycle parking stands in the city and local centres and 400 weather-protected bicycle parking stands for residents.

Also in 2009, the City Council tripled the cycling budget from €1.5m/year to €4.5m/year.

Munster was in a special position after WWII, in which 63% of the city had been destroyed (91% of the city centre). For practical reasons and because of a certain predisposition to the past it was decided to reconstruct the town centre in a traditional way, maintaining the existing street and plot pattern and reproducing the pre-war landscape. In the 1970s, the mobility discussion was rekindled around issues concerning the preservation of people's quality of life and the environment. This was in contrast with other German cities where priority was given to cars. Bicycle traffic became a component of general traffic policy, all main roads were provided with adjacent bicycle paths for reasons of traffic safety.

In the early 1980s cycling got a big boost. There was growing environmental awareness and there was a realization that traffic problems cannot be solved by building more roads. Increased bicycle use can improve a town's accessibility and quality of life. Numerous cycling experiments were realised in the city, such as cycling in two directions in one-way streets. The Ministry of Traffic of Nordrhein-Westphalia also supported these projects to allow other cities to gain experience from Munster.

Munster also paid attention to integral traffic policy and urban planning. In the 1993 traffic report there were direct measures how they could replace as many car rides as possible with cycling, walking, public transportation and the combination of those three. Car-restricted areas or a partly car-free town were introduced. At this time (publication from 2009) it was estimated that the cost of Munster's bicycle policy amounted to €2m/year. In 1975 there were 175 km of integrated cycle paths, this number increased to 252 km by 1995. In 2010 there were 275 km of segregated bike routes in Munster complemented by 300 km of agricultural routes which are permitted for car traffic and stretch across the farming and forested regions of Munster.

In 2004 the city accepted a compact bicycle policy strategy, a general description of desirable features. They switched from a promotion-based policy to a more managerial, maintaining, stabilizing policy. No more "getting people on their bikes", but rather optimising the many existing features.

b. Provision of cycling infrastructure

The table below shows the growth of different types of cycle facility in **Berlin** from 2002 to 2012. This shows an increase from 855km of different types of path and one Bicycle Street to 1,071km of paths and 16 Bicycle Streets. 62km of new cycle tracks represented a 10% increase over the decade, while 124km of new cycle lanes more than tripled the 2002 figure.

Munich had a 1,200km network of bicycle paths in 2013, comprising around 500km of tracks/lanes, around 450km of Bicycle Streets and other quiet streets; and around 260km of greenways in parks etc.

Development of Cycling Facilities

	2002	2005	2007	2009	2011	2012
Dedicated cycle tracks (km)	600	625	630	650	660	662
Marked cycle lanes on carriageway (km)	50	65	90	125	153	174
Shared foot/cycle paths (km)	100	100	100	100	100	100
Marked cycle lanes on footway (km)	50	50	50	50	50	50
Footway, cycling permitted (km)	5	5	5	5	5	5
Bus lanes usable by cyclists (km)	50	70	80	80	80	80
Bicycle Streets (no.)	1	3	5	11	16	16

Quelle: Senatsverwaltung für Stadtentwicklung und Umwelt Berlin

c. Provision of cycle training

In Leipzig there is a “Children’s Office” as part of the Urban Development programme of “Socially Integrative City” where the office addresses children’s participation in urban planning in their neighbourhoods. The office asks the children’s wishes through various methods and present these to the planners. In the German Land Hamburg children use a “Bicycle Diary” to describe the dangerous situations and risks as they encounter on their route to school. This allows schools and police trainers to understand the specific situation of children in cycle traffic. Educational neighbourhood tours, cycling training on route to schools and cycling training for kids to reach school safely are also part of mobility education.

d. Programmes + events

Munich has perhaps the most comprehensive cycling promotional programme of any country, region or city covered by this study. In 2008 the City Council launched a multi-facted campaign, which includes an annual ‘Bicycle Night’ ride around the city centre, a cycle fashion week, bicycle surgeries, and many other more conventional marketing activities. The budget for this campaign was €3.8m for the five years 2010-2014 (amounting to around €0.6/person/year).

Spain

National Level

a. Cycling policies + funding programmes

Spain does not have, and has never had, a national policy or strategy for cycling. In 2014, a confederation of Spanish cycling advocacy organisations produced a document entitled 'Guidelines for a National Bicycle Plan', for submission to the national Government.

b. Provision of cycling infrastructure

No information obtained.

c. Provision of cycle training

No information obtained.

d. Programmes + events

No information obtained.

Regional Level

a. Cycling policies + funding programmes

The region of Andalusia adopted a comprehensive Bicycle Masterplan in December 2012. As far as is known, this is the only document of its type in Spain. It is understood that the principal authors of the report were people who had previously had comparable roles in the city of Seville during the period of cycling investment there (2006-10). This is an indication that pro-cycling policies and funding tend to be found where those in authority have a pro-cycling stance (for whatever reason), and are not necessarily the norm.

The ECF understands that the Bicycle Masterplan came with a budget of €400m and that proposed new infrastructure includes over 5,000km of cycle paths; to help achieve a target cycling mode share of 7.5% by 2020.

b. Provision of cycling infrastructure

The two tables below, from the Andalusia Masterplan, show lengths of cycle paths in different locations. However, they highlight how difficult it can sometimes be to interpret such data. Firstly, it is unclear what year the non-population figures refer to (they could be different for different locations). Secondly, as can be told from the population data, places with the same name are not always the same place! In this case, the difference is between a city and the 'urban agglomeration' (metropolitan region) to which the city gives its name. These tables can be read in conjunction with the mode share data from Andalusian urban regions in section 02.

Table 12: Cycle paths (CP) for leisure, sport and transport in the urban agglomerations of Andalusia

Locations	Population 2012	Surface area (km ²)	Leisure-sport		Transport		km CP under construction	CPm/1,000 inhabitants	CPm/ha (km ²)
			km CP	CPm/1,000 inhab.	CPm/ha (km ²)	km CP			
Almeria	364,905	581.70	2.78	7.62	4.78	78.63	-	215.47	135.17
Bay of Cadiz	771,984	2,574.60	216.88	280.94	84.24	162.49	33.58	210.49	63.11
C. de Gibraltar	238,480	762.10	50.70	212.59	66.52	55.84	-	234.15	73.27
Cordoba	344,435	1,588.00	78.07	226.66	49.16	62.81	3.85	182.35	39.55
Granada	432,791	603.60	199.92	461.93	331.21	62.69	6.57	144.86	103.86
Huelva	344,693	2,334.00	146.12	423.91	62.60	126.20	5.32	366.11	54.07
Jaen	122,705	512.90	46.91	382.26	91.45	17.78	-	144.92	34.67
Malaga	986,836	890.50	3.88	3.94	4.36	94.55	27.65	95.82	106.18
Seville	1,177,632	2,626.40	106.89	90.77	40.70	245.46	21.48	208.44	93.46
Total	4,784,461	12,473.80	852.14	178.11	68.31	906.45	98.44	189.46	72.67

Table 14: Inventory of cycle paths in the leading cities of Andalusia

City	Population 2012	Cycle paths				CP/1,000 inhab.	Paths/Streets
		Streets (km)	Current (m)	Under construction (m)	CP/1,000 inhab.		
Algeciras	116,917	291	21,061	0	180.14	7.25%	
Almería	191,443	415	19,662	0	102.71	4.74%	
Cadiz	123,948	126	3,220	1,812	25.98	2.55%	
Cordoba	328,841	782	52,320	1,587	159.10	6.69%	
Granada	239,017	518	17,474	6,565	73.11	3.37%	
Huelva	148,568	223	15,250	0,00	102.65	6.83%	
Jaen	116,731	220	8,818	0,00	75.54	4.00%	
Jerez de la Frontera	211,900	789	16,489	7,182	77.82	2.09%	
Malaga	567,433	1,477	58,656	24,702	103.37	3.97%	
Seville	702,355	1,181	138,078	0	196.59	11.68%	

c. Provision of cycle training

No information obtained.

d. Programmes + events

No information obtained.

City/Town Level

a. Cycling policies + funding programmes

In 2008, **Vitoria-Gasteiz** adopted a Sustainable Mobility and Public Space Plan that was supplemented in 2010 with a Master Plan for Cyclist Mobility that made bicycle promotion an integral part of the city's transport policy and set the ambitious goal of 15% cycling mode share by 2020. The Master Plan was backed by investment of €22 million.

Seville's new General Urban Ordinance Plan was approved in 2006, and its provisions included the creation of a network of cycle paths for the city. The 'Steering Plan for Fostering Transport by Bicycle in Seville 2007-2010' was subsequently approved in 2007 and included a series of additional development projects, including:

- Construction of a large network of cycle paths, more than 120 km from 2006 to 2009 and
- Implementation of a public cycle hire scheme (SEVici)

A City Council officer, reported in a January 2011 article in 'Cycling Mobility', stated that the cost of the new cycling tracks from 2006-2011 amounted to €32 million.

In 2012, **Barcelona** adopted a new Urban Mobility Plan for 2013-2018. The UMP advocates a series of measures that attach greater importance to walking and cycling, promote the use of public transport and reduce the use of private vehicles. The objective is to improve the quality of the city, road safety and the efficiency of the entire mobility system. The Plan sets out a number of future scenarios, with cycling mode share growth increasing from 1.5% (2011) to between 2.3% and 3.4% (2018). The adopted scenario establishes a target of 2.5%, which is a relatively low total but represents a 67% increase over seven years. The Plan also establishes the ambition that 95% of the city's population would live within 300m of a designated cycle route by 2018, compared with 72% in 2011.

b. Provision of cycling infrastructure

In pursuit of its cycling masterplan, **Vitoria-Gasteiz** embarked on a programme of building dedicated cycle paths. A network of 165 km is planned, of which 135km were built by 2015. Surveys show that the proportion of cyclists using such facilities rose from about 33% in 2011 to about 37% in 2014. The proportion of cycling on pavements and in pedestrian areas dropped markedly over that period (from around 44% to around 26%), largely due to new regulations in 2014 that limit bicycle use in such areas (which were to help maintain the city's large walking mode share - around 54% in both 2011 and 2014). The city also adopted Barcelona's 'Superblock' approach to traffic management, to managing traffic and calming many streets in the city.

The inventory undertaken for the Andalusia Cycling Plan shows that **Seville** had a total length of 142km of cycle tracks in 2012. The growth in the total length of tracks in the city prior to 2012 is reported by SIBUS (Seville University Bicycle Service) as follows:

2004 = 12km; 2006 = 77km; 2008 = 92km; 2010 = 120km

In **Barcelona**, official figures indicate that recent growth in the length of protected bike lanes (mostly using 'light segregation' techniques) is as follows:

2008 = 140.2km; 2009 = 146.8km; 2010 = 159km; 2011 = 181.5km

In **Donostia-San Sebastian**, the growth in the total length of cycle lanes/tracks between 2003 and 2011 is shown in the table below (data from the EU Civitas-Archinedes project report).

Year	New cycle lane km/year	Total cycle network km
2004		19.7
2005	1.0	20.6
2006	4.1	24.7
2007	3.0	27.8
2008	4.9	32.7
2009	6.3	39.0
2010	9.6	48.6
2011	1.4	50.0

c. Provision of cycle training

As part of the package of initiatives ushered in by its 2010 cycling masterplan, **Vitoria-Gasteiz** is implementing cycle training programmes in schools, along the lines of the UK's Bikeability.

d. Programmes + events

No information obtained.

Austria

National Level

a. Cycling policies + funding programmes

The Austrian government launched a Cycling Masterplan in 2006 as a new cycling strategy to provide an impulse to promote cycling in the country. The plan was created to help the implementation of measures through the co-operation of federal, state and local authorities, and other key actors such as businesses, transport companies and NGOs. The masterplan was intended as an important contribution to achieve environmental and health objectives and the quality of life in cities and communities.

The second Cycling Masterplan was launched in 2011.

In 2010 there were around €35m spent on cycling in Austria. According to other data, the federal government invested €22.2m from the budget of the Environment Ministry from 2007-2012, and this triggered triggered investments of €135m for cycling improvements.

b. Provision of cycling infrastructure

No information obtained.

c. Provision of cycle training

No information obtained.

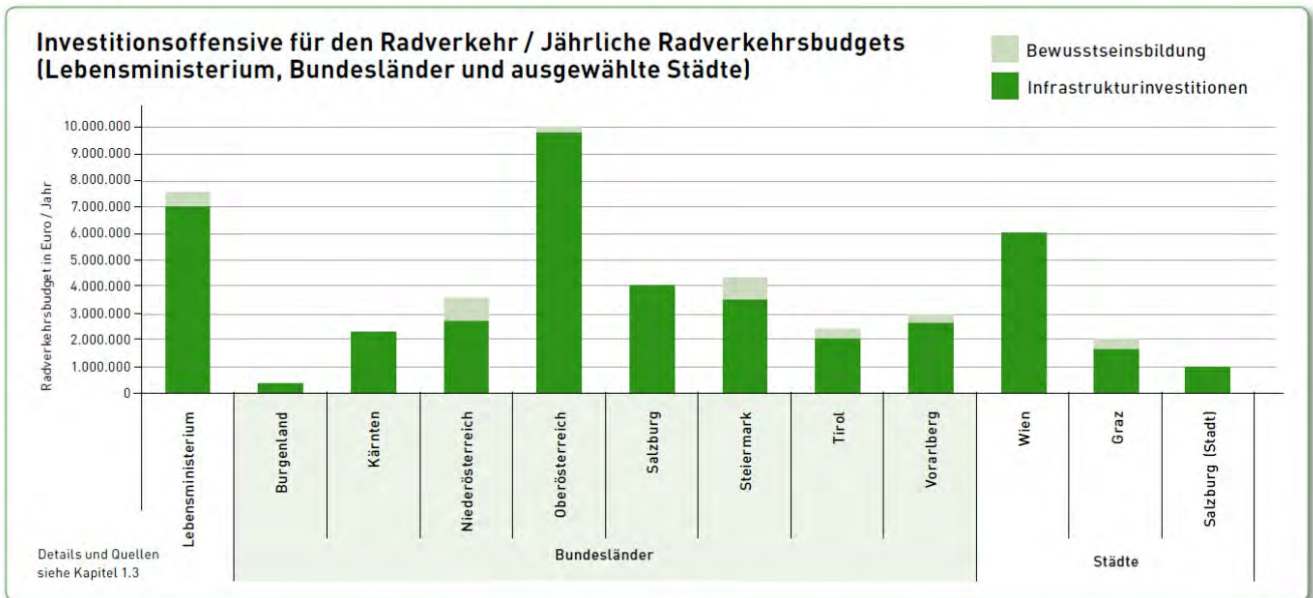
d. Programmes + events

No information obtained.

Regional Level

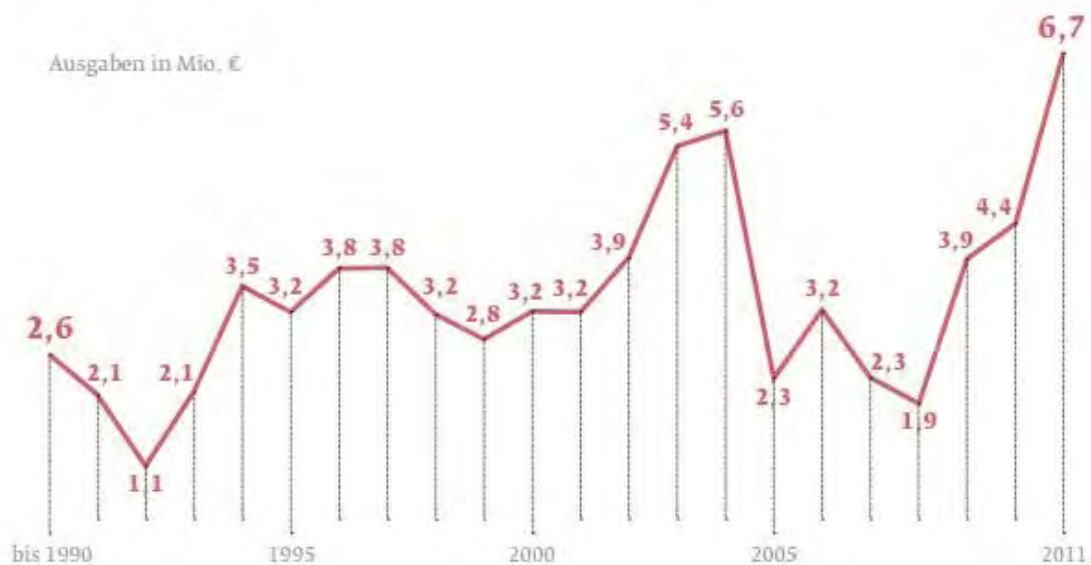
a. Cycling policies + funding programmes

The cycling budget in 2010 for each Austrian region was as shown in the first graph below (columns 2-9). The dark green blue is for infrastructure, and the light green for awareness-raising (figures in EUR). The second graph below shows how annual investment in cycling (in €million) in the **Salzburg Region** has changed between 1990 and 2011.



Jährliche Ausgaben für das Landesradverkehrsnetz, Land Salzburg, 1990–2011

Quelle: Land Salzburg, 2013



b. Provision of cycling infrastructure

In the 'Bicycle Traffic in Numbers' study (published in 2013) the following breakdown of cycle network lengths by region is provided.



c. Provision of cycle training

No information obtained.

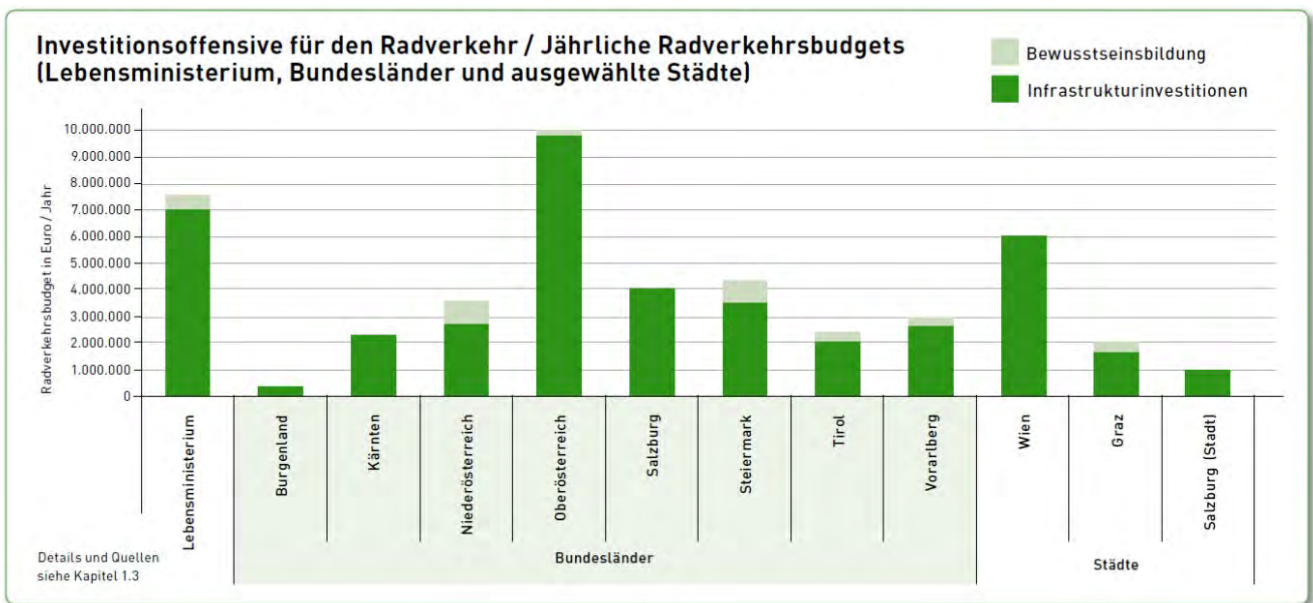
d. Programmes + events

No information obtained.

City/Town Level

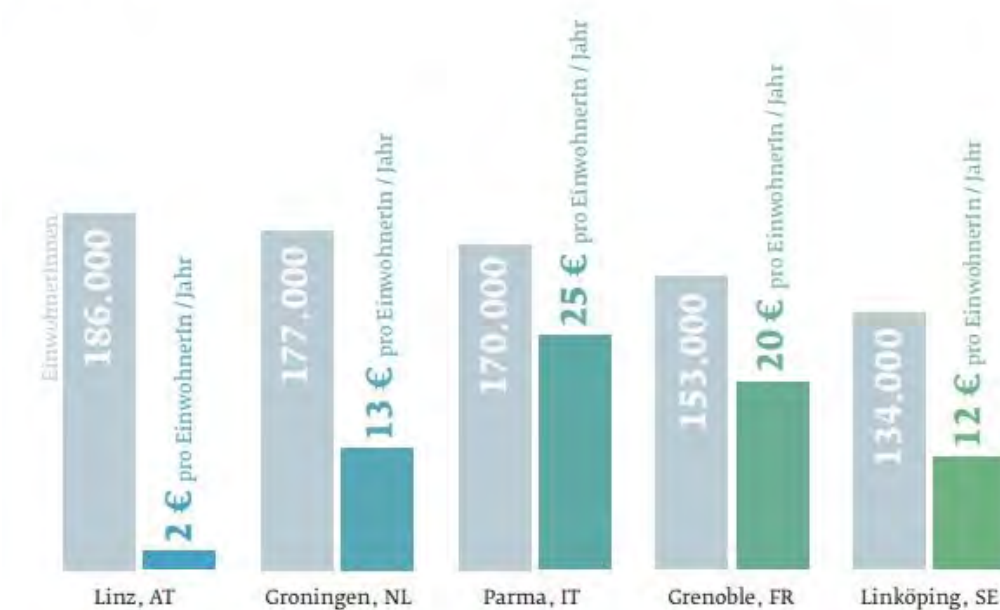
a. Cycling policies + funding programmes

The first graph below shows (last three columns on right), the level of cycling investment in **Vienna**, **Graz** and **Salzburg** in 2010. The second graph below shows 2004 spending on cycling infrastructure per head of population in **Linz**, compared with four other European cities (the column on the left of each pair is city population).



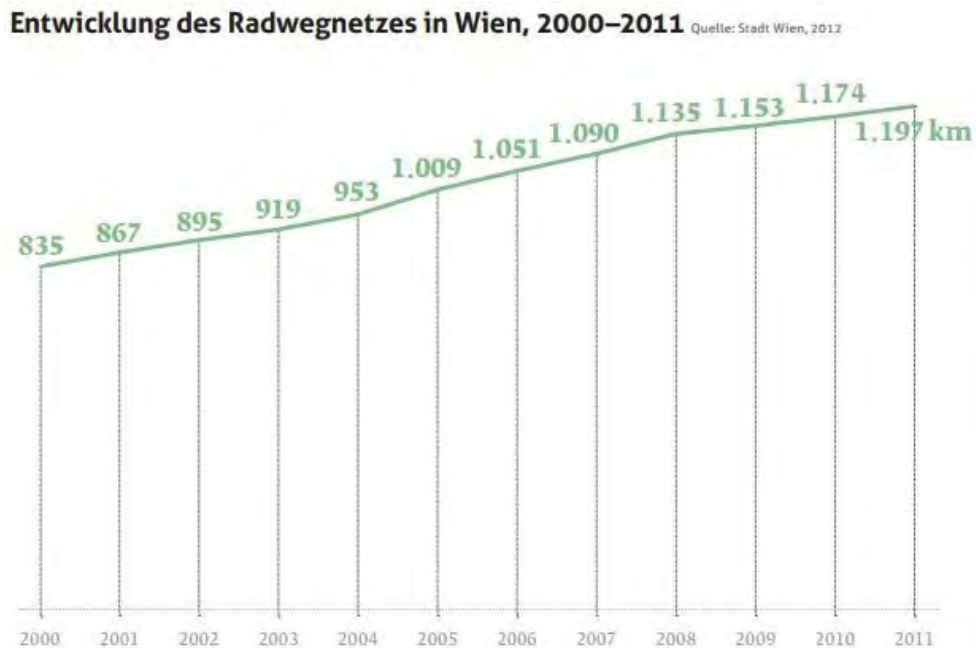
Investitionen in die Radinfrastruktur in vergleichbaren europäischen Städten

Quelle: Beurle/Prieler, 2004

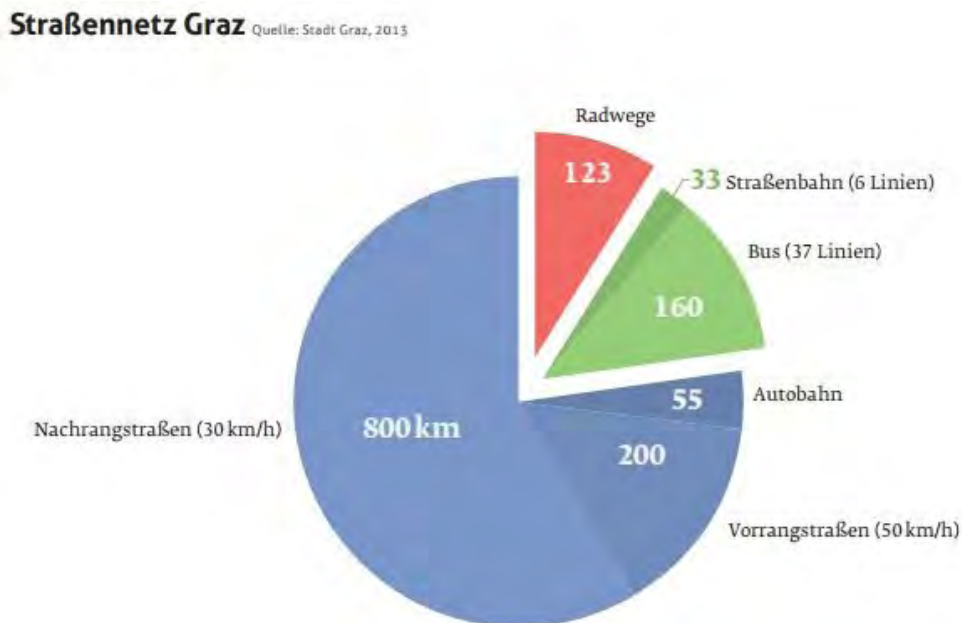


b. Provision of cycling infrastructure

Growth in the total length of cycle paths in **Vienna** from 2000-2011 is shown in the following graph.



According to the following chart, there were 123 km of cycle paths (red section) in **Graz** in 2013.



c. Provision of cycle training

No information obtained.

d. Programmes + events

No information obtained.

03 COMMON TRENDS

From Causes to Effects

Taking account of the large volume and wide range of different types of data presented in the previous two chapters, undertaking a detailed, forensic analysis is not possible in the context of this particular study. It is, any case, arguable if such analysis would be a profitable exercise. Both this study and the International Cycling Infrastructure Best Practice Study that Urban Movement undertook for Transport for London in 2013 show that even the richest datasets for single places cannot establish cause-effect relationships in the form of 'Quantity X of Action A will achieve Quantity Y of Change B'.

There is also the matter that different countries, regions and cities have, for various reasons, done different things to grow cycling having had, amongst other things, different starting points, political priorities and timescales for action.

Therefore, rather than trying to establish patterns for each country, and then attempt a detailed synthesis, this report focuses on identifying the common trends that are supported by most datasets, if not all, whatever the country, region or city.

Taking this approach, a clear cause-effect pattern has emerged, involving a sequential relationship between the following elements:

- a. Political commitment (leads to)
- b. Funding for cycling (leads to)
- c. Provision of better infrastructure (leads to)
- d. Increase in the amount and mode share of cycling.

Causes

In terms of the four causal factors that this study focused on, the following detail can be added.

• Cycling policies + funding programmes

The evidence indicates that a pro-cycling policy is an essential pre-condition to seeing change on the ground. However, well-worded policy alone does not deliver the change; it needs to be backed by significant funding, principally in physical measures. Although this may be because this study was tasked with looking specifically at cycling, little evidence emerged of authorities having joint walking and cycling policies.

• Provision of cycling infrastructure

Data on infrastructure tends to be limited to measures that it's simple to enumerate; typically lengths of cycle lanes/tracks. Traffic management measures - e.g. filtering permeability, slow speed zones - are rarely mentioned other than in general terms. Although it is not always easy to determine the quality of the measures installed, it is, nevertheless, possible to trace a positive general relationship between the length of cycle lanes/tracks and the amount of cycling.

• Provision of cycle training

Education and training is almost always part of the overall approach to growing and maintaining cycling in places where high levels of cycling, or clear growth in cycling over time, is found. No studies were found that established any direct relationship between the amount or quality of cycle training and the cycling mode share.

• Programmes + events

Significant cycling promotional programmes tend to be pursued by cities that are serious about growing cycling, and less by those where cycling levels are already high. The more comprehensive programmes are generally the work of cities that also have strong pro-cycling policies and funding regimes, and they do seem to engage the population at large. No clear relationship between promotional activities, in isolation, and change in people's long-term travel habits can be observed in the available data.

Effects

In terms of the four principal effects that this study focused on, the following detail can be added.

• Mode share + distance travelled

The evidence points to a fairly clear relationship between mode share and the quality of conditions for cycling. However, measures of distance cycled (e.g. total km/year or average km/person/year) are less reliable indicators. Some datasets show variance in both mode share and distance cycled over the same time periods, and these tell different stories in terms of increase/no change/decrease. Since distance cycled can obviously rise because the same number of people go further, this measure should be treated with caution when used to assert growth in the popularity of cycling.

• Bike ownership

While bike ownership levels are a simple and useful measure of the popularity of cycling, they are secondary to mode share, which is the primary indicator for determining what cycling effects have arisen from the causal factors. The available data indicates that higher bike ownership levels are associated with a higher cycling mode share, but does not enable any clear relationship between ownership levels and any causal factors to be asserted.

• Age + gender

The amount and quality of data on age and gender related to cycling is generally poor. What data there is tends to suggest that the proportion of women and both younger and older people in the cycling population is more representative of the population at large where the cycling mode share is highest (i.e. where conditions for cycling are found conducive by more people).

• Exposure to injury

The amount and quality of data on exposure to injury for cyclists is generally poor. What data there is generally suggests that exposure is lower in countries where there is more cycling.

However, while such a relationship (even though it may only be tentative) is sometimes used to assert that there is 'safety in numbers', it is important to remember that other data more clearly indicate that increases in 'numbers' are themselves the result of people finding cycling conditions to be better (including safer). It follows that cycling does not so much become more safe when there are more cyclists as that there are more cyclists when cycling becomes more safe.

Note that, should a reduced level of exposure to injury while cycling nevertheless still be a higher level than that for travel by other modes, this could be used to argue against a policy of growing cycling. Clearly, this is an area where further research would be beneficial, and where the broader health benefits of active travel, as well as cycling's contribution to other policy goals, should be brought under consideration.

04 LESSONS for SCOTLAND

- **A clear pro-cycling policy is an essential prerequisite for positive change**

This lesson, which is clear from the research, has been underlined by recent and separate piece of work by ECF to explore the relationship between where a nation is ranked on the latest ECF Cycling Barometer and whether or not it has (or has had) an adopted national cycle policy/strategy/plan. The headline findings were that all countries with a national cycling policy rank among the better performing countries (except Ireland), and that no country without a current or past national cycling strategy is in the upper half of the Cycling Barometer ranking.

- **The key measure of practical commitment to a pro-cycling policy is found in the funding support for cycling**

A pro-cycling policy must be supported by substantial investment pro-cycling measures, if the objectives are to be achieved; recognising that investment in improving conditions for cycling can often be part of complex budgets, and therefore hard to disaggregate.

As a guide, the ECF has calculated that each 1% increase in cycling mode share requires an average of a €0.8 per person per year. The 2010 figure for the Netherlands was around €25/head, for a 27% mode share; which compares with the current UK figure of around €2.4/head for a 2% mode share.

- **Provision of better physical conditions for cycling is key to growing levels of cycling substantially**

The evidence strongly indicates that, to grow cycling appreciably, the primary investment focus should be on enabling cycling through changing the physical environment (e.g. providing protected cycle tracks and/or managing motor traffic). Measures to encourage cycling (e.g. through training and promotion) should also be part of the package (see below).

- **Training for school-age children is an important part of the package for growing/maintaining cycling**

If the Netherlands considers it worthwhile to invest in ensuring school age children receive a programme of cycling education and training over many years - and it does - then that is probably lesson enough for Scotland. That the same is also true of Denmark emphasises the point. However, as both these countries and others demonstrate, cycle training - while an important tool in growing cycling - is not a substitute for physical measures to make cycling both be and seem safer.

- **Mode share is the most reliable indicator of cycling's popularity**

A number of measures are used to communicate how the amount of cycling changes over time and to compare success in growing cycling. Measures based on distance travelled must be understood in the context of other factors, like population growth, or the extent to which increases are due to the same people cycling further. Mode share is the most reliable single indicator of whether more people are cycling for more journeys; and therefore of the success of any pro-cycling policy.

(N.B. There are differences in how walking as main-mode is assessed. So, in comparing cycling mode share datasets, it is important to check that walking has been treated consistently.)

- **While targets are helpful, these should be set intelligently**

In any country, the national mode share for cycling will always be lower than the mode share in the best regions or cities. This in turn suggests that the national aspiration for cycling in Scotland should be lower than that for the best cities; which in turn indicates that cycling target-setting should be reviewed at a local level. Any mode share target should be based on the current mode share; and although ambitious targets can help drive positive change, it is important that these are not set unfeasibly high.

- Efforts to grow cycling from a low base will be most effective when targeted on relatively short journeys

It is no surprise to observe that the highest cycling mode share data is found in cities and towns where a very large number and wide range of journey types involve trip lengths of no more than around 5 miles (8 km). These are the distances for which cycling is most competitive with motorised modes in terms of journey times, and which most people tend to consider achievable on bike with no more than a modest amount of physical effort and with no need to change clothes. This is another factor that has implications for how cycling targets should be set and how funding on physical measures should be focused to maximise the return on investment.

APPENDIX REFERENCE DOCUMENTS

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