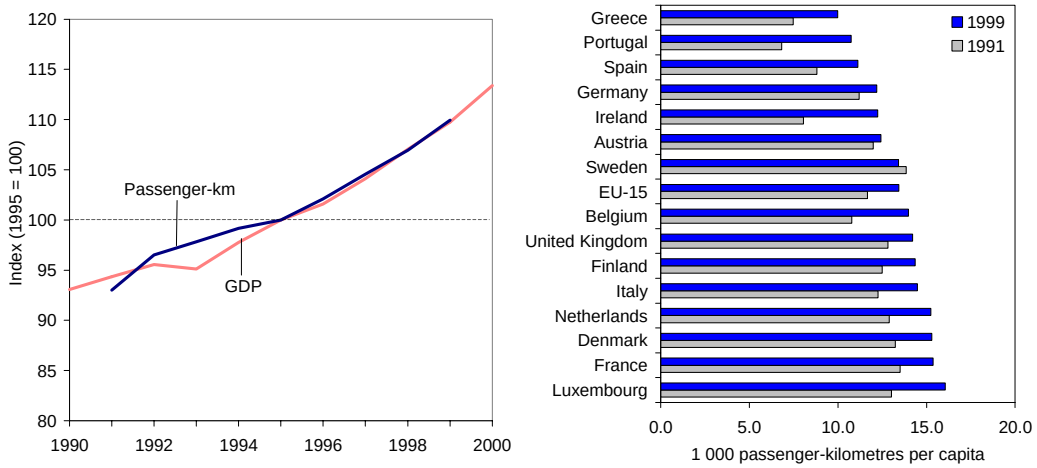
Indicator fact sheet

TERM 2002 12 EU — Passenger transport demand by mode and purpose

☹ **Passenger transport (in terms of passenger-kilometres) grew at the same pace as GDP between 1991 and 1999 and has therefore not yet moved towards the objective of decoupling economic development and passenger transport demand. The share of the more environment friendly modes (bus/coach, rail and tram/metro) declined slightly. Certain countries are showing some progress in shifting transport flows away from cars and domestic aviation.**

Figure 1: Passenger transport demand and GDP (EU)



NB: Passenger transport (passenger-kilometres) includes car, bus/coach, rail, tram/metro and domestic, intra- and extra-European aviation. GDP based on US dollars in constant 1995 prices.

Source: Eurostat, 2002.

Results and assessment

Policy relevance

The European Commission has set itself the following objectives to achieve sustainable transport:

- reduce the link between economic growth and passenger transport demand ('decoupling');
- shift transport use from road to rail, water and public passenger transport (SDS);
- bring back the shares of alternative modes (rail, water and public passenger transport) to their 1998 levels by 2010 and thus make for a shift of balance from 2010 onwards (White Paper).

Policy context

In its sustainable development strategy (European Commission, 2001a), endorsed by the European Council meeting in Gothenburg (European Council, 2001), the EU has set itself the abovementioned objectives. In the White Paper on the common transport policy (CTP) 'European transport policy for 2010: time to decide' (European Commission, 2001b), the Commission proposes various measures to reach these objectives. The proposed action programme aims mainly at stabilising the modal shares at 1998 levels by 2010. The White Paper suggests that this would also result in the decoupling of transport growth (in terms of

vehicle-kilometres) and GDP. However, no evaluation has been made of the effectiveness of the proposed measures, nor of their environmental gains.

To shift passenger transport flows towards alternative modes, the CTP proposes the following measures.

- Revitalise alternative modes, in particular rail — The recently adopted railway package (European Commission, 2002a), aimed at creating an interoperable high-speed and conventional railway network, is the latest development in this field.
- Make targeted investments in the trans-European network — With the revision of the trans-European network (TEN) guidelines, the Commission proposes concentrating investment on the creation of a dedicated rail freight network, the development of a high-speed rail network and the integration of air and rail (European Commission, 2001c). Moreover, the Commission proposes to raise the maximum Community funding for 'crucial' projects to 20 %. These 'crucial' projects might include rail projects crossing natural barriers (like, for example, the Pyrenees) and projects (all modes) in frontier regions of the candidate countries.
- Introduce fair and efficient pricing — Internalising the external costs of transport should encourage the use of modes with a lesser environmental impact. The revenues raised, which are higher than the costs of infrastructure use, can be used for investments in the development of new (environment friendly) infrastructure.

Along the lines of the CTP, the Commission is promoting the development of clean urban transport in the following ways.

- Reforming the European regulatory framework for public transport, introducing Community-wide true competition in public transport, establishing an explicit obligation for authorities to ensure sufficient public transport services and at the same time creating opportunities for modern public transport services to develop.
- The citizen's network, which grew out of the 1995 Green Paper (European Commission, 1995) is a programme specifically aimed at promotion and development of alternative means of urban transport. The ELTIS database (European local transport information service), an interactive guide to current transport measures, policies and practices, is one of the results of this citizen's network (www.eltis.org).
- Initiating Civitas (City–Vitality–Sustainability), which provides funding for cities experimenting with the development of urban transport to encourage competitive alternatives to cars in city centres and to combat growing congestion and pollution (European Commission, 2000b). The Civitas initiative will support the best-integrated and innovative proposals put forward by European cities.

At Member State level, several countries have developed policies and targets related to passenger transport:

- The Dutch national traffic and transportation plan (V & W, 2000), which is under development, aims to develop an efficient, safe and sustainable transport system by introducing a kilometre-based pricing mechanism before 2010, using existing infrastructure more efficiently and improving the quality of infrastructure for cycling;
- The Danish Government's transport policy paper 'Transport 2005' (Danish Ministry of Transport, 1996) aims to transfer 4 % of passenger-kilometres from motorised vehicles to bicycles and walking by 2005.

Environmental context

Transport is one of the main sources of greenhouse gases and also gives rise to significant air pollution. Passenger transport (in terms of passenger-kilometres) and freight transport (in terms of tonne-kilometres, see TERM 2002 13 EU — Freight transport demand by mode) are indicators for total transport volumes. Therefore, this indicator is linked with combating climate change and the protection of human health and natural resources, priorities of the sustainable development strategy (European Commission, 2001a; European Council, 2001).

The relevance of the modal split in passenger transport is due to differences in environmental performance of transport modes (see TERM 2002 28 EU — Specific emissions). In general, bus/coach, rail, tram/metro (together referred to as public transport), inland waterways, walking and cycling are considered to be the more environment friendly transport modes, as (in general) these modes consume less energy and emit less pollutants per passenger kilometre.

NB: Shifting passengers away from the less environment friendly modes of transport to the more environment friendly modes of transport will benefit the environment, provided that total transport volumes remain the same. However, there are signs that the overlap between the different transport markets (e.g. rail and cars, high-speed rail and intra-European aviation) is limited, meaning that the availability in a specific region of transport mode alternatives to car and air transport (i.e. rail, high-speed rail, as well as urban trams, metros, etc.) will generate additional traffic, instead of shifting existing traffic to another mode. Hence, looking at the modal split in passenger transport only makes sense when total transport volumes are considered simultaneously, preferably even specified by different geographical areas (city centres, urban areas, rural areas, inter-city, intra-European and extra-European transport).

The number of vehicle-kilometres by mode would complete the overall picture transport volumes and the environmental problems arising from it. However, only very limited and low-quality data are available. Data on the number of passenger-kilometres by foot and bicycle are also limited. Such data would provide valuable information if they could be combined with passenger transport statistics at urban level.

Assessment

The total number of passenger-kilometres travelled in the EU ([1]) increased from 4 268 billion in 1991 to more than 5 000 billion in 1999, an 18 % increase or an average of 2.1 % per year, outstripping that of GDP (1.9 % increase per annum). Instead of growing more rapidly than GDP, passenger transport growth has been in line with economic growth since 1995.

There are several factors underlying the strong linkage between passenger transport demand and economic growth and hence the continuing growth of passenger-kilometres.

- The main factor is growing incomes and the fact that people spend more or less the same share of their disposable income on transport (around 11–12 % in the period 1980–97). Additional travel budget allows more often, faster (thus further) and more luxurious travelling. Indeed, the average daily distance travelled by EU citizens has steadily increased (from 32 km in 1991 to 37 km in 1999), and passenger car and aviation (both fast and luxurious) are the fastest growing modes of transport.
- Another major component of the growth of passenger traffic is increasing travel distances (which is made possible due to improved infrastructure) to destinations like work, shops, schools and leisure activities. These distances are increasing because origins and destinations (residential areas, industrial areas, shops, hospitals and schools) are being located further apart due to ill spatial planning while, at the same time, people are able to live further apart from these locations (‘urban sprawl’). Additionally, easy accessibility has not only reduced travelling times, but also induced additional transport, since more distant destinations can be reached within the same amount of time (see also TERM 2002 15 EU — Regional accessibility and market cohesion (Box ‘The two-way argument’)).

Passenger car and air transport are by far the fastest growing modes. Car transport caused 74 % of the increase in passenger transport demand between 1998 and 1999, air transport 24 %. Over the whole period (1991–99) car transport has grown on average by 1.8 % per year, air transport by 6.9 % per year. The more environment friendly modes had the lowest growth rates between 1991 and 1999: rail (1.0 % per year), tram/metro (0.6 % per year) and bus/coach (0.3 %). Waterborne transport and in particular cycling are two alternative modes showing a relatively strong growth with 1.1 % and 1.3 % respectively between 1994 and 1999.

Passenger car transport per capita grew drastically in Greece, Portugal and Ireland, corresponding with the high increases in car ownership (see TERM 2002 32 EU — Size of the

([1]) Including passenger cars, bus/coach, rail, tram/metro, and domestic, intra- and extra-European aviation. Excluding motorcycles, waterborne, walking and cycling.

vehicle fleet). In spite of the generally strong link between car ownership and passenger transport by car, growing car ownership does not entail more car usage in all countries: in Finland, the Netherlands and Spain, car ownership grew substantially faster than passenger-kilometres by car. In Austria and Sweden, passenger-kilometres by car even decreased with growing car ownership.

The limited data available on the number of vehicle-kilometres by passenger cars ([2]) shows that the number of passenger-kilometres grew less fast than that of vehicle-kilometres in the early 1990s, suggesting dropping occupancy rates (see also TERM 2002 29 EU — Occupancy rates of passesnger vehicles). From 1995 onwards, however, the number of vehicle-kilometres closely followed that of passenger-kilometres. Since the number of passenger-kilometres is estimated, based on *inter alia* vehicle-kilometres, not much can be concluded from these figures.

Motorcycle transport grew on average by 3.2 % between 1995 and 1998 (longer time series are not available), which is even faster than car transport. Its importance remains, however, relatively low compared with that of cars (3.5 % in total private road transport).

The highest per capita demand for air passenger transport in 1999 was in the Netherlands and the United Kingdom (more than 3 600 and 2 000 passenger-km per capita, respectively), mainly because of the high competitiveness of Schiphol Airport and London Heathrow serving inter-continental flights, which account for 87 and 80 % of the per capita demand respectively. Note that this international air transport demand cannot be solely attributed to the UK and the Netherlands, as much of this transport activity is related to the transfer of passengers. Sweden, Spain, Denmark and Finland all show high domestic air transport demand, which is related to the countries' geographical sizes (Spain, Sweden and Finland) and shape (Denmark).

The number of passenger-kilometres travelled by rail in the EU increased on average by 1.0 % per year, though this rate has grown in more recent years. Passenger-kilometres per capita by rail decreased in Greece and Portugal (linked to the high increase of car ownership), Italy, Austria and The Netherlands.

Waterborne passenger transport remains relatively small compared to the other modes. Per capita passenger transportation by water is high in the Scandinavian countries, Greece and Ireland, as a result of geographical position and long coastlines.

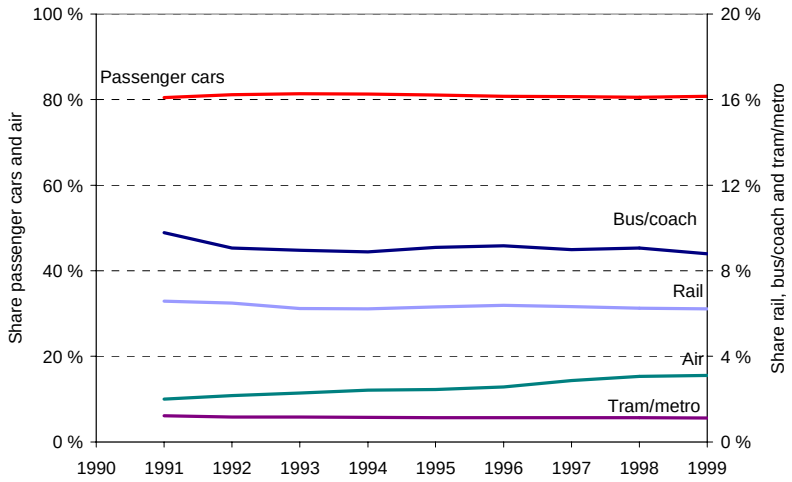
Passenger-kilometres by foot and bicycle have remained stable. On average, a European walks around 1.0–1.4 km per day. Variation in bicycle usage is much greater, from an average of 100 metres per person a day in Greece, Portugal and Spain to 2.3 and 2.6 km in The Netherlands and Denmark, respectively.

Sub-indicator: Modal shares

⊗ **Passenger transport continues be dominated by cars, with 81 % of total passenger-kilometres in EU-15, but domestic and intra-EU air transport is now the fastest growing mode. The share of the more environment friendly modes (bus/coach, rail and tram/metro) declined from 17.6 % to 16.1 %. However, in Spain, Luxembourg, Austria, Sweden and the United Kingdom, the share of passenger car and domestic air transport decreased between 1991 and 1999.**

([2]) Data is available only for Belgium, Denmark, France, Portugal, Finland, Sweden and the UK, 1990–98.

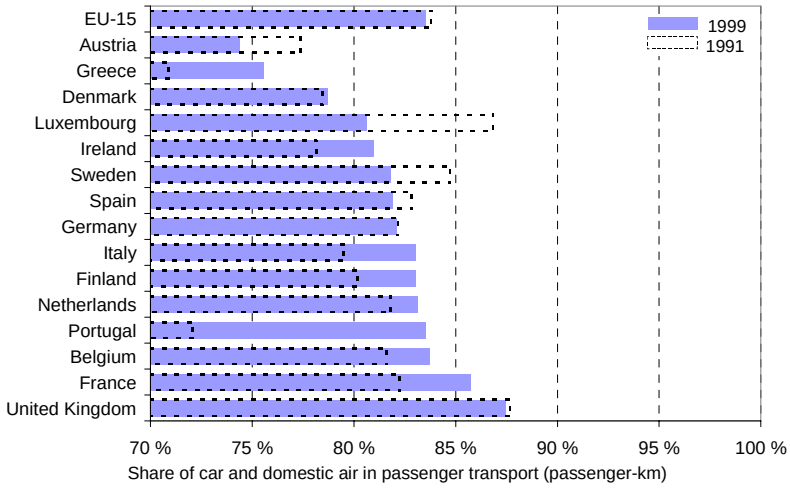
Figure 2: Modal shares of passenger transport demand (EU) — including domestic and intra-EU aviation



NB: Shares based on passenger-kilometres. Air includes domestic and intra-European only, since no mode shift on a European level is reasonably possible on extra-European flights.

Source: Eurostat, 2002.

Figure 3: Share of passenger car and domestic air transport in 1991 (dashed) and 1999 (coloured) in Member States



NB: Shares based on passenger-kilometres. Air includes domestic only, since no mode shift on country level is reasonably possible on intra- or extra-European flights.

Source: Eurostat, 2002.

Assessment for the sub-indicator

The share of passenger cars remained more or less stable (at around 80–81 %), but the share of domestic and intra-European aviation increased from 2.0 % to 3.1 % ([3]), resulting in an increase of share of the less environment friendly modes from 82.4 % to 83.9 %. The shares of bus/coach, tram/metro and rail all decreased to 9 %, 1 % and 6 % respectively in 1999, hence in total from a 17.6 % to a 16.1 % share.

On a more detailed country level (excluding intra-and extra-European aviation, since this cannot be subject of modal shift), the modal share of passenger car and domestic air transport decreased in five Member States between 1991 and 1999: Spain, Luxembourg,

([3]) When extra-European air transport is included, the share of passenger car transport decreased from 77 % to 75 %, while total aviation increased its share from 6 % to 10 %. Either way, the more environment friendly modes lost in share.

Austria, Sweden and the United Kingdom. This suggests that, in these countries, progress has been made with shifting transport flows to the more environment friendly modes of transport.

The main underlying factors for the generally observed shift towards private transport are listed below.

- Private transport is (outside urban areas) generally faster, more flexible and considered more luxurious than public transport, as the car is seen as a symbol of wealth.
- Inefficient pricing (i.e. not reflecting all costs to society and the environment) has made private and (to a lesser extent) public transport relatively cheap. Moreover, price structures (based on annual vehicle taxes rather than real vehicle usage) have made the perceived costs of passenger car use lower than those of public transport.
- The process of 'urban sprawl' leads to increasing distances between residents and basic services (see TERM 2001 14 EU — Access to basic services), which are often primarily linked with roads. Investments are directed mainly towards roads as a response to traffic bottlenecks, occurring possibly because of urban sprawl. Walking and cycling facilities are often less developed or ill-adapted to newly emerging urban patterns. Even though public transportation is often well developed in the central parts of urban areas — and competitive with cars — this is generally not the case in the outskirts, where public transport is much less accessible. As a consequence, accessibility to basic services by public transport, cycling or walking decreases. This leads to more car usage and subsequent traffic bottlenecks. As a response, more road infrastructure is developed, which closes the vicious circle.
- Rising transport budgets resulting from increasing personal incomes have led mainly to increased leisure travel. The car is by far the favourite means of inter-urban transport because of the poorer accessibility of public transport systems. The continuing fall in airfares has made rail transport less favoured for longer distances. Besides, rail connections between cities are still much slower if they include border-crossings. High-speed rail lines are developing quickly to compete with air transport, but, without fair pricing of air transport, its growth may continue to outpace growth in long-distance rail transport. High-speed rail connections will then generate more passenger-kilometres, only because they offer a relatively cheap way of travelling between cities.

Cycling and walking have the potential to increase their modal share at the expense of cars, especially in urban regions. Half of all car trips are for less than 6 km, for which cycling is often faster than driving (in urban areas); 10 % are for less than 1 km, an ideal walking distance (European Commission, 2001e). The argument that cycling is a lot more dangerous than driving a car is not valid for those aged between 18 and 50 (see TERM 2002 09 EU — Transport accident fatalities).

Congestion has the potential to shift passengers from road to public transport, especially in urban areas, provided that public transport is sufficiently available and is not affected by congestion.

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Data

Table 1: Passenger transport demand per capita by air in 1999

Unit: passenger-kilometres per person

	Domestic	Intra-European	Extra-European
Austria	0	290	684
Belgium	–	639	1 096
Denmark	246	471	423
Finland	233	658	609
France	156	159	1 104
Germany	69	204	777
Greece	102	309	380
Ireland	19	724	1 258
Italy	122	126	388
Luxembourg	–	1 380	465
Netherlands	–	471	3 207
Portugal	124	350	463
Spain	291	201	505
Sweden	367	702	629
United Kingdom	82	317	1 642
EU-15	**123**	**262**	**960**

Source: Eurostat, 2002.

Table 2: Shares of modes in passenger transport demand in 1999

Unit: % shares in passenger-kilometres (modes included are the modes listed)

	Car	Bus/coach	Tram/metro	Rail	Domestic aviation
Austria	74	14	3	9	0
Belgium	84	10	1	6	0
Denmark	77	15	2	5	2
Finland	81	11	1	5	2
France	85	5	1	8	1
Germany	82	8	2	8	1
Greece	75	22	1	2	1
Ireland	81	15	0	4	0
Italy	82	11	1	5	1
Luxembourg	81	15	0	5	0
Netherlands	83	8	1	8	0
Portugal	82	12	1	4	1
Spain	79	12	1	5	3
Sweden	79	10	1	7	3
United Kingdom	87	6	1	5	1
EU-15	**83**	**9**	**1**	**6**	**1**

Source: Eurostat, 2002.

File: TERM 2002 12 EU — Passenger transport.xls

Metadata

Technical information

1. Data source:

   Passenger-kilometres from the *Eurostat statistical compendium* (Eurostat).

   GDP and population from Eurostat. File: TERM 2002 00 EU+AC — Basedata.xls.

   Trip length from the and Energy and Transport DG pocketbook 2000 (European Commission, 2001e).

2. Description of data:

   Data contains the number of passenger-kilometres by private cars, buses and coaches, rail, tram/metro, domestic, intra- and extra-European aviation. Data on motorcycles, waterborne, walking and cycling are limited. Passenger-kilometres: unit of measurement representing the transport of one passenger over one kilometre (the distance to be taken into consideration is the distance actually run).

   NB: Aviation includes domestic, intra- and extra-EU, based on principal air carriers only. Therefore, aviation data (and corresponding share) is higher than the data used in, for example, the Energy and Transport DG pocketbook.

   GDP: gross domestic product in constant 1995 prices (billion US dollars).

3. Geographical coverage:

   EU-15 (Belgium, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, the Netherlands, Austria, Portugal, Finland, Sweden and the United Kingdom).

4. Temporal coverage:

   1991–99.

5. Methodology and frequency of data collection:

   Passenger-kilometres by mode: annually collected by a common questionnaire developed jointly by Eurostat, UNECE and ECMT.

   Data on trips are based on the results of national mobility surveys. Eight EU countries carried out passenger mobility surveys in the 1990s (continuous/regular surveys: Denmark, Netherlands, Sweden and the United Kingdom; periodic surveys: Germany; other surveys: France, Austria and Finland).

6. Methodology of data manipulation, including making ‘early estimates’: None.

Quality information

7. Strength and weakness (at data level):

   The data on passenger-kilometres are calculated rather than directly measured. However, since the same methodology has been used for many years, the trends give a good indication of the passenger transport demand.

8. Reliability, accuracy, robustness, uncertainty (at data level):

   Data is considered to be fairly reliable and consistent.

9. Overall scoring (give 1 to 3 points: 1 = no major problems, 3 = major reservations): 2

   Relevancy: 2 (Vehicle-kilometres provides a better unit of measurement, since it is more directly linked to the environmental impact of transport movements.)
   Accuracy: 3 (Passenger-kilometres figures are estimated (more uncertainty for cars than for bus/trains, etc.) rather than measured and vary by source (Eurostat, ECMT, UNECE, etc.).)
   Comparability over time: 1
   Comparability over space: 1

Further work required

Further work is needed to develop reliable and comparable statistics on vehicle-kilometres used for passenger transport, since such data are closer connected to the environmental consequences of transport and might reveal evolution of occupancy rates.

Shifting passenger transport flows towards more environment friendly modes in urban or rural areas or for local or international trips requires different policy approaches. It would therefore be valuable to be able to monitor the modal split for these specific areas and trips. In this context, the inclusion of non-motorised modes (walking and cycling) would be valuable.

Currently, tourism and business air travelling cannot be separated. Since air transport is the fastest growing mode, it would be valuable if estimations became available on the share of tourism in air transport. More generally, regular surveys regarding travel purposes can reveal valuable information for policy-makers.

Box 1: Travel purpose

No EU-wide data are available on travel purpose. Moreover, the definition of travel purpose is often unclear. In some statistics (Eurostat), a distinction is made between travelling for leisure and for visiting friends, which could be included in travelling for leisure. Some countries count commuting as business travelling, while others keep separate statistics for commuting and business travelling. Tourism is often related to leisure travelling, but can also include business travelling (WTO, 2000).

Estimates based on the results of national mobility surveys in Denmark, Germany, France, the Netherlands, Austria, Finland, Sweden and the UK indicate that of all trips in the 1990s (European Commission, 2001e):

- 40 % were for leisure;
- 30 % were commuting;
- 20 % were for shopping.

Tourism is perhaps the most important travel purpose, particularly for the number of passenger-kilometres (most of which results from long-distance trips). Tourism is the fastest growing sector in the world.

Sources: WTO, 2000; European Commission, 2001d.

Box 2: Short car trips and walking and cycling trips

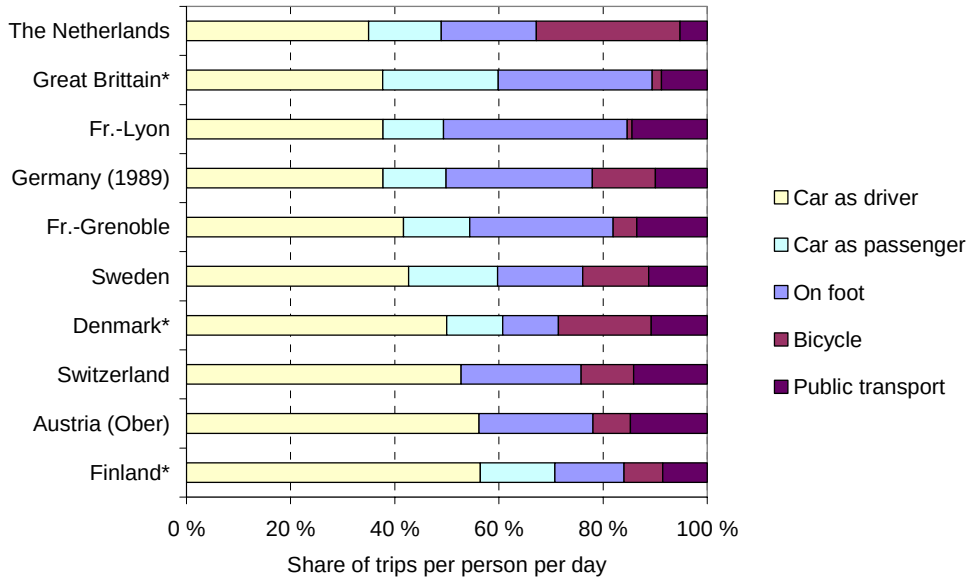
The average European makes about three trips per day. In most countries, the average number of walking trips is between 0.5 and 1 trip per day, and cycle trips between 2 and 2.5. Most trips are 1 km or less for walkers and 3–5 km for cyclists, although this differs between countries. The share of cycling in Europe is around 5–10 % of all trips, with much higher rates in the Netherlands (29 %) and Denmark (17 %).

Many car trips are quite short; a change from car to walking or cycling for trips shorter than 3–5 km could replace half of all car trips in many European cities. Trip chains (a sequence of trips to travel between origin and destination) could only explain some of the car use on short trips. There are important differences between men and women, young and old, car-owners and those without a car, workers and non-workers.

Some other findings about walking and cycling are listed below.

- Walking and cycling are often done as a purpose in themselves.
- Women walk more than men.
- People working part-time make most trips.
- The larger the city, the more people walk.

Figure 4: Modal split of all trips in nine European countries



NB: Share based on number of trips. Denmark Finland and Great Britain based on trips longer than 200–500 metres.

Source: European Commission, 2000d.