Urban Transport Benchmarking Initiative Year Three

Year Three Final Report

Urban Transport Benchmarking Initiative

July 2006

Transport & Travel Research Ltd

THE REGIONAL ENVIRONMENTAL CENTER for Central and Eastern Europe

The Urban Transport Benchmarking Initiative

Year three final report

Prepared for

European Commission
Directorate General for Energy and Transport

by

Author(s)	Neil Taylor
Quality Control	Sarah Clifford
Project Manager	Kieran Holmes
Project Number	L/05/256
Version	Final
Date	31st July 2006
File location	\\Ttr01\company\TTR PROJECTS\CURRENT PROJECTS\EC Benchmarking Year 3\Technical\Project Reports - Year Three\A0 Final Report
Last edited	31/07/2006

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0. EXECUTIVE SUMMARY

0.1 Background

This document is the final report of the third year of the Urban Transport Benchmarking Initiative. The report provides an overview of year three of the project and summarises the headline results from the benchmarking activities. This document is supported by full reports of each of the four thematic working groups and the findings from the common indicators, which were collected by all participants in the initiative.

Year three of the Urban Transport Benchmarking Initiative was launched in September 2005 and the themed working groups established during the first two years of the initiative continued to evolve their chosen topics based upon the following themes; Behavioural & Social Issues in Public Transport, Urban Transport for Disabled People, Cycling, Demand Management, and Public Transport Organisation and Policy. Unfortunately due to insufficient interest from participating cities, the Demand Management group ceased its activities in February 2006 and was not replaced due to the advanced stage of the project. However additional activities were undertaken during year three of the Urban Transport Benchmarking Initiative including a joint working group report focusing upon 'Interesting Practice at Interchanges', while the most innovative good practices from all three years of the Urban Transport Benchmarking Initiative have been summarised into a 'Good Practice Case Study handbook'.

Each of the working groups attended three site visits during year three of the benchmarking initiative, with a total of 9 different cities being visited by the working groups. The site visits organised during year three were held in; Mälmo, Rotterdam, Santander, Hasselt, Berlin, Nottingham, Brussels, Paris and The Hague. As in previous rounds of the benchmarking initiative, these site visits were used partially to provide meeting time for the working groups in which the participants discussed progress in the benchmarking process and planned the next phases of development, as well as allowing the participants to focus upon the good practices evident in the cities being visited. The site visits held in Santander and The Hague were jointly attended by the Behavioural & Social Issues in Urban Transport and Cycling working groups as part of the groups' formal joint working in year three of the project. The outcomes of these joint meetings have been reported in each of the working group reports (Annex A2 and A3) and the jointly produced Interchange Report (Annex A6), which support this document.

0.2 Common Indicator Findings

A total of 25 different cities and regions participated in the third year of the Urban Transport Benchmarking Initiative and 15 cities submitted common indicator data. Including the data obtained from PLUME benchmarking cities and the cities involved in the first two years of the Urban Transport Benchmarking initiative, a total of 45 sets of common indicator data have been collected. The data were analysed by the project team in order to highlight interesting comparisons and identify key trends. The detailed findings of the common indicator analysis are included in the common indicator report in Annex A1 and a number of policy implications have been outlined for small, medium and larger cities. The principle trends identified during the course of the project have remained constant throughout the three years of benchmarking data analysis and are listed below:

- *Average income levels have an impact upon public transport use and car use in cities/regions*. Where GDP per capita was found to be high, the modal share of public transport was generally lower and the proportion of trips made by car was higher. This has obvious policy implications

for both less affluent cities/regions and wealthier cities/regions, because it implies a clear preference for car travel. People who can afford to travel by car appear to do so unless traffic congestion, lack of parking or access restrictions associated with large, heavily urbanised cities/regions prevent them from doing so (as in London or Rome). It also implies that people in less affluent cities/regions would travel by car, if it were more affordable, but instead rely upon public transport.

- *Cycling was found to be popular where it had been encouraged by investment.*
  Cities/regions that have larger cycle lane networks tended to be those with higher levels of GDP per capita. The cities/regions that have large cycle lane networks in proportion to the size of the urban road network were also found to display the highest levels of cycling modal share. This sends a clear message to policy makers that are keen to develop a cycling culture in their cities/regions. People are more likely to cycle where they are provided with the facilities that enable them to cycle safely and quickly.

- *A critical mass of population is necessary to support a metro system.*
  The majority of cities/regions with populations in excess of 500,000 inhabitants have metro systems, all of which are supported by a wide range of other public transport modes (bus, train and particularly tram) and were generally focused upon central urban areas (those more extensive networks of Paris and London are exceptions). Averaging the size of metro systems across the metro cities/regions revealed a guide threshold of approximately 46 km of metro per million inhabitants. Although this needs to be considered in relation to the other public transport modes available in each city, it does suggest that Dublin could be considered as a potential metro city. Cologne also falls into this category, although it has an extensive tram network which runs underground in the central areas of the city.

Additional trends using updated information from year three of the benchmarking initiative have also been identified and these include:

Public Transport Trends in the Benchmarking Cities

- Smaller cities are largely reliant upon bus services for the delivery of their public transport.
- Metro and tram systems, which generally account for significant proportions of the total number of passenger kilometres travelled, are more prevalent in cities with populations greater than 600,000 inhabitants.
- In 6 out of 8 of the cities where there is a metro system present the proportion of passenger kilometres travelled by metro is roughly 25-30% of total passenger kilometres travelled.
- The smallest cities in terms of population generally demonstrate the lowest levels of public transport use and this is reflected in the modal share figures.
- Of the 4 cities which achieved public transport modal shares in excess of 50% and were also able to provide the average speed data (Budapest, Madrid, Oxford and Warsaw), only Budapest demonstrated a faster average peak-hour speed for public transport than private motorised modes.
- This finding suggests that the urban traveller does not base his/her decisions solely upon the speed of the transport modes available to them. Issues such as the cost of and access to suitable public transport services are also likely to influence these decisions.

Accessible Urban Transport for Disabled People - Trends

- Many cities (particularly those in the UK and Germany) with smaller populations demonstrate greater proportions of wheelchair accessible bus fleets than the largest cities involved in the initiative.
- Central and Eastern European cities demonstrated significantly smaller proportions of bus fleet access for wheelchairs.
- It is likely that, in cities, a high proportion (if not all) of the accessible bus fleet may operate on a limited number of routes. In some cases these may be referred to as 'Quality Bus Corridors' and examples of these have been observed in Dublin during working group site visits by the Public Transport Organisation & Policy working group and the Demand Management working group.
- In several cities the infrastructure available for buses (e.g. bus stops) does not appear to provide to provide adequate wheelchair access in relation to the proportion of the bus fleet that is wheelchair accessible.
- Cities with the highest levels of wheelchair accessible urban transport fleets are likely to have been undertaking vehicle renewal programmes and made use of accessible design principles. The provision of accessible infrastructure (e.g. stops and stations) lags behind the availability of accessible vehicles.

Cycling Trends

- The average cycling modal share for all of the benchmarking cities was 9%.
- On average, the cycle networks are roughly 15% of the size of urban road networks in the benchmarking cities.
- The smaller cities have the largest cycle networks as a proportion of total road space. This suggests that smaller cities are better suited to the development of cycle networks, possibly because there is less pressure upon urban land space than there is in the larger cities
- The common indicator data suggests that cycling is most popular as a mode of transport in cities where it is encouraged through the supply of urban cycle paths.
- A feature of these cities is that the level of GDP per capita is often greater than in cities which have developed larger cycle path networks.

Urban Employment and Commuter Travel - Trends

- Oulu and Aalborg, two of the smaller cities to have participated in the Urban Transport Benchmarking Initiative, demonstrate a high proportion of people employed in their urban areas in relation to the urban population. This suggests that these cities experience relatively intense commuter movements in relation to their size.
- Of the sixteen cities which were able to provide data for these indicators a total of seven (Cardiff, London, Dublin, Madrid, Brescia, Budapest and Prague) showed that one hour's parking in the city centre was more expensive than a 5 km trip to the city centre.
- The cities of Liverpool (Merseyside), Prague, Bucharest and Budapest all have relatively expensive parking and petrol costs (as a percentage of GDP per capita) and these cities all display greater modal shares for public transport than they do for car use. Conversely the city of Oulu has the cheapest petrol prices and car parking facilities as a percentage of GDP per capita and also displays a very large car modal share of 90%.
- Although the data available and limited number of cities that collected the information means that it is not possible to link these two issues more thoroughly, it appears logical that the real-

term cost of parking and petrol in cities does have a significant impact upon car and public transport use.

Clean vehicles and intelligent energy use in urban transport - trends

- Sofia, Brescia, Brussels, Santander, Malmo and Preston have the bus fleets containing the largest proportions of bus vehicles with older Euro ratings from before 1996. Conversely, Aalborg, Copenhagen and Cardiff have bus fleets with the largest proportions of buses with Euro ratings from 2003 onwards.
- The Euro ratings indicate which cities have the most sustainably fuelled bus fleets, as well as giving an indication of the recent investment in bus fleets in the cities which provided data.
- Brescia, Copenhagen and Paris have significant numbers of Liquid Petroleum Gas (LPG) powered vehicles in their bus fleets.
- Compressed Natural Gas (CNG) has been more widely adopted, with six of the eight cities that provided data having CNG powered buses. In particular Malmo and Paris have large numbers of CNG powered buses.
- Bio-fuel bus fleets and other types of sustainable fuel are much less common.
- Particulate traps are widely used on bus fleets in the benchmarking cities, being fitted to most buses in each of the cities.
- In 11 of the 13 cities which submitted data, the average age of the bus fleet was less than 10 years.

Comparisons between New Member States, Accession Countries and EU 15 States

- The average level of public transport use across the 17 cities which submitted data was 249 trips per person in 2003, although this figure was significantly higher in Bucharest, Budapest and Prague, which are located in Central and Eastern European New Member States and Accession Countries.
- Cities from New Member States and Accession Countries do not necessarily have inexpensive fares when considered in real terms. This dismisses the perception that public transport in Central and Eastern Europe is 'cheap' and a factor that encourages high public transport use.
- Cities from New Member States and Accession Countries generally have significantly smaller proportions of wheelchair accessible bus fleets than cities in EU 15 states. It is possible that this pattern reflects a trend for more regular bus-fleet renewal in EU 15 cities than New Member State and Accession Country cities. This seems to be supported in the analysis of the average age of the bus fleet.
- As in year two of the benchmarking initiative, New Member State and Accession Country cities tend to have less densely developed urban road networks than those in EU15 cities. With the exception of Suceava, the New Member State and Accession Country cities with less densely developed road networks also demonstrate very large public transport modal shares of more than 50% of all trips made in the cities.

0.3 Working Group Findings and Recommendations

The findings of the analysis of the thematic indicators for each working group are available in the working group reports in Annexes A2 to A5 but are also summarised below;

Cycling

The Cycling working group pursued two research questions during year three of the Urban Transport Benchmarking Initiative, building on the findings from the group's research in previous years and developing the joint working link with the Behavioural & Social Issues in Urban Transport. These were: ***"How can cities monitor and evaluate cycling?" and "How to encourage intermodality for cyclists and public transport users so that both can benefit?"***

The recommendations were drawn from the analysis of the thematic indicators and working group visits:

- **City cycle-hire schemes** – There is potential for research into different hire schemes (subscription, coin operated, conventional) to be undertaken in order to explore which type of schemes are appropriate in cities of different sizes and with different existing levels of cycle use. Pilot demonstration projects could form part of this approach.
- **Cycle parking at interchanges** – Exploring the amount of parking required when installing interchanges could also form the basis of an interesting research project. The distance of cycle parking from interchanges could also be considered, because as the distance of cycle parking increases from the interchange the likelihood is that cyclists will be discouraged from using the facility.
- **Funding staffed cycling facilities** – There is also an opportunity to demonstrate the potential of staffed cycling facilities and consider who should fund these installations. Pilot schemes to assess the 'preparedness to pay' of users and demand for such services would greatly assist in this debate.
- **Foldable bicycles** – There is scope for the foldable bicycle to become an important tool in the research into their advantages and disadvantages, usability and design.
- **Bicycles on trains, trams and buses** – There is clear potential for bicycle use on trains, trams and buses to be explored through research and demonstration projects. Malmö has already begun to trial the carriage of bicycles on public transport and there is clear potential for other cities to embrace this approach.
- **Incentives given to employers by Local Authorities to encourage sustainable travel** – A comparative research project exploring the relative merits and effectiveness of sustainable travel incentives offered by local authorities would greatly assist local authorities seeking to identify and develop travel incentives which would work in their city.
- **Innovation in cycling** – With such a wide variety of innovation in cycling occurring across Europe, research into the creation of a good practice guide should be implemented. A particular emphasis should be placed on transport interchanges to create a coherent good practice guide in the way that interchanges are developed.
- **Cycling spending** – Identifying the most productive levels of spending in cycle infrastructure, maintenance and promotion at varying levels of cycling and cycle network development in cities would be beneficial for cities with ambitions, and funds, to develop cycling as a mode of urban transport.

Behavioural & Social Issues in Urban Transport

The Behavioural and Social Issues in Urban Transport working group also chose to develop its working group theme from year two in order to look at a different urban transport user group. The group looked at the user group of commuters in order to consider the question of ***"How can we influence the travel behaviour of commuters in order to increase the market share of sustainable modes and retain existing customers?"***

The following recommendations were drawn from the analysis of the collected information;

- The lack of awareness among the group's participants of the size of the commuter user group, and potential for encouraging commuting by public transport, in their own cities indicates that people commuting to work is a surprisingly overlooked target group for publicity and marketing activities. This highlights a clear need for further behavioural research into commuting and the comparative values of public transport users and car drivers when accessing their place of work.
- It is clear that proactively promoting public transport fares and services with direct comparisons against the full cost of car use could help to encourage public transport commuting in cities. This would need to be undertaken strategically, through a concerted campaign of marketing and incentives, rather than sporadic offers and could form the subject of an EC-funded demonstration project.
- Simplifying fare options available to commuters may also help to promote greater uptake of commuting by public transport. It is clear from the typology of fares available, that such an array of options is likely to confuse potential public transport users.
- Greater effort must be made to involve employers in campaigns to encourage sustainable commuting. Legislation to encourage employers to be more responsible in their choice of site location and the information they provide to staff in relation to travel to work has mainly been permissive to date, although the UK and The Netherlands have begun to realise the potential of these approaches. Across Europe some employers have recognised the benefits of encouraging their staff to travel sustainably and are making cost savings through proactive travel planning activities (e.g. such as reducing land-take and car parking requirements, as detailed in the DfT Smarter Choices case studies[1]). An EU-wide version of this publication, accompanied by a concerted effort to influence company legislation in EU Member States would have a significant impact upon sustainable commuting.
- The key challenge to encouraging sustainable commuting stems from the need to change people's culture. This requires continuous campaigning at a European level in order that the benefits of commuting sustainably, by public transport, walking and cycling are linked to issues which affect everyone. As well as the environment and health benefits associated with sustainable commuting there is a key need to underline the personal financial benefits of travelling sustainably.
- The private car remains the cheapest and fastest transport option in some EU states and cities. As a result there is a clear need for complementary Demand Management measures, to influence both the supply of, and demand for, road capacity (e.g. pricing disincentives), will ultimately be required in most cities if sustainable modes are to be considered to be 'better' than private car use.

<u>Public Transport Organisation & Policy</u>

At the launch workshop for year three, the working group opted to focus upon issues relating to the financing of public transport. The group decided that it was less important to focus upon the collection of the data and the comparability of quantitative indicators. Instead the group decided to pursue an exchange of good practices. Each site visit was used to focus upon one of the following three topics:

- Diversification of revenue sources

[1] DfT (2004), Smarter Choices - Changing the way we travel:, available online at: http://www.dft.gov.uk/stellent/groups/dft_control/documents/contentservertemplate/dft_index.hcst?n=13850&l=2, last accessed 10/07/06

- Fare Policy
- Strategies to reduce costs of operations

The following conclusions and recommendations were drawn from the group's analysis of the collected information;

- In some areas of public transport organisation and policy, practices were very similar across all participating networks:

  - With respect to the decision making process regarding fares, it is an almost general practice that the operator proposes but that the authority has the final say. Even in supposedly deregulated networks, the authority still retains the power to intervene if it is considered that the market outcome yields undesirable results.
  - Objectives are generally vague and there is no explicit treatment of the trade-offs between conflicting policy goals.
  - There is a rather general move towards fare integration and the use of smartcards. It is clear that the introduction of smartcards facilitates integration. The main obstacles are linked to important transition costs (and, in the case of the UK, to competition policy). There was a wide agreement within the group that this was one of the areas that offered the largest potential for improvement.
  - Public compensation for Public Service Requirements and concessionary fares are present in all networks, even those that are, in principle, deregulated. The details of the compensation schemes differ widely, however, and, due to differences in terminology, international comparisons can be difficult.
  - Mainly due to legal obstacles, earmarking of specific tax revenues (including congestion charges) for public transport funding is not widespread. However, several participants expressed themselves clearly in favour of such mechanisms. Moreover, due to the increases in traffic speed they induce, congestion charges bring benefits to public transport, even if they are not earmarked for public transport.
  - Public Private Partnerships are not widespread amongst participants in the working group, despite their potential for efficiency improvements. The main objections against these schemes are the higher cost of borrowing and the important transaction costs linked to complex long-term contracts.
  - Except in the UK and in Ireland, there are no examples of land value capture, mainly because of a lack of appropriate legislation. Nevertheless, the examples from the UK and from Ireland show the potential of this approach.
  - The relative importance of 'non fare' commercial revenues (mainly from advertisement and from services linked to infrastructure provision) is limited (with the notable exception of advertisement revenue in Paris).

- In other areas of public transport organisation and policy, we see a huge variety in approaches. Maybe surprisingly, there is no clear link between fare structure (zonal-, distance- or time-based) and the regulatory regime.
- On the issue of cost reductions, operators emphasise the importance of an efficient fleet maintenance policy, active human resources management and of reducing the costs linked to fare collection. Monitoring and information management turns also out to be a crucial factor. However, some factors that influence cost efficiency are at least partially outside the scope of the operator and must also be tackled by the authority such as traffic conditions and fare policy.
- In theory, competition should provide strong incentives for cost reduction. However, due to high barriers to entry, actual competition in deregulated markets can be disappointing. In

networks with a periodic award of concessions, the quality of the tendering process can have an important impact, both on the quality of the product that is finally offered and on the actual strength of the 'competition for the market'.
- One clear lesson from the project is that there is no single best approach and that 'best' practices should suit local requirements. However, elements of good practice can be implemented and problems avoided.
- It is also clear that, in almost every network, some potential has remained untapped, both for revenue increasing and for cost reduction.
- Change is a long-term issue.

Urban Transport for Disabled People

The Urban Transport for Disabled People working group was founded at the beginning of the third and final year of the Urban Transport Benchmarking Initiative. All group members found it very useful to be able to compare the experiences and policy priorities of transport practitioners in other European cities, and to discuss different means of providing accessible urban public transport services, in a constructive, non-competitive environment. In this context, the working group contributed to achieving the objectives of the initiative, including sharing knowledge among urban transport providers, and disseminating best practice throughout Europe.

As the focus for its research, the working group considered the trade-off between investing in improving the accessibility of mainstream public transport rolling stock and infrastructure, and funding a specialised, but dedicated, service that meets the needs of all disabled people, including wheelchair users.

Key findings and conclusions from the activities of the working group include:

- In spite of the difference in emphasis apparent in the two policy approaches, it should be pointed out that, in both locations, work continues to be done to address both individual needs and the accessibility of mainstream services.
- Whilst it has already been noted that much investment is, and continues to be, channelled into mainstream public transport provision in Ile-de-France, De Lijn also provides a demand responsive back-up service for its urban bus system.
- Since there are limitations to the extent to which 'full' accessibility can be achieved in Hasselt, because bus stop infrastructure does not yet provide level access at each stop, and because the city's buses provide a designated space for just one wheelchair user, there is a lift-equipped, wheelchair accessible minibus service that can be called upon by passengers as a back-up.
- Because these minibuses are provided by De Lijn, which is constrained to being a provider of a public service, however, the limitation of this demand responsive back-up service is that it can only operate between bus stops, so cannot operate in a door-to-door capacity.
- It is recognised that a key element of providing an accessible public transport system is the ability of members of staff to have an understanding of the needs of people with different types of disability, including people with sensory impairments, and people with learning disabilities.
- Drivers in particular, represent the immediate point of contact that the travelling public has with the public transport provider, need to receive such training, so that they have knowledge of how best to assist disabled passengers.
- The European Commission should recognise the valuable contribution that the Urban Transport Benchmarking Initiative has made to the sharing of knowledge, and to the dissemination of good practice, throughout the European Union, and should consider funding similar activities in the future.

- The European Commission, and the European transport community as a whole, should seek to develop a standardised definition, or series of definitions, to identify the accessibility of urban transport systems. The varying definitions present in the 4 cities involved in this working group made it very difficult to formally compare the 'true' degree of urban transport accessibility being provided for disabled people.
- There should also be recognition that the Urban Transport for Disabled People working group has shown the particular benefits of sharing knowledge of different approaches towards, and priorities for, the provision of accessible public transport services. This is particularly relevant in the context of a growing level of interest, both in Europe and in the USA, in the benchmarking of the accessibility of environments for disabled people.
- Any future initiatives to benchmark accessibility in different cities should consider ways of measuring the social benefits of providing transport services that are accessible for everyone.

Intermodality Issues and the Role of Interchanges in Urban Transport

As a result of the collaborative work undertaken by the Cycling and Behavioural & Social Issues in Urban Transport working groups, a joint set of data was collected on the topic of intermodality, specifically focusing on the integration of cycling and public transport modes. The groups met twice during year three of the initiative to consider intermodality issues and have produced a joint report, entitled 'Interesting Practices at Interchanges', which outlines the findings of the information collected by the two groups. The recommendations from the joint working on intermodality issues and interchange facilities in cities are summarised below:

- No aspect of transport (cycling, public transport or anything else) exists within itself and can ignore the wider view. While this could simply be considered as a truism, it is especially true for sustainable transport modes whereby, in order for cycling / walking to be both successful and achieve their potential, they have to be fully integrated with other modes.
- Stakeholders working in cycling know well from personal experience that the integration, cooperation and understanding between city cycle departments and the public transport department / operators can often be very bad. Often it is the case that cycling stakeholders wish to influence, change or at least be involved in decision-making. However these efforts are frequently blocked or the stakeholders experience difficulties in getting different parts of big city administrations to talk to each other. The perception of most of the stakeholders involved in the working group was that the process of coordinating different local authority departments very rarely happens, and when it does it is often only in a limited manner.
- There were set aims for the joint working group meetings and a structure was defined before the groups began work in year three of the project, but there was little concept of what the evaluation of intermodality issues would offer the two groups in terms of outputs and findings. This was a positive aspect, because it demonstrated the willingness of the group's participants to work cooperatively. In addition it has served to demonstrate the potential of intermodality for cycling and other modes, highlighting what can be achieved when cooperation is initiated.
- Following the initial joint working group meeting in year two, both groups indicated a desire to have a more formal working link. While this was partly achieved during year three, the groups both felt that this is only a small indication of what could be done, and everyone wanted to do more research in this direction.
- There is not only willingness, but also an expressed interest, to investigate intermodality issues further among the participants of the two groups. Developing the approach of joint discussion and data gathering with public transport operators and cycling stakeholders is therefore important for the successful evolution of attitudes and approaches to urban transport provision.
- Several ideas were mooted for further study by the working group participants. These include;

  - Interchange facilities and the role they can play in improving the efficiency and seamlessness of urban travel.
  - Intermodality between cycling and public transport and how this can be encouraged
  - Marketing intermodal travel, including online route planners which offer cycling route options as well as public transport and car routes.
- For sustainable transport modes to reach their potential there needs to be maximum understanding of both the issues of integration and intermodality and also how they can be implemented in a practical manner. Given that the findings from the 11 cities involved in the joint working activity highlighted that not much is currently done on this issue, it is clear that there needs to be not only more research, but also the development of a method for involving and engaging with cities on this issue.
- There is considerable potential for seamless intermodal travel to encourage commuters to combine cycling and public transport modes in order to rival the cost and efficiency of private car use. Developing improved interchange facilities at important commuter stops (e.g. entry and exit points from the public transport network, such as suburbs and business districts), which are complemented by integrated, real-time information and parking provision for bicycles, would be of particular benefit.
- This subject of intermodality and interchange is recognised in the mid-term reviews of the European Commission's 2001 Transport White Paper – 'Keep Europe Moving' as being important in the very recent European Commission communication. In the conclusion, it states that 'the efficient use of different modes on their own and in combination will result in an optimal and sustainable utilisation of resources'[2]. The working group's belief is that without further study and encouragement (both also supported in the EC review), there is little chance that there will be an improvement in the efficient use of different modes. It is also a subject that could help to inform the upcoming Urban Transport Green Paper next year. The group therefore strongly urges more research in this field, drawing on the body of work already undertaken by the cities involved in the Cycling working group of the Urban Transport Benchmarking Initiative.

0.4 Policy Implications

The findings from the common indicators have provoked a series of policy implications which have been identified according to the size of a city's population as well as for cities in Central and Eastern European states. These policy implications were developed in year two of the Urban Transport Benchmarking Initiative and remain largely unchanged as a result of the updated information from year three of the initiative. Although they were included in the common indicator report from year two, the salience of these policy objectives means that were worthy of inclusion in the year three common indicator report and are summarised below:

Policy implications for larger cities (populations of more than 1 million inhabitants)

Larger cities demonstrate the most densely developed transport networks with the widest variety of public transport modes and are most likely to have metro systems and urban heavy rail networks, which provide rapid transit in central areas and are unaffected by road traffic congestion. Bus networks in larger cities often act as feeder services for tram/heavy rail/metro systems and, compared to those in less populated cities, a smaller proportion of the bus fleet in larger cities is

[2] European Commission (2006) *Keep Europe Moving – Mid term review of the 2001 Transport White Paper*, p21. Available at: http://ec.europa.eu/transport/transport_policy_review/doc/com_2006_0314_transport_policy_review_en.pdf, last accessed on 21-07-06.

wheelchair accessible. The findings of the Urban Transport Benchmarking Initiative suggest that metro systems coincide with greater public transport modal shares in cities. The presence of a metro encourages greater public transport use, because it is rapid, efficient, segregated and easy to use. The cities with the largest populations and population densities have all introduced metro systems, because they represent the most efficient way of transporting large numbers of passengers. The need for a sufficient critical mass of citizens (or potential metro users) is a basic requirement for successfully introducing a metro system. In this respect larger cities have a distinct advantage over medium-sized and smaller cities, because their densely developed central areas and larger populations provide the ideal conditions for sustainable transport use compared to private car travel for urban trips.

The larger cities involved in the Urban Transport Benchmarking Initiative tend to be national or regional economic centres which face the issue of managing the demand for travel into their metropolitan areas. Unlike in less-populated cities policy makers in large cities, which are usually core zones of economic growth and inward investment, have greater potential to make bold transport policy decisions. The fact that larger cities often have public transport networks in place which provide better access to central areas than is possible by car means that policy makers in these cities have the potential to implement demand management measures aimed at encouraging further modal shift to public transport and sustainable modes. Rome and London are good examples where demand management measures have been successfully adopted in order to discourage car use and encourage public transport travel.

Larger cities provide less support for cycling as a mode of transport, demonstrating relatively small cycle networks as a proportion of the total road network. Two main types of barriers prevent city authorities from promoting cycle use in the same manner as medium-sized and smaller cities as outlined below;

- Land space is at a premium in the centre of large cities as a result of the dense urban development. As a result there is often insufficient space to integrate cycling infrastructure into the existing environment without severe disruption and cost. It is hard to promote cycling or to develop a cycling culture when the physical infrastructure required by cyclists is not in place.

- Road traffic congestion, pollution and the lack of safe routes deter people from attempting to cycle.

These barriers need to be addressed through bold policy making to encourage cycling in larger cities. The findings from smaller cities suggests that the uptake of cycling is often infrastructure led and therefore if larger cities can engineer solutions which overcome the lack of space for cycling infrastructure then it should be possible to generate a cycling culture and increase the uptake of cycling.

A key finding of the research of the Urban Transport Benchmarking Initiative is that the challenge for policy makers in larger cities is to manage the existing transport infrastructure in order to optimise the use of public transport and reduce car use, primarily through the implementation of demand management measures. Larger cities should focus upon creating opportunities for sustainable modes of transport (walking and cycling) to increase their modal share and improve the accessibility of the existing public transport system in order to open up urban transport systems to provide equality of access for disabled people.

Policy implications for medium-sized cities (300,000 – 1 million inhabitants)

The cities with between 300,000 and 1 million inhabitants (medium sized cities) demonstrate a broad range of urban transport issues which overlap with both the smallest and largest cities involved in the Urban Transport Benchmarking Initiative. The medium-sized cities are often local or regional economic centres, which are likely to have bus and light rail networks and approximately half have metro systems, some of which are being expanded or are planned for expansion to meet the needs of growing populations and nearby conurbations (e.g. Rotterdam, Helsinki, Lisbon).

These medium-sized cities therefore share the policy implications for both smaller and larger cities, since many are large enough to support high-load mass transit systems, but are not as densely developed as the largest cities in the initiative and therefore also display relatively high levels of car use. The resultant challenge for policy makers in medium-sized cities is to balance the pressure of car use through careful demand management and parking controls which increase the cost and reduce the accessibility of private motorised travel, yet simultaneously seek to encourage greater levels of public transport use, walking and cycling through the development of infrastructure which reflects the size and stature of the city.

Policy implications for smaller cities (less than 300,000 inhabitants)

Smaller cities involved in the benchmarking initiative demonstrate much lower density public transport networks and are largely reliant upon bus networks to provide public transport services. A key obstacle for transport policy makers in these cities is that the road network can often provide the car/motorcycle user with a faster, more convenient journey than the public transport system can offer. As a result car use is generally higher in the less populated cities and, although there is considerable potential for demand management measures to be applied in these cities, it is possible that local authorities are often reluctant to use them because of the risk of reducing the attractiveness of the city to businesses and visitors.

In terms of cycle use in cities a key finding was that the highest levels of cycle use and the largest cycle networks as a proportion of total road space were found to exist in smaller cities. The lower densities demonstrated by less populated cities and greater availability of land for traffic-free cycle routes have provided transport policy makers with ideal conditions to encourage cycling. Urban planners in larger cities may seek to learn from the practices of smaller cities in this field in order to encourage greater use of cycling.

Transport policy makers in cities with smaller populations are faced with the challenge of encouraging public transport use where there may be an insufficient critical mass to provide an extensive, high frequency public transport network and where car use is very high. Subtle use of demand management measures aimed primarily at reallocating road space to sustainable modes, the continued development of sustainable modes (walking and cycling) through pedestrian and cycling infrastructure and the development of high quality, accessible bus services could be considered as key challenges for policy makers in cities with smaller populations.

Policy implications for cities in Central and Eastern Europe

Cities in New Member States consistently display large public transport modal shares relative to car use, although levels of car ownership are increasing in these cities. The experiences of cities located in Southern Europe (e.g. Lisbon) suggest that levels of car ownership dramatically increase following accession to the EU, primarily as a result of the growth in income levels. The Urban

Transport Benchmarking Initiative has demonstrated a link between the selection of modes and the level of GDP per capita (a proxy indicator for economic activity and, indirectly, the average income level) and it is therefore possible that cities in New Member States will experience similarly rapid growth in the level of car use.

One challenge for transport policy makers in Central and Eastern European Countries is therefore to continue to maintain the high levels of public transport use in the face of rising car ownership. One way of assisting this process is to carefully benchmark the development of new road space in cities in Central and Eastern Europe, because these cities currently demonstrate significantly less road space per square kilometre when compared to EU15 cities. It is possible that continuing to constrain the size of the urban road networks in these cities could act as a natural form of demand management measure. Integrating the development of urban transport systems with land-use planning in cities in Central and Eastern Europe may also help to regulate the pressure for rapid development which many observers are predicting as an outcome of accession to the EU.

Promotional and awareness campaigns are likely to be a useful tool in encouraging sustainable travel in cities in New Member States and Accession Countries. While it seems inevitable that levels of car ownership will rise in these countries, it is possible that excessive car use can be deterred by encouraging citizens to consider using alternative modes of travel by marketing and promotion campaigns and innovative transport planning.

0.5 Recommendations for Further Research

The following opportunities for future research have been identified following the completion of the Urban Transport Benchmarking Initiative:

- Undertake a repeat Urban Transport Benchmarking Initiative, involving the same cities which participated in this initiative. This repeat benchmarking exercise could be undertaken in 2008 in order to provide a 5 year time series dataset. This would be particularly interesting for the cities which are currently proactive in improving their urban transport network and for those likely to experience significant changes during this time period (e.g. New Member States and Accession Countries).
- Funded demonstration projects could be established by drawing on the combined body of quantitative data and qualitative examples which highlight good practices in Urban Transport. This represents a logical step for the research since it would enable participants to implement good practices which address problems identified in their city and monitor the impacts. This would effectively test the potential of the good practices which the Urban Transport Benchmarking Initiative identified and enable real-life guidance to be developed based on the experiences of transferring good practices. The transferability of good practice is a key issue and one that should be given serious consideration for development. While it has proved relatively straightforward to identify good practices, it is less simple to determine whether a solution will work well when transferred to other cities. This would be of particular benefit to New Member States and Accession Countries seeking to draw upon good practice experience from EU15 states and vice-versa.
- The initiative's working groups could be developed to form individual projects, which continue to research good practice and act as knowledge centres for their urban transport themes. This type of research activity could be privately funded by the participants (as the CoMET[3] metro benchmarking has continued to be) or through European Commission funds. The topic of

[3] Community of Metros International Railway Benchmarking Group website available at: http://www.comet-metros.org/, last accessed on 27-07-06

benchmarking accessible urban transport for people with reduced mobility has already raised considerable interest in the UK and has the potential to be extended across the EU.

- The innovative work on interchanges and intermodality, developed through joint working between the Behavioural and Social Issues in Urban Transport and the Cycling working groups, could be developed into a project in its own right. This work has so far focused upon the combination of cycling and public transport modes, and specifically commuting, but could be broadened to include all modes of urban transport as well as topics such as car sharing and car clubs, which have not been considered so far. The two groups involved in this research suggested that a design guide focusing upon integrated public transport interchanges would be widely beneficial to urban transport stakeholders in Europe and the development of such a guide could provide the objective for a research and/or demonstration project.

1. INTRODUCTION

1.1 Project background

Year three of the Urban Transport Benchmarking Initiative represents a further evolution of the work undertaken during the first two years of the project (autumn 2003 to summer 2005). The project has continued to apply the concept of benchmarking to the urban transport systems in cities across the EU, including the New Member States and Accession Countries. This is in line with the European Union's policy approach, which places considerable importance upon the roles that attractive, efficient local and regional transport systems can play in the economic development and social cohesion of the Member States. In the field of urban transport, the exchange and promotion of best practices is one of the main policy tools that the European Commission possesses. Through a combination of quantitative data collection and benchmarking and site visits the Urban Transport Benchmarking Initiative has sought to act as a conduit for good practice in EU cities. Year three of the Urban Transport Benchmarking Initiative has therefore continued to compare the transport systems of the participating cities in order to identify and promote interesting practices in urban transport.

The benchmarking concept has considerable potential when applied to urban transport systems. A range of previous initiatives, not least the first two years of the Urban Transport Benchmarking Initiative, have provided the opportunity to refine the benchmarking process and provide more comparable results. The data indicators used to collect information for the Urban Transport Benchmarking Initiative were significantly re-worked at the start of year two of the initiative and only received minor adjustment in year three.

The development of more practical data indicators has aided the learning process for the organisations involved in the project and this has greatly helped to improve the robustness of the data collected for the project. During year two of the project the indicators were also applied to the Planning Land-use and Urban Mobility in cities (PLUME[4]) benchmarking exercise in order that the baseline of background data for cities across Europe was widened and a total of 45 cities worth of data has been collected when the PLUME data is added to that of the Urban Transport Benchmarking Initiative.

The Urban Transport Benchmarking Initiative has adhered to the European Commission's subsidiarity principle by including as many urban transport stakeholders as possible. The process of transition into each year of the Urban Transport Benchmarking Initiative was a fluid one. The project team responded and addressed the issues raised by participants in the first two years of the project, rather than following a rigid, predetermined process. In this way the subsidiarity principle has been fulfilled. The recommendations compiled in the project reports have been made by the participatory network of urban transport operators, user groups, local authorities and municipalities, rather than a single centralised institution. It is therefore intended that the project findings will provide a useful resource for other urban transport stakeholders and help them to implement innovative solutions to commonly experienced urban transport problems. Since the third year of the project represents the final year of the Urban Transport Benchmarking Initiative, the emphasis for the reporting is upon learning from the project activities over the last 3 years. To achieve this goal a Good Practice Case Study Handbook is being produced to showcase good practices identified through the work of this project.

[4] PLUME project website available at: www.lutr.net, accessed on 11/05/05. PLUME is a project funded by the European Commission DG Research as part of the City of Tomorrow research initiative.

Working group themes

Year three of the Urban Transport Benchmarking Initiative was based around four themes, which were organised into working groups as follows:

- Behavioural and Social Issues in Urban Transport
- Cycling
- Public Transport Organisation and Policy
- Urban Transport for Disabled People

The working group themes were chosen by the participating cities to reflect their interests and responsibilities. In their respective working groups the participants selected and defined a series of thematic indicators, which were collected during the course of the third year of the Urban Transport Benchmarking Initiative. The thematic indicators are specific to each working group and aim to answer the group's chosen research questions. Each working group received technical and administrative assistance from an expert and a rapporteur, who were responsible for co-ordinating activities such as the definition and analysis of thematic indicators and the organisation of site visits.

The results from each of the working groups have been reported in detail in annexes A2 to A5 of the benchmarking reports and can be downloaded from the project website www.transportbenchmarks.org.

Integration Indicators

A new activity introduced for year three of the Urban Transport Benchmarking Initiative, was the collection of integration indicator data. Each working group nominated three indicators for which they wanted all of the participants in the initiative to collect data in order to create a larger dataset for three of each of the group's thematic indicators. Although this information was not available from all of the cities participating in the benchmarking initiative, the additional data has enabled the groups to draw broader comparisons for key questions in their analyses.

Common Indicators

The common indicators summarised in this document represent an evolution of those collected during the first two years of the Urban Transport Benchmarking Initiative. Following feedback received from participants at the end of year two conference the common indicators were left relatively unchanged from year two. The data indicators were significantly re-worked at the start of year two of the benchmarking initiative and most participants felt that further revisions were unnecessary. The only new indicators for year three focused upon the clean vehicle component of the bus fleets in cities involved in the initiative.

Final report context

This document is the summary report of the third year of the Urban Transport Benchmarking Initiative. The report provides an overview of the activities undertaken as part of the project and also summarises the headline results from the benchmarking process. This document is supported by full reports of each of the four working groups, the findings from the common indicators, a report focusing on the topic of urban transport interchanges and a Good Practice Case Study Handbook.

1.2 The benchmarking concept

The concept of benchmarking has been used widely by many different types of organisation seeking to learn more about their operational merits and shortcomings. The process of benchmarking involves comparing operational performance with similar institutions, organisations or enterprises in order to gain some understanding of the best practices employed within a given industry. Once performance differences across an industry are understood then each participating organisation has the potential to integrate best practices within the scope of its own operations in order to attain measurable performance improvements.

Successful Benchmarking =
Self Analysis + Identify Best Practices + Analyse Performance Differences + Implement Findings
Result = Narrowed Performance Gaps & Tangible Performance Improvements

The benchmarking process is usually centred upon performance indicators, which operate as a means of self analysis and help to identify key differences between participating organisations. The participants of a benchmarking exercise will collect data for these indicators in order to establish best practices in a particular field. Site visits or case studies are often used to showcase best practices, because this helps participants to understand more fully how the best practices have been developed and how they work on a daily basis.

Once benchmarks have been established it is the responsibility of individual participants to return to their respective organisations and implement the process changes that should improve performance levels. This requires a commitment from participants that the organisation is willing to co-operate not just in the process of benchmarking, but in following up the recommendations in order to implement change. This is not simply a case of "following the leader", but of constructively integrating the best practices that leading organisations have established into existing procedures.

In the case of the Urban Transport Benchmarking Initiative the city representatives that have participated in the exercise have been urban transport stakeholders. This included a range of organisations such as municipal authorities, public transport operators, and regional authorities. It is intended that the organisations representing each of the participating cities will disseminate results relevant to their city to other local transport stakeholders. In a number of the cities and regions involved in the initiative local reference groups have been established throughout the three years, either through internal, inter-departmental co-operation (e.g. Belfast and the Emilia Romagna region) or through collaboration between a number of stakeholders (e.g. Lisbon, Paris/Ile de France region and Brussels).

It is intended that urban transport stakeholders who were not able to be involved in the initiative will also be able to benefit from the work undertaken by the Urban Transport Benchmarking Initiative. The final reports and good practice case study handbook are intended to be as accessible as possible, each being a stand-alone document, which can be used and understood when read on its own, or in conjunction with the other reports from the initiative.

1.3 Review of previous benchmarking initiatives

As part of the planning phase of each round of the Urban Transport Benchmarking Initiative a review of existing and current transport benchmarking projects was undertaken in order to learn as much as possible from the experiences of previous transport benchmarking projects. The full review of previous and ongoing transport benchmarking initiatives is detailed in Annex A1.1.

1.4 Comparisons with other transport benchmarking exercises

Included in the final reports from the first two years of the Urban Transport Benchmarking Initiative were references to and comparisons with the findings from previous transport benchmarking activities, in particular the Citizen's Network Benchmarking Initiative and the first year of Urban Transport Benchmarking. Where it has been relevant to do so, similar references have been made in this report to the findings from the first two years of the Urban Transport Benchmarking Initiative.

The inclusion of relevant and comparable data from cities involved in earlier rounds of the benchmarking initiative and the cities involved in PLUME benchmarking has made it possible to revisit the findings from these two sets of data and re-evaluate the trends identified. Compiling these sets of data has also greatly increased the number of data indicators available for comparison, thus improving the statistical validity of correlation coefficients and trends identified.

1.5 Objectives of the Urban Transport Benchmarking Initiative

The key objectives of the Urban Transport Benchmarking Initiative were:

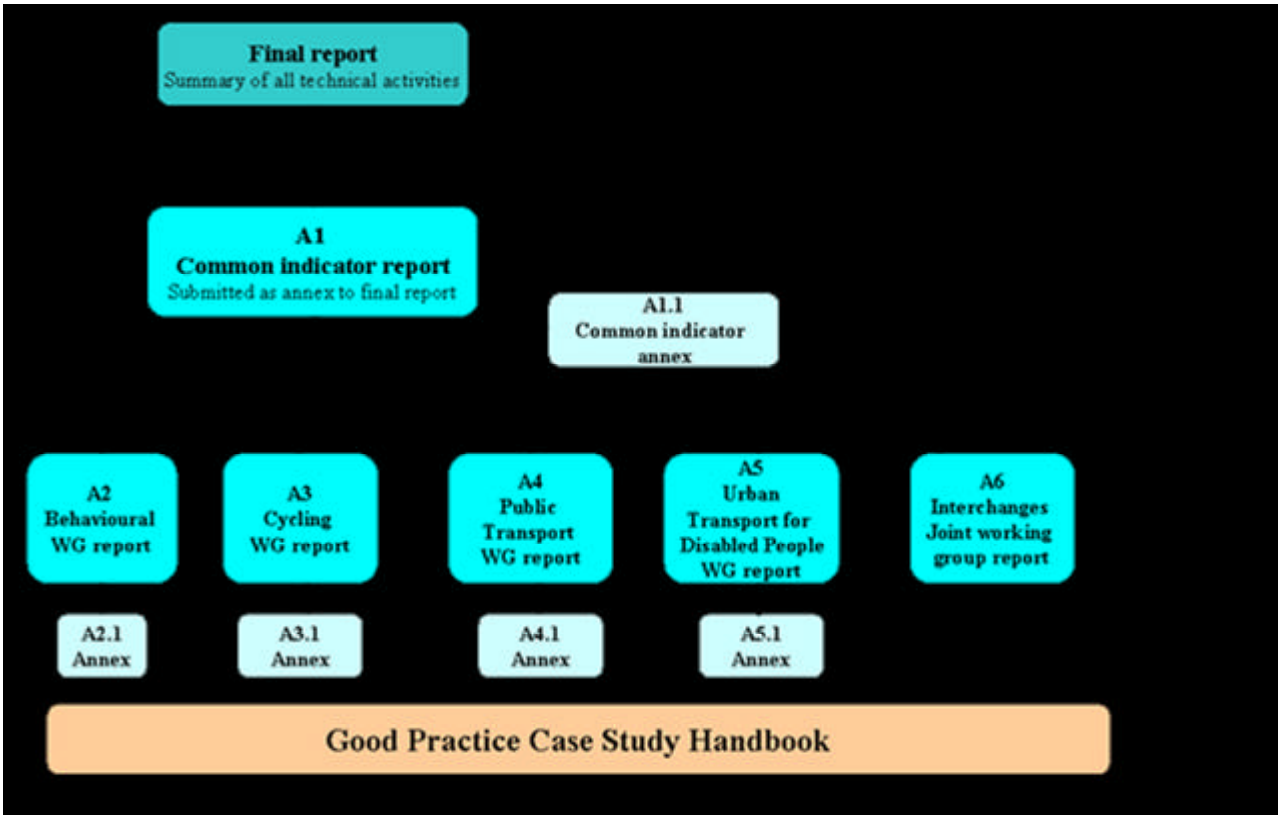
1. To select annually a group of participants representing local and regional urban transport stakeholders from 35-40 cities.
2. To agree a set of common performance indicators covering urban passenger and freight transport.
3. To undertake a comparative analysis across stakeholders.
4. To set up a maximum of 5 thematic working groups on topics agreed by the participants.
5. To organise site visits (3 per year) for the working groups through which to identify and study best practices.
6. To disseminate the results.

These objectives were largely achieved and a review of the achievements of all three years of the Urban Transport Benchmarking Initiative is presented in the concluding section of this report.

1.5 Purpose and context of this report

This document represents the summary report of the third, and final, year of the Urban Transport Benchmarking Initiative. The document outlines the organisation of the project and summarises the findings of the project. This document is supported by a range of annexes (detailed in Figure 1.1), containing the reports that have been produced for each of the four working groups and for the common indicators. In addition a Good Practice Case Study Handbook has been produced which summarises good practices from all three years of the benchmarking initiative. Electronic versions of these documents are available for download from the project website www.transportbenchmarks.org.

Figure 1.1: Reporting structure for the Urban Transport Benchmarking Initiative



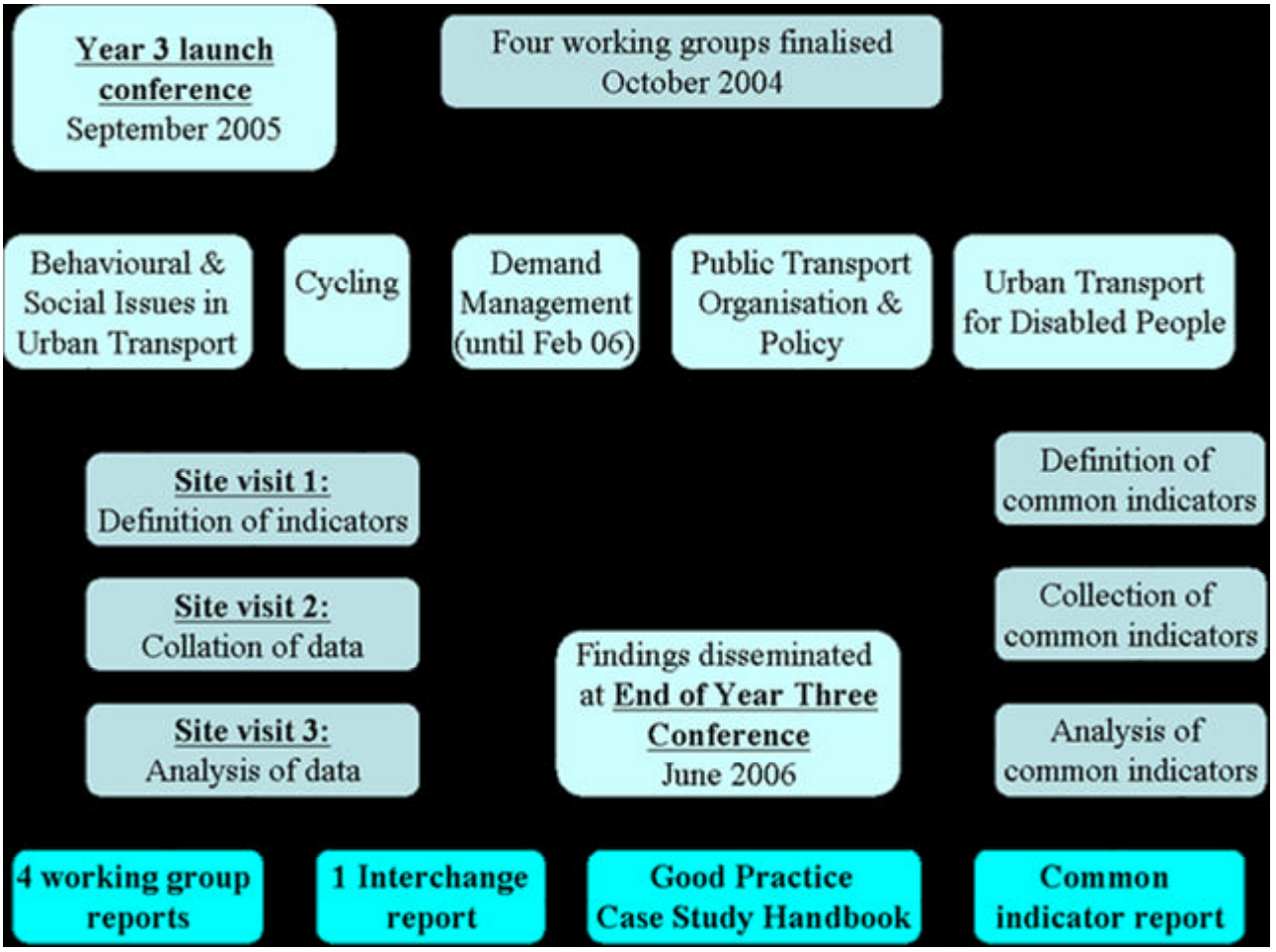
The remainder of this report includes an overview of the cities and regions that have participated in the Urban Transport Benchmarking Initiative (section 2). Section 3 of the report outlines key statistics and trends identified from the analysis of the common indicators. Section 4 summarises the findings of the four working groups which have focused upon different urban transport-related themes and highlights the crossover working which has occurred between these groups. The final section of the report outlines the conclusions from year three of the Urban Transport Benchmarking Initiative. A series of recommendations for developing the outputs of the benchmarking initiative, through future research and implementation activities, are also included in section five of this report.

2. ORGANISATION, PARTICIPANTS AND SITE VISITS

2.1 Project Organisation

Year three of the Urban Transport Benchmarking Initiative was launched in September 2005 and the work of year three of the Urban Transport Benchmarking Initiative continued until June 2006. The results of the third and final year of the benchmarking initiative were disseminated at the end of Year Three conference. Figure 2.1 (below) outlines graphically how the project has progressed during its second year:

Figure 2.1: Year three of the Urban Transport Benchmarking Initiative



The five themed working groups maintained during year three of the initiative continued to evolve their chosen topics based upon the following themes; Behavioural and Social Issues in Urban Transport, Cycling, Demand Management, Public Transport Organisation and Policy and Urban Transport for Disabled People. Due to limited interest in the Demand Management theme this working group ceased its activities in February 2005 and was not replaced due to the advanced stage of the project.

A total of 9 different cities were visited during the course of year three of the Urban Transport Benchmarking Initiative. The site visits organised during year three were held in; Mälmo, Rotterdam, Santander, Hasselt, Berlin, Nottingham, Brussels, Paris and The Hague. These site visits were used partially to provide meeting time for the working groups in which the participants

discussed progress in the benchmarking process and planned the next phases of development, as well as allowing the participants to focus upon the good practices evident in the cities being visited. The site visits held in Santander and The Hague were jointly attended by the Behavioural and Social Issues in Urban Transport and Cycling working groups as part of the groups' formal joint working in year three of the project. The outcomes of these meeting have been reported in each of the working group's reports (Annex A2 and A3) and the jointly produced Interchange Report (Annex A6), which support this document.

Once the working groups had advanced through the process of data collection and analysis the rapporteurs from each working group were responsible for producing an end of year report, with the help of the participants in the group. The key findings from year three of the project were disseminated at the final conference which took place in June 2006 and, as illustrated in Figure 1.1, the working group reports are annexed to this report.

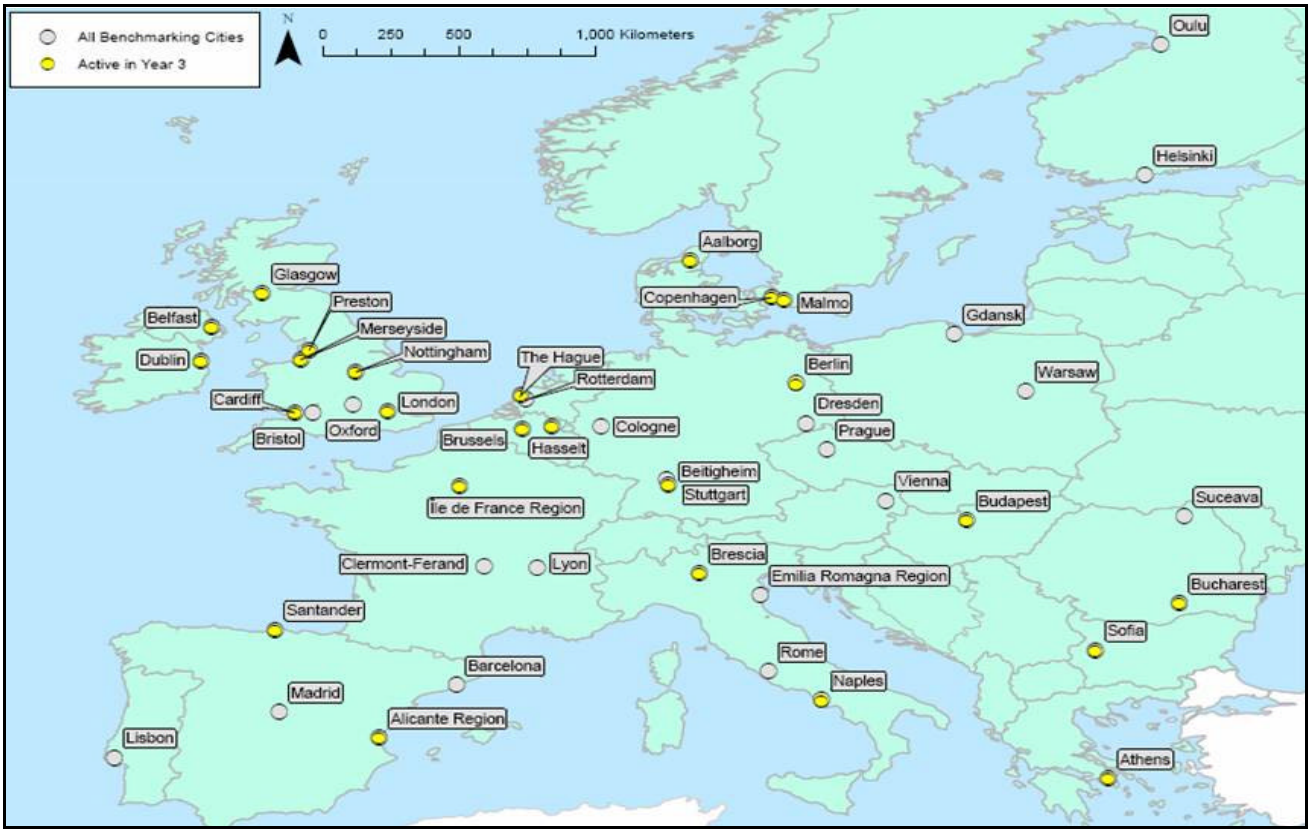
2.2 Participating cities and regions

A total of twenty five different cities and regions participated in the third year of the Urban Transport Benchmarking Initiative and fifteen submitted data for the project's common indicators. Among the data collected for the third year of the initiative a total of three cities were new participants in the initiative and these included:

- Preston
- Santander
- Sofia

Including the data obtained from PLUME benchmarking cities and the first year of the Urban Transport Benchmarking Initiative, a total of 48 cities fell within the scope of this report, for which 44 sets of common indicator data were collected. The map shown in Figure 2.2 illustrates the wide geographical spread of the cities involved in the three projects.

Figure 2.2: Cities participating in the Urban Transport Benchmarking Initiative[5]



2.3 Project site visits

During the course of year three of the Urban Transport Benchmarking Initiative a total of 10 different cities were visited by the working groups including:

- Santander
- Paris
- The Hague
- Berlin
- Nottingham
- Hasselt
- Rotterdam
- Brussels
- Mälmo

In year three of the Urban Transport Benchmarking Initiative the continued shift in emphasis towards reporting good practices and evaluating how they could be applied in other cities has given greater importance to the site visits. In particular, the Public Transport Organisation and Policy working group wholeheartedly adopted the approach and elected not to collect data, but to share information on public transport finance issues through a series of three focused working group discussion sessions. Many of the groups have included detailed summaries of good practices observed during site visits in the annexes of their final reports (A2.1 through to A5.1) and some working groups have included case study sections in the main bodies of their reports (Annex A2 to A5). The site visit reports are also available on the Urban Transport Benchmarking Initiative website at: http://www.transportbenchmarks.org/events/site-visits.html. Figure 2.3 highlights some images from the cities visited over the course of year 3.

[5] Some of the participants involved in the Urban Transport Benchmarking Initiative represent regional authorities, including Emilia Romagna, the Ile de France, Merseyside and Grand Lyon. While it is acknowledged that these are not cities each regional area contains one or more cities and therefore throughout this report reference is made to "cities".

Figure 2.3: Cities visited by the working groups

Cities pictured are: Top left to right; Hasselt, Mälmo and Paris
Bottom left to right; Nottingham, The Hague and Santander

3. THE COMMON INDICATORS

This section of the summary report outlines selected background information and the key findings drawn from the common indicator report (Annex A1 and A1.1). The common indicator report fully describes the process of indicator selection, data collection and data analysis and includes a complete list of the common indicators.

3.1 Background data

This section of the analysis displays the data used to provide a contextual overview of the cities and regions which have participated in the Urban Transport Benchmarking Initiative and the PLUME benchmarking initiative. These figures have been displayed to cover background statistics, such as population, area, population density and GDP per capita, as well as general data which describe the urban transport network in each of the cities and regions.

Figures 3.1 to 3.5 provide five key statistics for each of the cities and regions that were included in the analysis.

Figure 3.1a: Surface area of cities/regions (continued in Figure 3.1b)

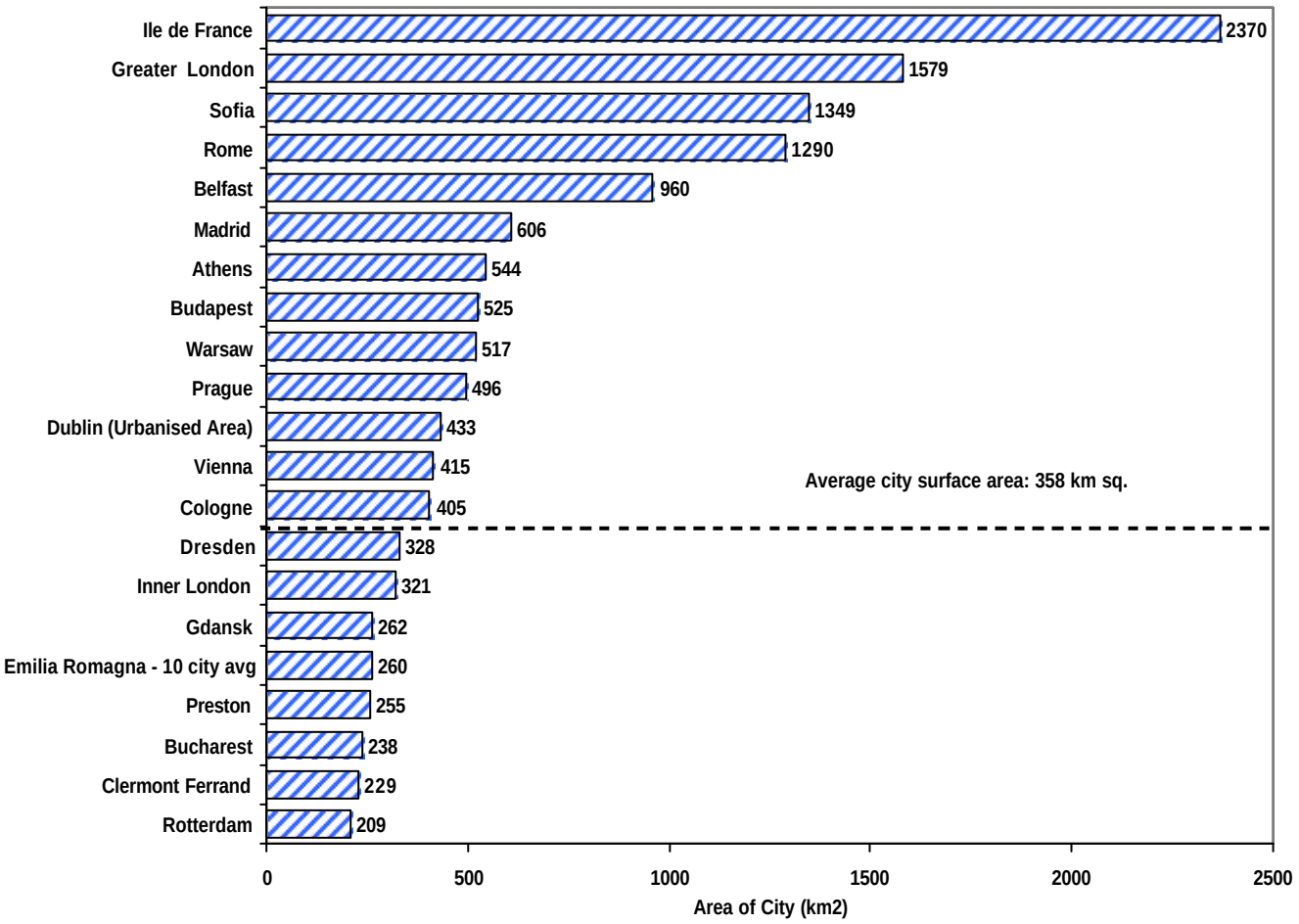
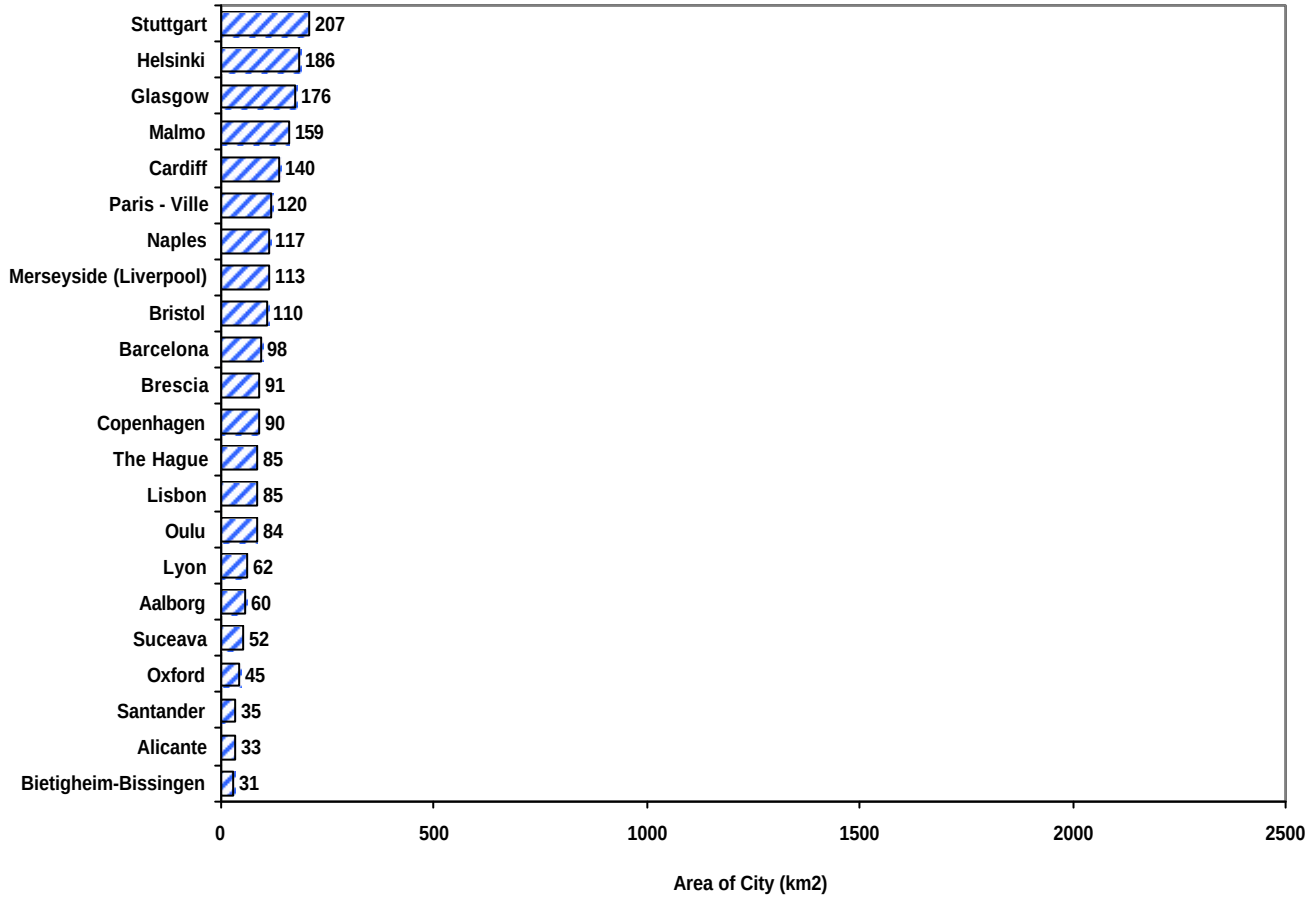


Figure 3.1b: Surface area of cities/regions (continued)



Key data issues:

- Data relates to 2003, except for Clermont Ferrand (1999), Emilia Romagna (2001) Oxford, Suceava, Lyon, Lisbon, Barcelona, Bristol, Naples, Helsinki, Rotterdam, Gdansk, Dresden, Cologne, Vienna, Warsaw, Athens, Rome and London (2002), Prague, Santander, The Hague, Cardiff, Preston, and Sofia (2004) and Merseyside (2005).
- Data for Rotterdam refers to the municipality of Rotterdam.
- Data for Paris and London have been displayed for both city/ville areas and the wider, metropolitan areas in recognition of the different sub-divisions in each of these cities.
- Data for Rome refers to the built-up area and not the surrounding metropolitan area.
- Data for Barcelona refers only to the city.
- Data for Dublin relates to the urbanised area of Dublin's District Electoral Divisions (DEDs).

Figures 3.1a and 3.1b illustrate the wide variety of cities that have collected common indicators for the Urban Transport Benchmarking Initiative and the PLUME benchmarking activity. The cities range in size from Bietigheim-Bissingen, the smallest city in the initiative with a surface area of 31km^2, to the Ile de France which covers an area of 2,370 km^2.

The mean average surface area of all of the benchmarking cities was 358 km^2 and, as shown in Figures 3.1a and 3.1b it is possible to identify clear groups of cities according to their population sizes. One third (15) of the 45 cities which submitted population data to the benchmarking initiative have between 300,000 and 600,000 inhabitants. These groupings are used for further analysis later in this report and enable like-for-like comparisons to be made between cities which are similar in size.

Figure 3.2a: Population of cities (continued in Figure 3.2b)

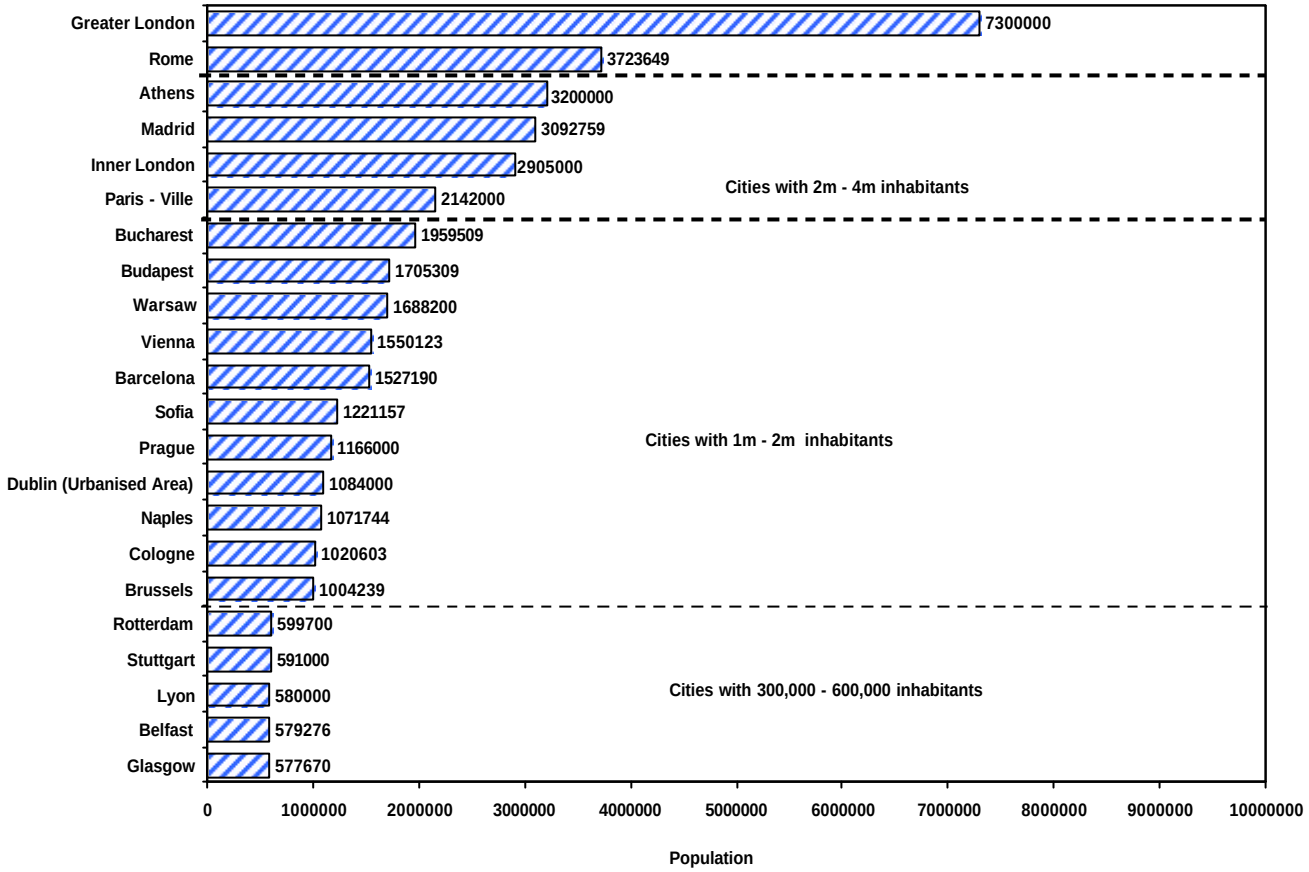
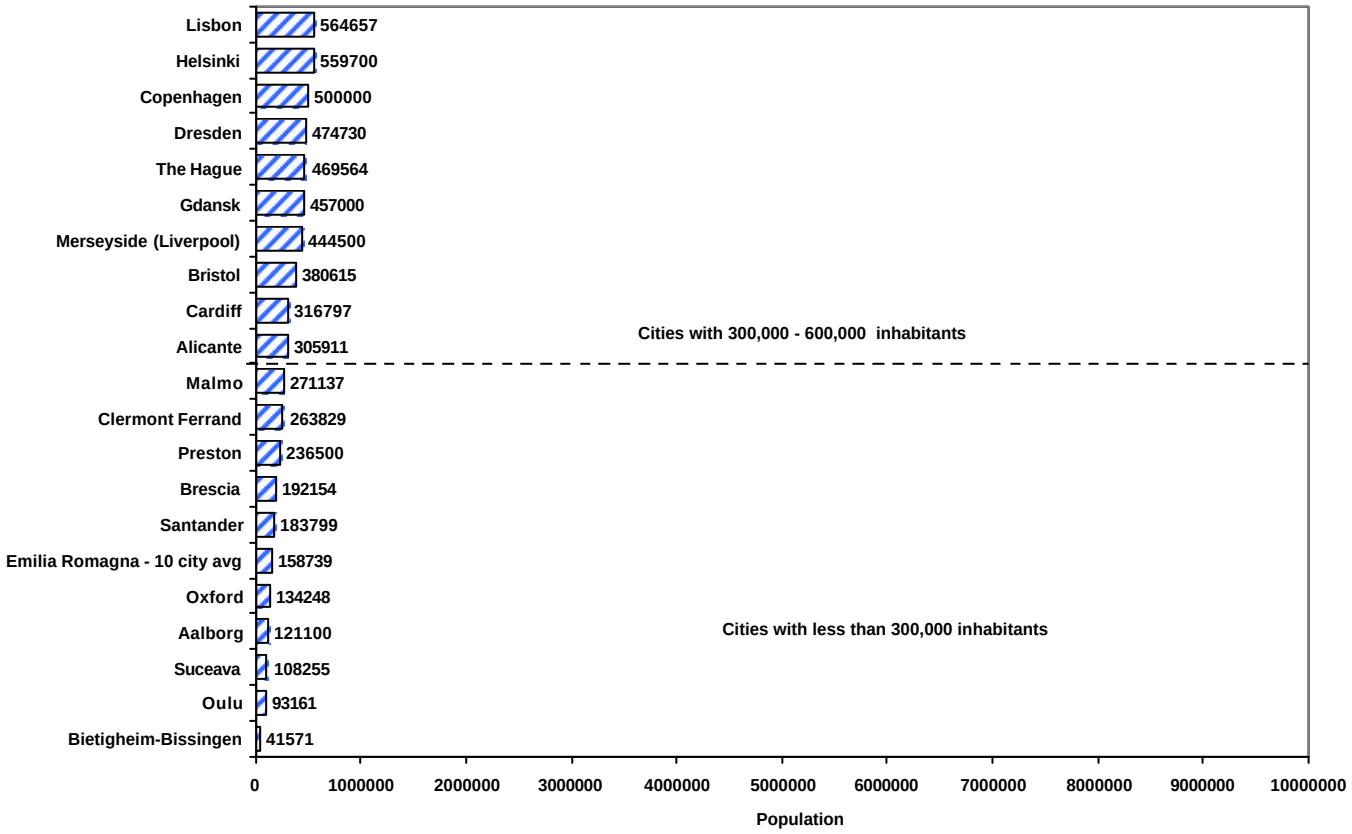


Figure 3.2b: Population of cities (continued)



Key Data Issues

- Data refers to 2003, except for Clermont Ferrand (1999) Belfast (2000), Athens, Bristol, Lisbon, Merseyside, Vienna and Oxford (2001), Gdansk, Suceava, Dresden, Helsinki, Cologne, Naples, Lyon, Rotterdam, Dublin, Barcelona, Warsaw, Rome, Greater London and the Ile de France (2002), Santander, Brescia, Preston, Cardiff, Merseyside, The Hague, Glasgow, Sofia and Paris Ville (2004) and Aalborg and Malmo (2005).
- Data for Rotterdam refers to the municipality of Rotterdam.
- Data for Paris refers to the built-up area and not the entire Ile de France region.
- Data for London relates to the Greater London area.
- Data for Rome refers to the built-up area and not the surrounding metropolitan area.
- Data for Dublin relates to the urbanised area of Dublin's District Electoral Divisions (DEDs).
- Data for Barcelona refers only to the city and not the metropolitan area.

Figures 3.3a and 3.3b show the range of population density figures that have been calculated for the benchmarking cities using surface area and population data. Population densities for the largest cities differentiate between central areas of the city, which tend to be densely populated (e.g. Paris, Barcelona, Inner London) and the whole city area, for which the population density is averaged across the most densely populated areas and those of lower densities (e.g, suburban areas). The variations between these figures highlight the difficulty associated with successfully de-limiting "the city" in order to ensure comparability. In the case of Central London no accurate population data was available which corresponded to the surface area information and, as a result, the data for Inner London has been presented. The population density figures have also been used as points of comparison for further analysis in this report.

Figure 3.3a: Population density of cities (continued in Figure 3.3b)

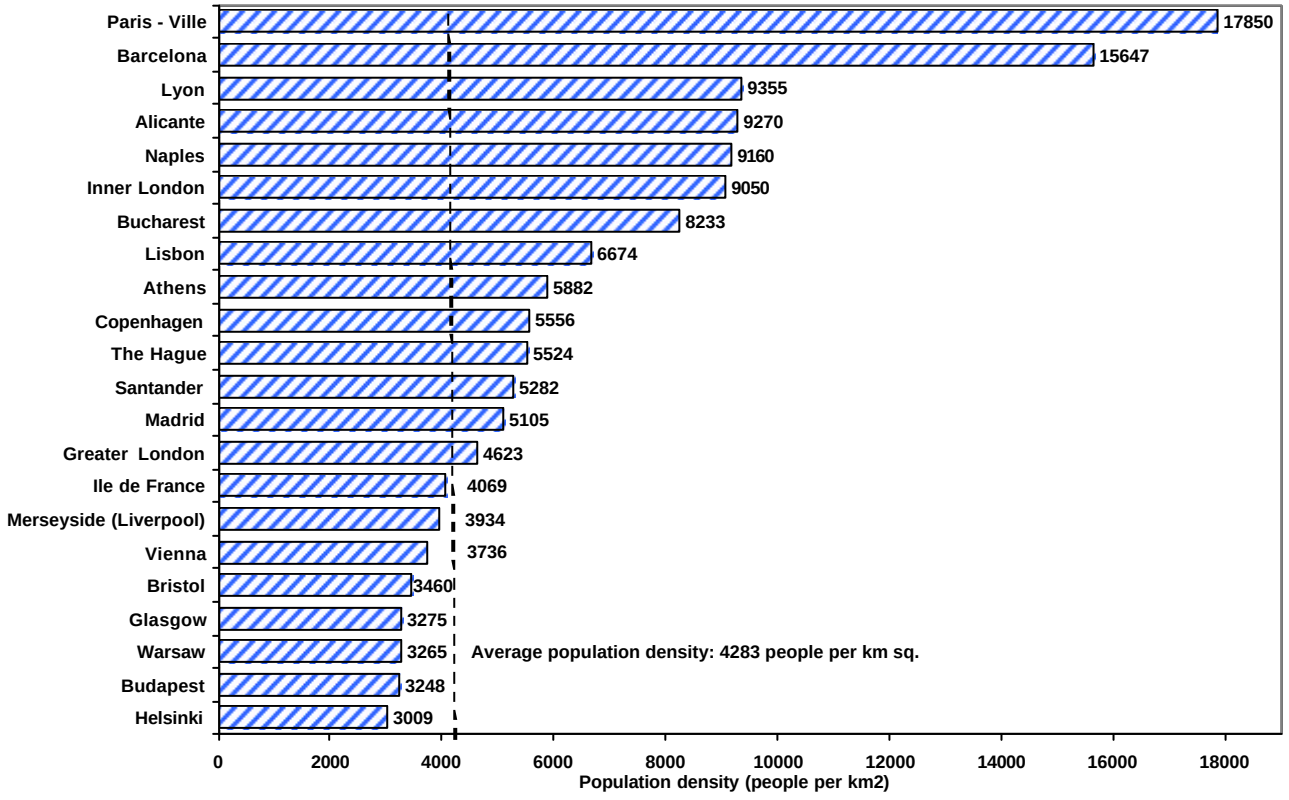
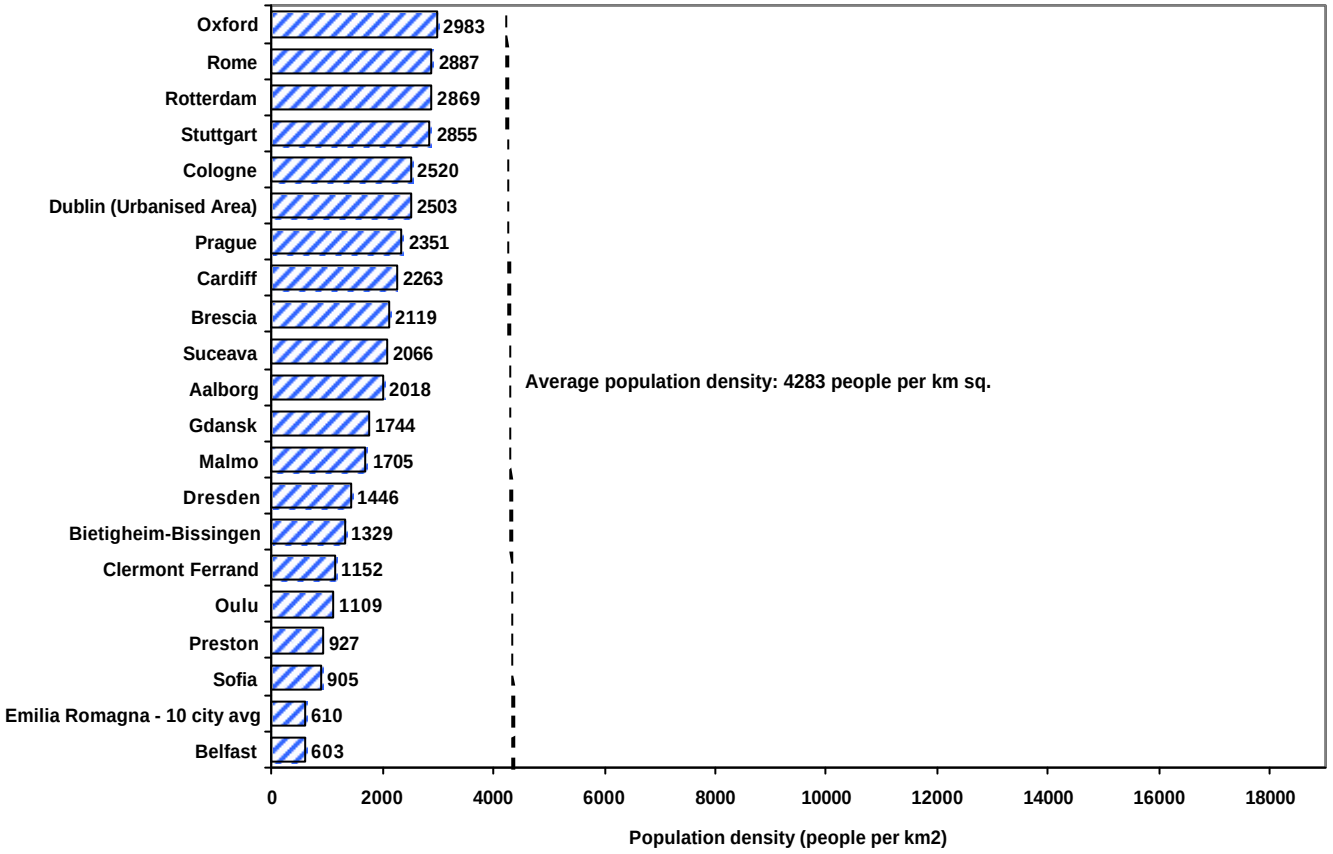


Figure 3.3b: Population density of cities (continued)



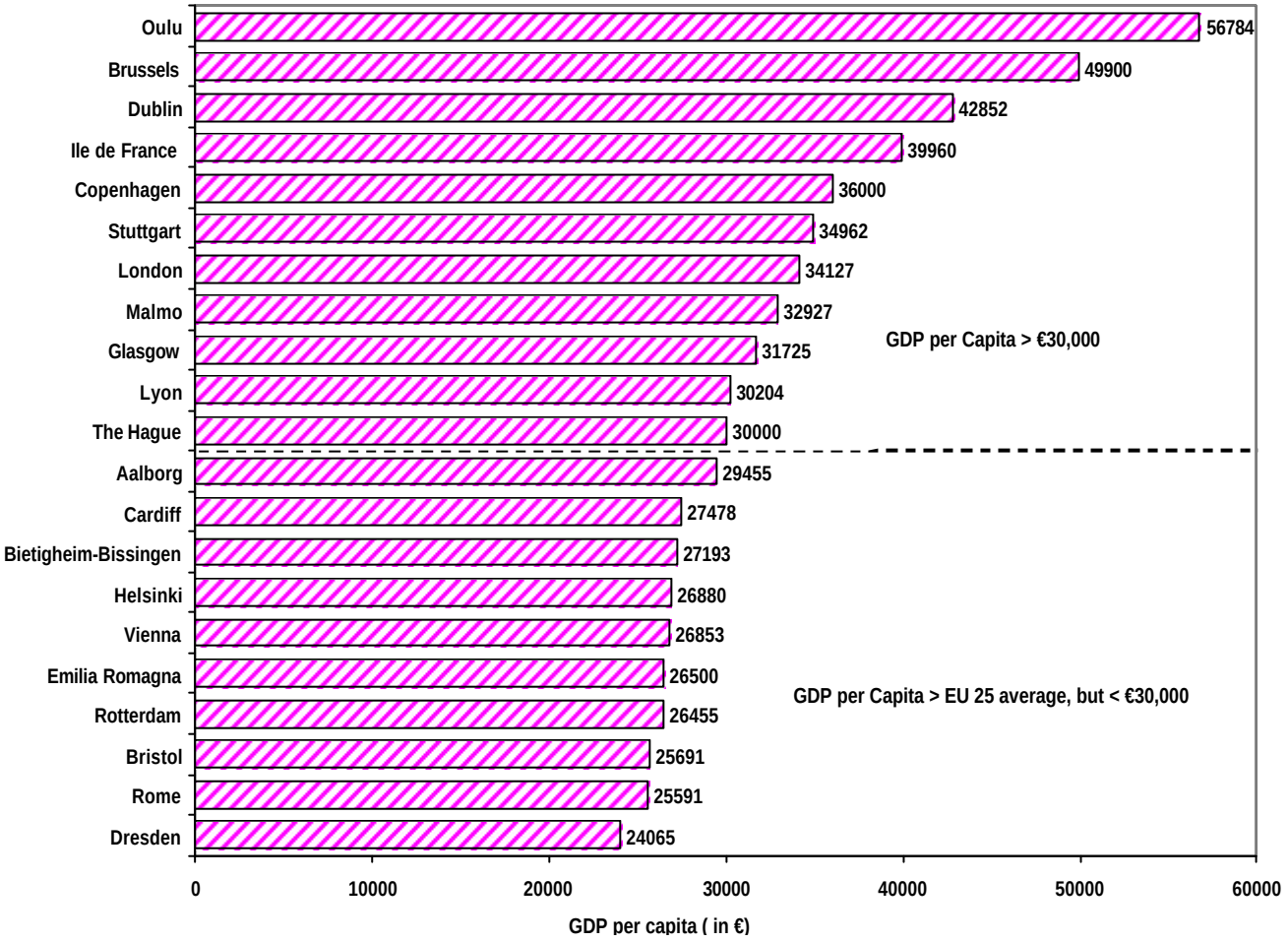
Key Data Issues:

- Data refers to 2003, except for Clermont Ferrand (1999) Belfast (2000), Athens, Bristol, Lisbon, Merseyside, Vienna and Oxford (2001), Gdansk, Suceava, Dresden, Helsinki, Cologne, Naples, Lyon, Rotterdam, Dublin, Barcelona, Warsaw, Rome, Greater London and the Ile de France (2002), Santander, Brescia, Preston, Cardiff, Merseyside, The Hague, Glasgow, Sofia and Paris Ville (2004) and Aalborg and Malmo (2005).
- Data for Rotterdam refers to the municipality of Rotterdam.
- Data for Paris refers to the built-up area and not the entire Ile de France region. In Paris Ville (the urban centre of the city) the population density exceeds 24,000 people / km^2.
- Data for London relates to the Greater London area.
- Data for Rome refers to the built-up area and not the surrounding metropolitan area.
- Data for Dublin relates to the urbanised area of Dublin's District Electoral Divisions (DEDs).
- Data for Barcelona refers only to the city, which is completely urbanised.

Figures 3.4a and 3.4b display the GDP per capita values for the benchmarking cities. It is important to note that GDP per capita at market prices (as displayed here) is only an indicator of average wealth levels and does not represent average incomes in the cities concerned. GDP per capita is, however, a useful indicator of general levels of wealth creation and is used later in this report as a variable for further comparisons and trend analysis. In a similar manner to the population of the cities, the cities in Figure 4.4a and 4.4b have been grouped by GDP per capita levels relative to the EU25 average GDP per capita level.

As in previous years of the benchmarking initiative, significant differences are evident in the levels of GDP per capita, most notably between Oulu, the city with the highest GDP per capita (€56,784), and Suceava, the city with the lowest (€1,800). The mean-average GDP per capita of all of the cities participating in the Urban Transport Benchmarking Initiative is €23,733 and this figure compares favourably to the average level of GDP per capita in the EU25 cities in 2004 of €22,700 which was obtained from Eurostat[6].

Figure 3.4a: GDP per capita of cities and regions (continued in Figure 3.4b)

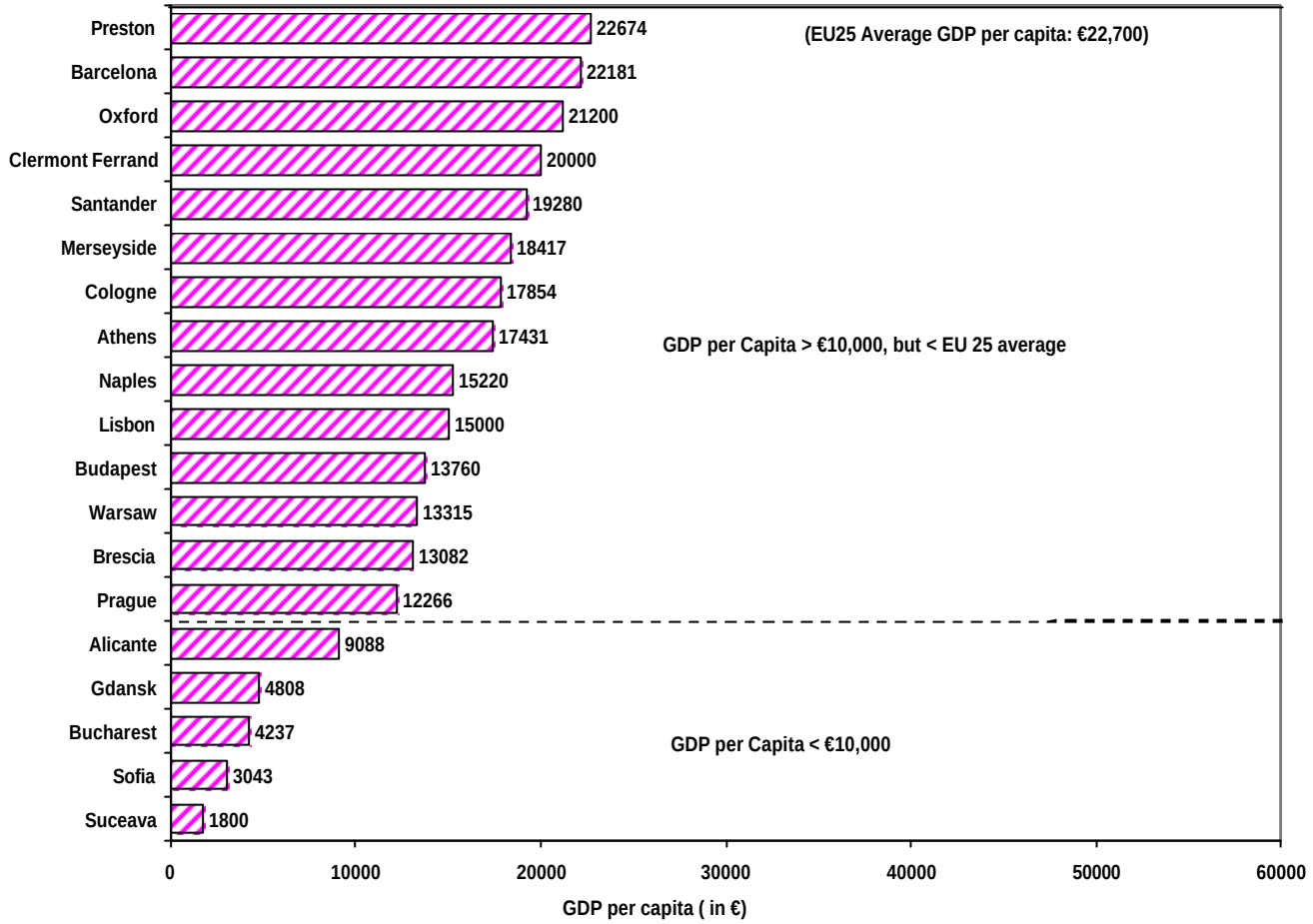


Key Data Issues:

- Data refers to 2003, except for; Lisbon, Clermont Ferrand, and Stuttgart (2000), Bucharest, Oxford, Barcelona, Dresden, Bristol, Rotterdam, Emilia Romagna (2001), Suceava, Gdansk, Warsaw, Naples, Athens, Cologne, Merseyside, Merseyside, Glasgow, Madrid, Rome, Vienna, Helsinki, Bietigheim-Bissingen, Lyon, Ile de France, London, Dublin, Brussels and Copenhagen (2002) and Brescia, Santander, The Hague and Aalborg (2004).
- Data for Brescia, Lyon and Emilia Romagna refers to regional area.

[6] EU 25 GDP per capita figures obtained from Eurostat, available at: http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136173,0_45570701&_dad=portal&_schema=PORTAL, accessed on 14/07/06.

Figure 3.4b: GDP per capita of cities and regions (continued)



In order to draw sensible comparisons between the cities involved in the benchmarking initiative, the remainder of the common indicator analysis used the population and economic data to group the cities. Issues such as geographic locations and the climate of cities involved in the initiative have also been considered when drawing comparisons between the cities.

Following the approach used in the analysis of year two of the benchmarking initiative, a total of five groups made up of cities with similar populations were established. These groups are based upon those defined in Figures 3.2a and 3.2b and, where several measures of population were given (e.g. Dublin, London and Paris) the area for which the most complete data were submitted has been used. The groups of similarly populated cities are described below in Table 3.1:

Table 3.1: Population groups for data analysis

Up to 300,000 inhabitants	300,000 – 600,000 inhabitants	1m – 2m inhabitants	2.m – 3m inhabitants	More than 3m inhabitants
Aalborg	Alicante	Barcelona	Athens	Greater London
Bietigheim-Bissingen	Belfast	Brussels	Madrid	Ile de France
Brescia	Bristol	Bucharest	Rome	
Clermont Ferrand	Cardiff	Budapest		
Emilia Romagna (10 city average)	Copenhagen	Cologne		
Malmö	Dresden	Dublin (Met area)		
Oulu	Gdansk	Merseyside		
Oxford	Glasgow	Naples		
Preston	Helsinki	Prague		
Suceava	Lisbon	Sofia		
Santander	Lyon	Warsaw		
	Rotterdam	Vienna		
	Stuttgart			
	The Hague			

3.2 Urban transport in the participating cities: A comparison

Table 3.2 shows the range of public transport modes available in each of the cities, which have been grouped according to their population size. This table has been developed from year two of the benchmarking initiative and the table reveals the following key points:

- Buses are the most commonly represented public transport mode, being present in all of the cities. This is likely to reflect the fact that buses offer the greatest route flexibility and are the least costly public transport mode since they require no fixed infrastructure other than the road network.
- The majority of the cities are served by inter-urban heavy rail, although only some medium-sized and most of the larger cities have an urban heavy rail networks within the metropolitan area (e.g. Dublin, Merseyside/Liverpool, Paris, Rome).
- Tram and metro systems are much less common in the cities with smaller populations. Of the 9 cities with fewer than 300,000 inhabitants only Bietigheim-Bissingen (on the edge of Stuttgart's metropolitan transport network) and Clermont-Ferrand (which has a unique rubber-tyred, optically guided tram system) are served by these modes.
- Copenhagen (500,000 inhabitants) is the least populous city to have a metro system. The majority of cities with populations greater than 500,000 inhabitants have a metro system; Dublin, Merseyside and Belfast are notable exceptions.

Table 3.2: Typology of public transport modes present in each city/region

City	Population	GDP per capita	Bus/ Trolley	Train	Tram	Metro
Aalborg	121,100	28,898	✓	✓		
Bietigheim-Bissingen	41,571	27,193	✓	✓	✓	✓
Brescia	192,154	36,900	✓			
Clermont Ferrand	263,829	20,000	✓	✓	✓	
Emilia Romagna	158,739	26,500	✓			
Malmö	267,171	32,292	✓			
Oulu	93,161	56,784	✓	✓		
Oxford	134,248		✓			
Preston	236,500	22674	✓			
Santander	183,799	19280	✓			
Suceava	108,255	1,800	✓			
Alicante	305,911	9,088	✓			
Belfast	579,276	No data	✓	✓		
Bristol	380,615	25,691	✓	✓		
Cardiff	305,200	No data	✓	✓		
Copenhagen	500,000	54,000	✓	✓		✓
Dresden	474,730	24,065	✓	✓	✓	
Gdansk	457,000	4,808	✓	✓	✓	
Glasgow	585,090	19,597	✓	✓		✓
Helsinki	559,700	26,880	✓	✓	✓	✓
Lisbon	564,657	15,000	✓	✓	✓	✓
Lyon	580,000	30,204	✓		✓	✓
Rotterdam	599,700	26,455	✓		✓	✓
Stuttgart	589,000	32,855	✓	✓	✓	✓
The Hague	436,754	28,000	✓		✓	
Barcelona	1,527,190	22,181	✓	✓	✓	✓
Brussels	1,004,239	49,900	✓	✓	✓	✓
Bucharest	1,705,309	4,237	✓		✓	✓
Budapest	1,959,509	13,760	✓	✓	✓	✓
Cologne	1,020,603	17,854	✓	✓	✓	✓
Dublin	1,180,083	42,852	✓	✓		
Merseyside	1,365,900	18,417	✓	✓		
Naples	1,071,744	15,220	✓	✓		✓
Prague	1,166,000	12,266	✓	✓	✓	✓
Sofia	1,221,157	3043	✓		✓	✓
Warsaw	1,688,200	13,315	✓	✓	✓	✓
Vienna	1,550,123	26,853	✓	✓	✓	✓
Athens	3,200,000	17,431	✓	✓	✓	✓
Madrid	3,092,459	22,818	✓	✓		✓
Rome	3,723,649	25,591	✓	✓	✓	✓
London	7,300,000	34,127	✓	✓	✓	✓
Ile de France	9,644,507	32,000	✓	✓	✓	✓

Modal share

Figure 3.6a and 3.6b and Figure 3.7a and 3.7b show the modal split in each city/region which is usually measured through travel survey data and public transport ticket sale data. As in the final reports from year two of the benchmarking initiative the population groupings have been maintained on each of the graphs in order to enable comparisons to be made across the data-set as a whole as well as between similarly sized cities. It is important to note that there has been little change to the modal share figures collected by cities which participated in the first two years of the benchmarking initiative and therefore these graphs have only been updated with revised figures or data from new cities.

Figure 3.6a and 3.6b illustrates the percentage of trips made using motorised transport, discounting the figures for cycling and walking (which have not been provided by all cities) and which are often based upon estimates. The full modal split is displayed in Figure 3.7a and 3.7b and analyses of the collected data has been presented as a bullet point summary after the graphs.

Figure 3.6a: Modal share of motorised trips in the urban administrative area on a weekday (continued in Figure 3.6b)

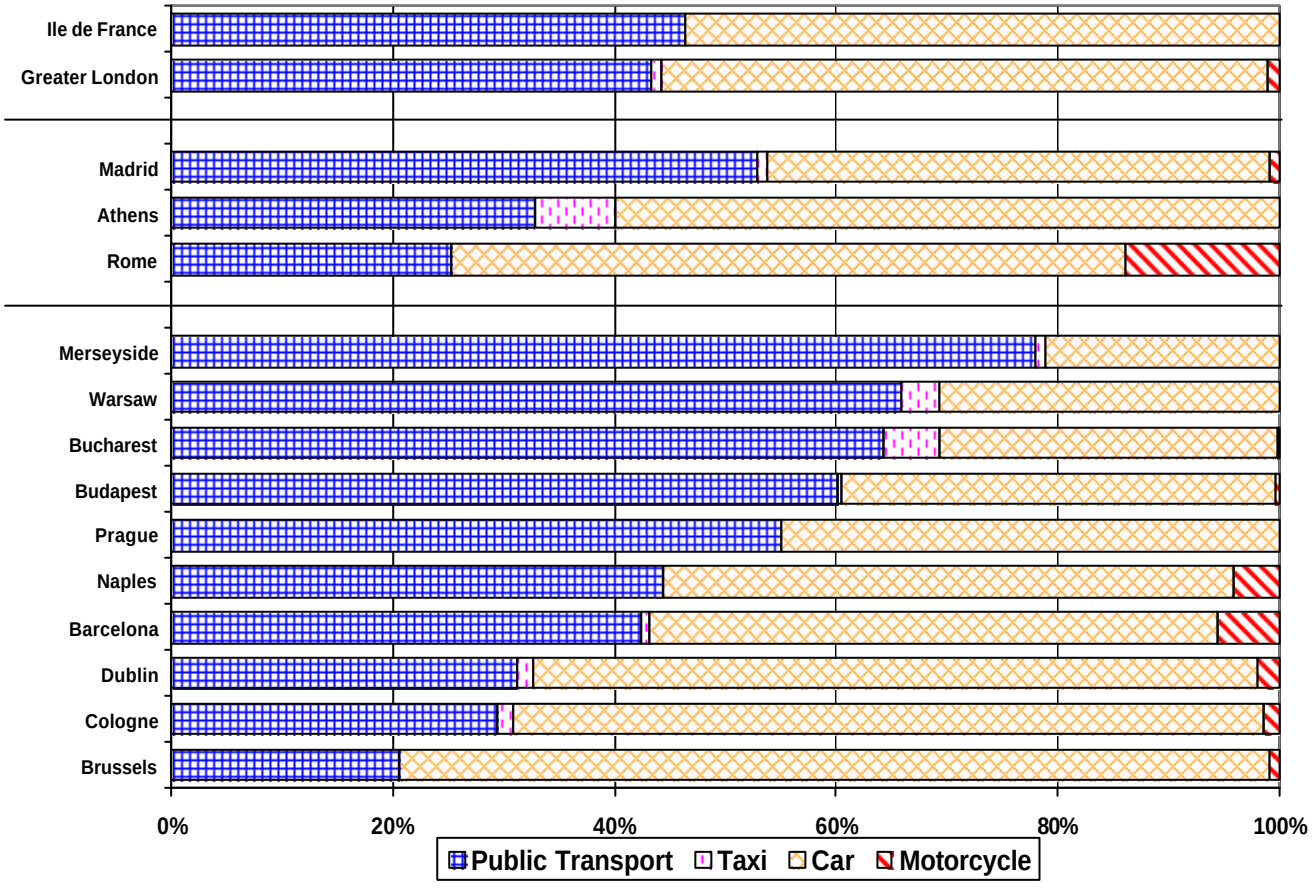
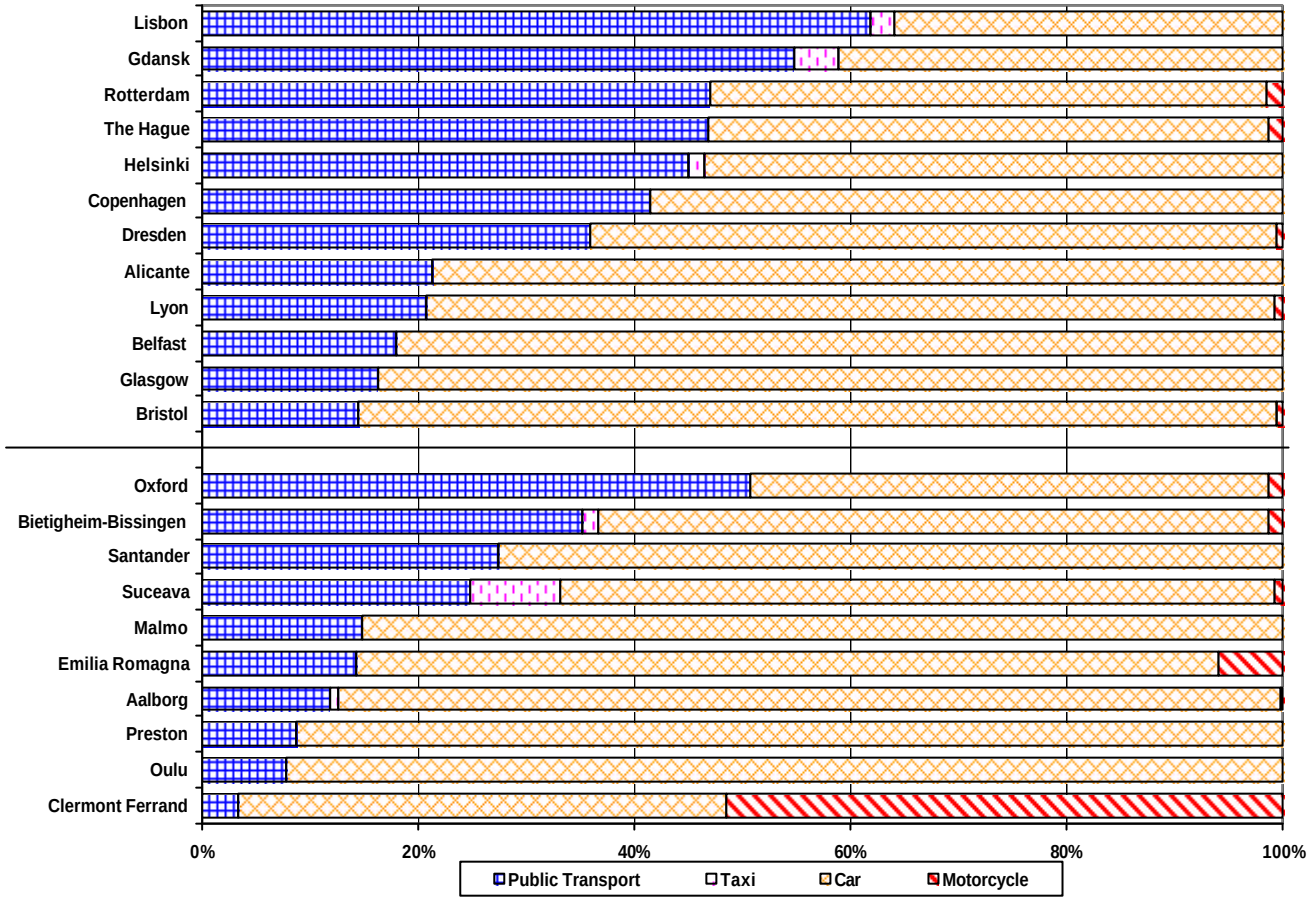


Figure 3.6b: Modal Share of motorised trips in the urban administrative area on a weekday (continued)



Key Data Issues for Modal Split Data in Figure 3.6a and 3.6b and 3.7a and 3.7b

- The data displayed relates to the study year of 2003 except for: Budapest (1994), Lyon (1995) Madrid (1996), Lisbon and Warsaw (1998), Athens and Rome (1999), Bucharest (2000), Emilia Romagna and Rotterdam (2001), Dublin, Bristol, Oxford, Naples, Gdansk, Clermont Ferrand, Suceava, Helsinki, Cologne, Dresden, Barcelona and Vienna (2002) and The Hague, Preston and Santander (2004).
- Walking and cycling data was unavailable for Belfast.
- The data for non-motorised modes displayed for Rome, Prague, Barcelona and Alicante in Figure 3.7a and 3.7b reflects the combined modal shares of walking and cycling.
- Data for Dublin reflects all the daily trips that are made to places of work, school and university only (irrespective of start time) do not therefore reflect the total level of daily trips. The figures are therefore of more non-car based modes, because the majority of these types of trips take place during the peak daily transport hours.
- Data for the Emilia Romagna region related to daily systematic trips (e.g. commuting and school trips).
- It should be noted that 4% of all urban transport trips in Bucharest were attributed to "lorries". This figure has been removed from Figure 3.6a and 3.6b and 3.7a and 3.7b for improved comparability.
- Data for Cardiff is not presented, because figures relating to the number public transport trips were the only data available and it was not therefore possible to calculate a modal split.

Figure 3.7a: Modal share of trips by all modes in the urban administrative area (continued in Figure 3.7b)

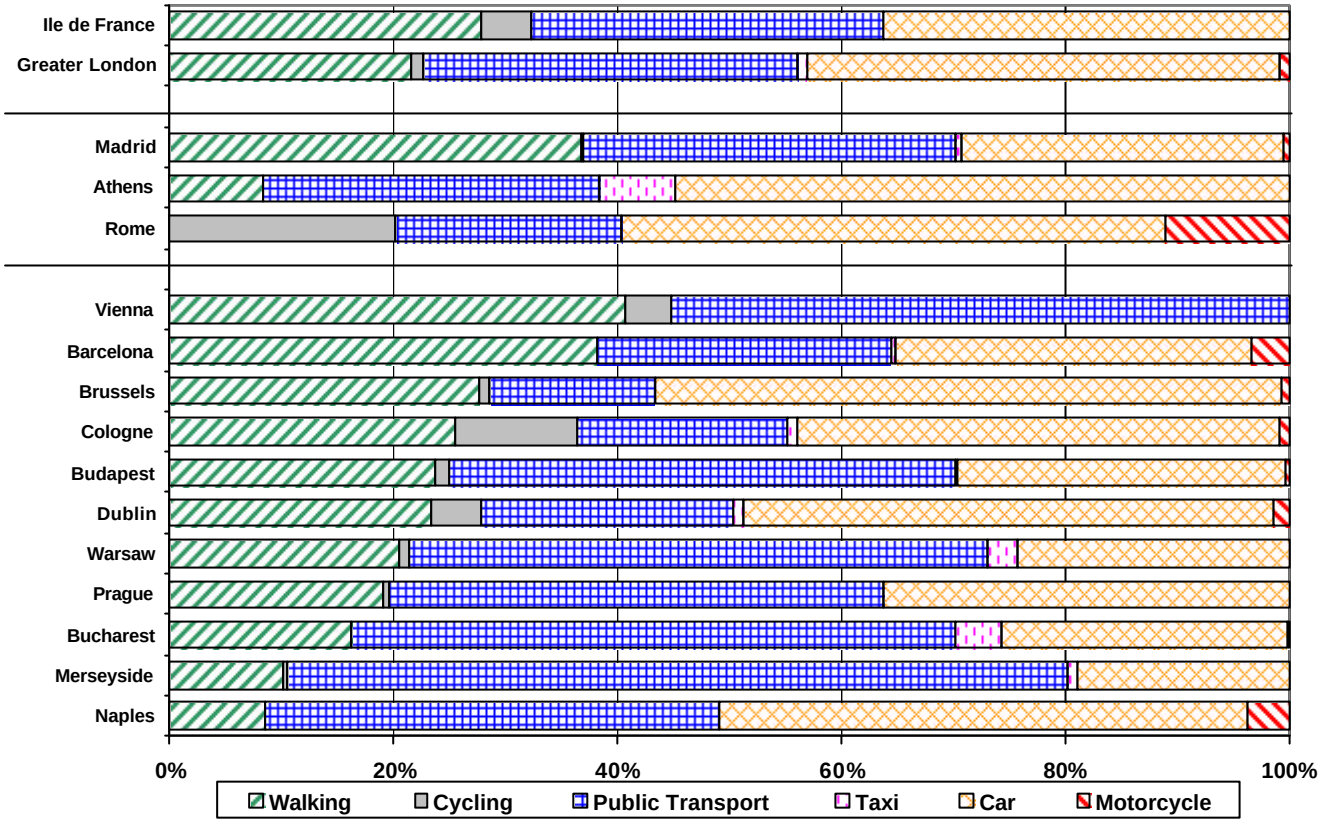
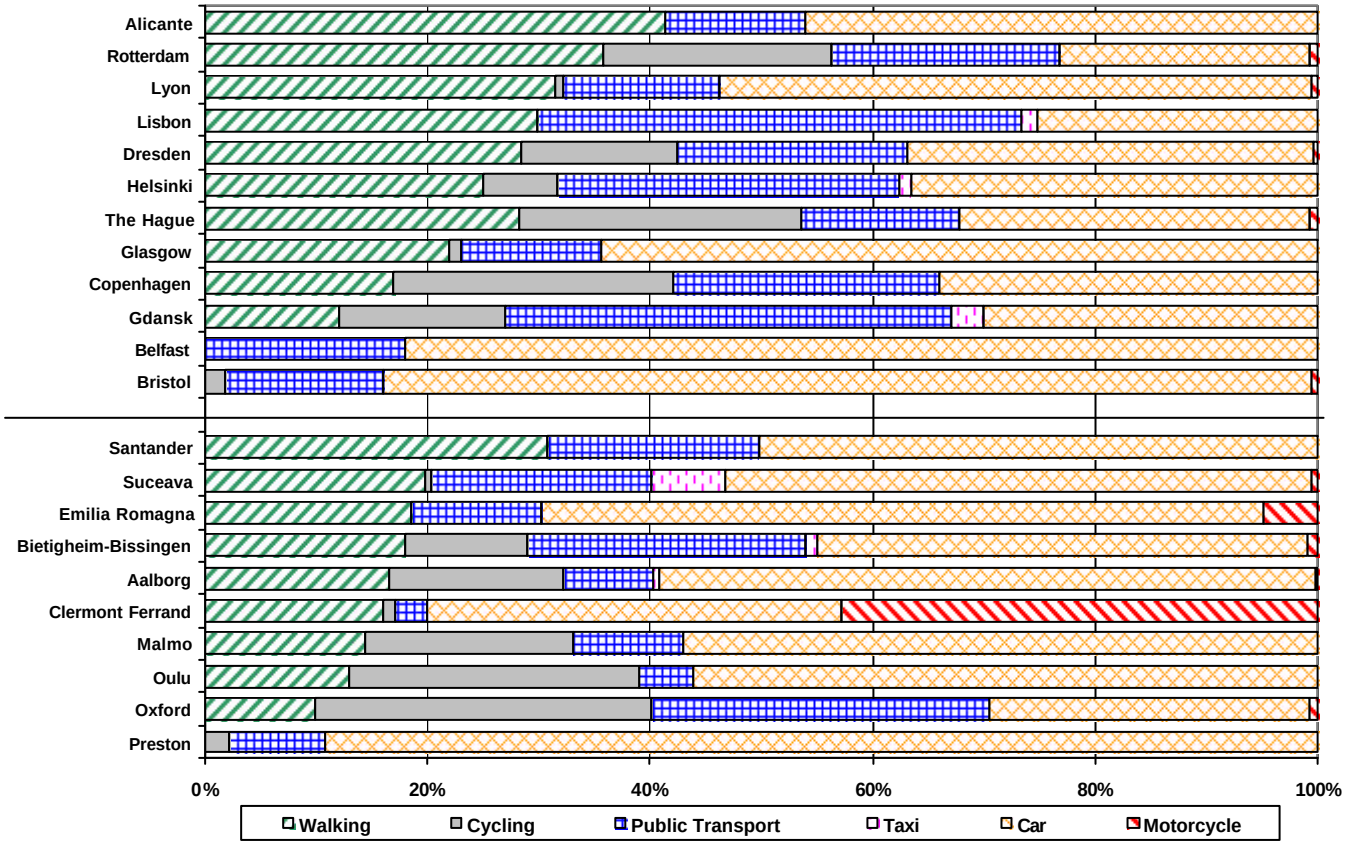


Figure 3.7b: Modal share of trips by all modes in the urban administrative area (continued)



The key findings from the analysis of the modal split of motorised trips (Figure 3.6a and 3.6b) are:

- Of the 35 cities for which data was available a total of 9 demonstrated a public transport modal share of more than 50% (Madrid, Warsaw, Bucharest, Budapest, Prague, Merseyside, Lisbon, Gdansk and Oxford).
- 5 of the cities with a motorised-trip modal share of more than 50% for public transport modes are situated in New Member States of the European Union.
- 7 of these 9 cities have between 300,000 and 2 million inhabitants.
- Capital cities generally showed a relatively high level of public transport modal share, while cities in more provincial locations demonstrated higher car modal shares.
- Italian and Spanish cities, Rome and Barcelona in particular, appear to demonstrate the greatest motorcycle modal shares for all motorised trips, which appears to lend support the commonly accepted "scooter culture" which is deemed to be more prevalent in Southern European cities.

Figure 3.7a and 3.7b shows the modal split figures including the submitted data for walking and cycling trips. This chart displays the cities in rank order of modal share for walking and, as in year two of the benchmarking initiative, the data have been presented in groups of cities with similar populations. The key findings from the data for modal split of all trips in the urban administrative area on a weekday are largely unchanged from year two of the benchmarking report:

- Of the six New Member State (NMS) and Accession Country cities three have less than 20% modal share for walking and none of these cities is among those which displayed a walking modal share greater than 30%.
- Scandinavian, Dutch and German cities appear to have the greatest uptake of sustainable transport modes, with The Hague, Rotterdam, Dresden and Copenhagen having significant modal shares (more than 40%) for walking and cycling. Vienna, Alicante, Aalborg, Oulu and Oxford also have large modal shares for walking and cycling.
- The Ile de France and Greater London have very similar modal splits, although the Ile de France demonstrates a marginally greater proportion of trips made by sustainable modes. In Figure 3.6a and 3.6b the two cities display near identical modal splits for motorised travel, which suggests that the two are suited to further comparisons.
- The cities of Madrid, Athens and Rome demonstrate very different modal shares. In the city of Rome, walking and cycling trips are not segregated, which can be misleading and therefore limits the potential for further analysis of non-motorised travel in Rome. Of the three cities with populations of 2-4 million inhabitants, Athens appears to display the smallest proportion of trips made by walking and cycling. This is supported by anecdotal evidence from the representatives from Athens who suggest that the local topography and climatic conditions in Athens represent a major barrier to walking and cycling in the city.
- Of the cities with between 1 million and 2 million inhabitants there is a significant range in the proportions of trips made by cycling and walking. Although no clear patterns emerge the three cities with the highest proportion of walking modal share (Vienna, Barcelona and Brussels) also have relatively high levels of GDP per capita. Further comparison of these cities and their varying modal splits is likely to be of interest, since all 9 of the cities are relatively similar in size and each has a well developed urban transport system.
- The cities with between 300,000 and 600,000 inhabitants also demonstrate a wide range of modal splits, with notable variations in the proportion of walking trips, although no data for walking and cycling trips was available for Bristol, Belfast and Cardiff. A number of cities

within this population group also demonstrate significantly larger cycling modal share proportions when compared to the more populous cities.

- The cities with populations of less than 300,000 demonstrate much lower levels of walking, with all but one of the cities having a less than 20% share of all trips. Conversely these cities demonstrate some of the larger cycling modal shares from all 35 of the cities. It is therefore possible to suggest that the cities with smaller populations (less than 600,000) appear to be more conducive to cycling, although this finding should be treated with some caution due to the fact that walking and cycling values are often based upon estimates.
- Santander and Preston are two of the new cities which submitted common indicator data in year three of the benchmarking initiative. Santander displays a high level of walking (30% of all trips) while both cities have large car modal shares in relation to their public transport modal share figures. Preston has the largest car modal share of all the benchmarking cities, with almost 90% of all trips in the city being made by car.

Figure 3.8a: Car ownership (cars per 1000 people) (continued in Figure 3.8b)

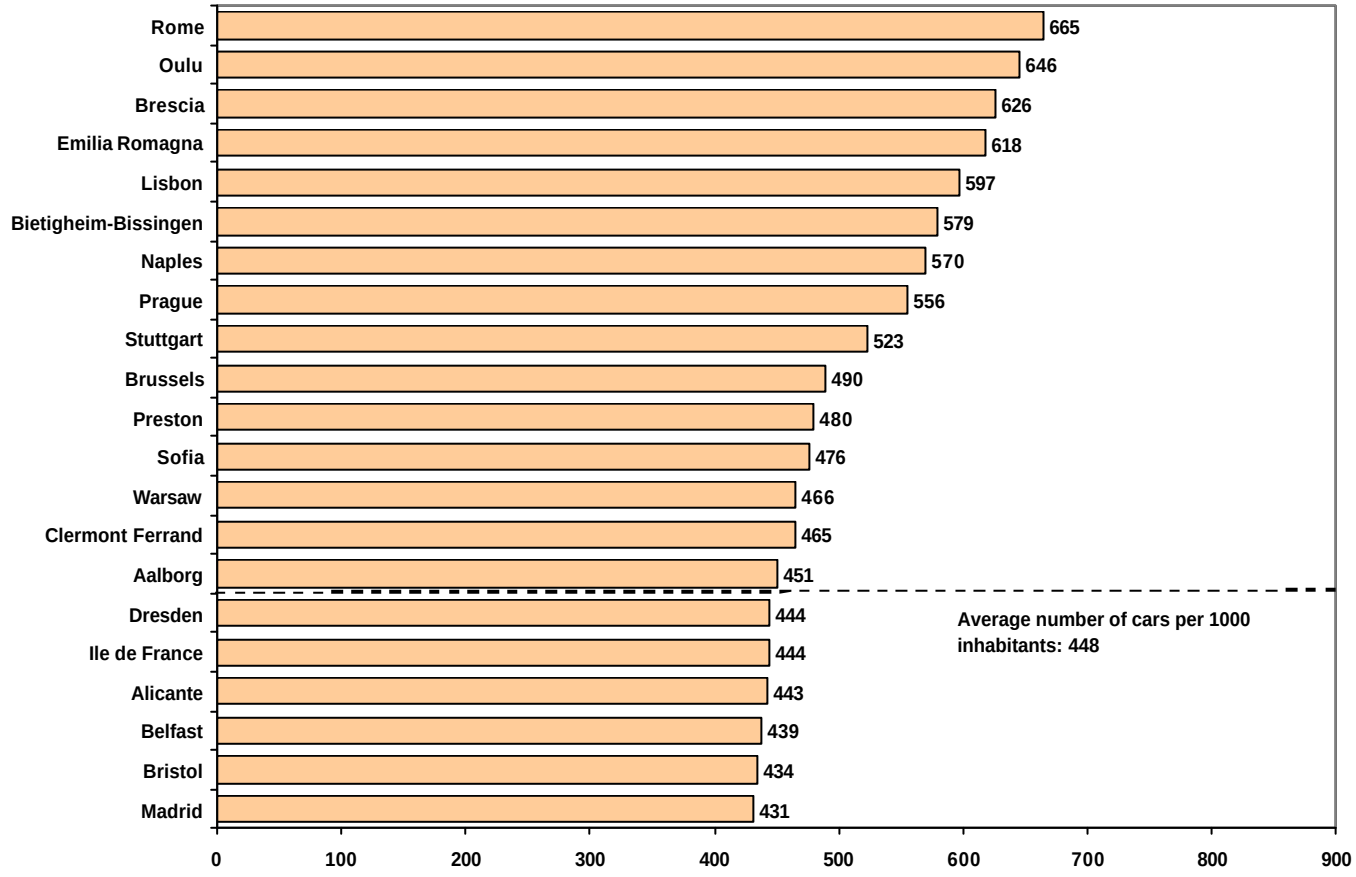
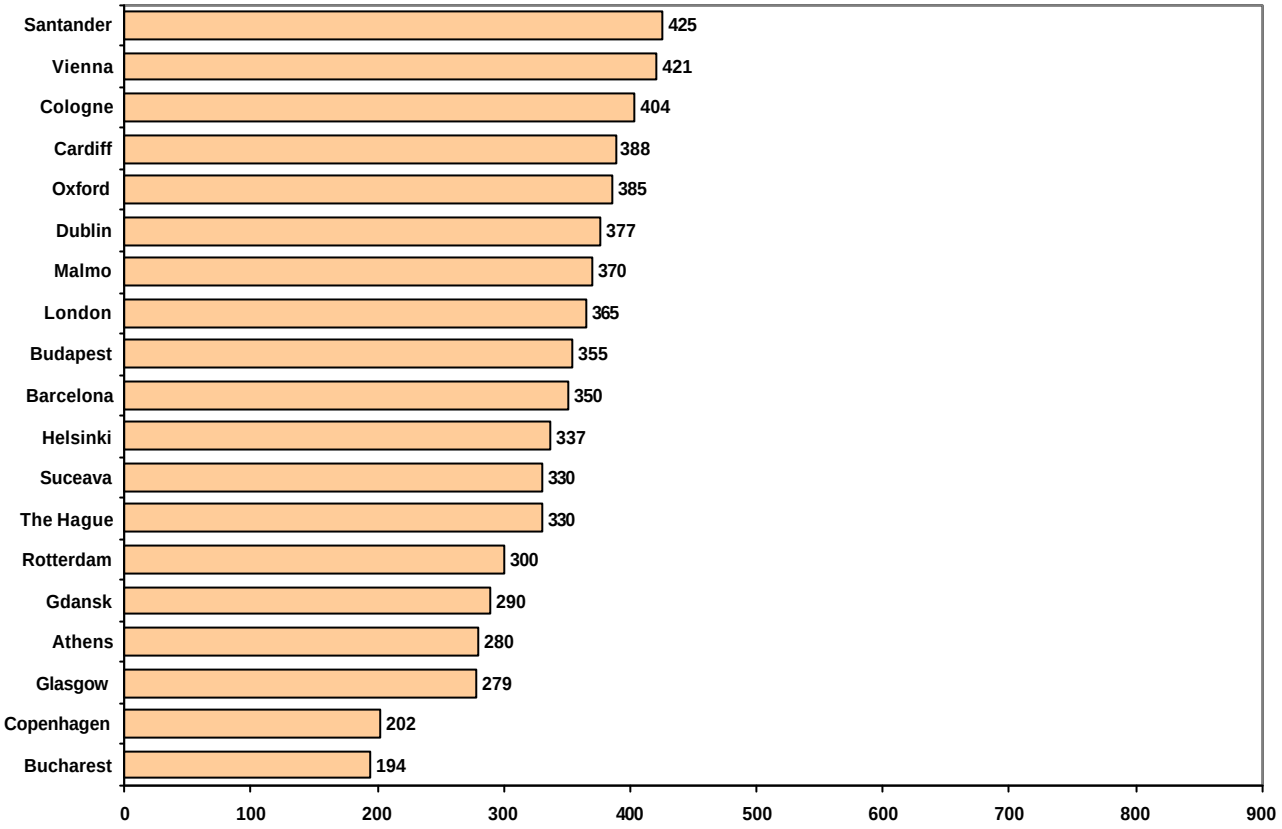


Figure 3.8b: Car ownership (cars per 1000 people) (continued)



Key data issues

- Data relates to 2003, except for; Athens (1999), Barcelona (2000), Oxford and Lisbon (2001), Bristol, Rotterdam, Rome, Bucharest, Dublin, Warsaw, Stuttgart and the Ile de France (2002) Glasgow, Malmo, Cardiff, Santander, Sofia, Preston, Brescia and Merseyside (2004) and The Hague, Aalborg and Copenhagen (2005)
- Data for Belfast includes both cars and vans.
- Data for London refers to the Greater London area.
- Data for the Ile de France, Merseyside and Barcelona relates to regional areas.

Figure 3.8a and Figure 3.8b display car ownership in terms of the number of registered cars per 1,000 people. The city with the highest level of car ownership is Rome, with 665 cars per 1000 people and Oulu, Brescia and the Emilia Romagna Region also display high levels of car ownership, with each city having more than 600 cars per 1000 inhabitants. Sofia, one of the new cities to submit common indicator data in year three of the project, displays a relatively high level of car ownership (476 cars per 1000 inhabitants, which is similar to that of Prague and Warsaw) when compared to other New Member States. Bucharest (194 cars per 1000 population) and Copenhagen (202 cars per 1000 population) display the lowest levels of car ownership among the benchmarking cities. The average number of cars per 1000 population for all of the cities listed above is 448, which is higher than in year two of the benchmarking initiative and is indicative of a slight increase in car ownership levels in some of the cities.

The common indicator report also contained a number of graphs contrasting the density and coverage of urban transport networks in the benchmarking cities. These graphs have not been included in this report, but are available in the Common Indicator report (Annex A1).

The following bullet points provide a detailed overview of the urban transport situations that exist in the benchmarking cities. The key observations have been updated from year two of the Urban Transport Benchmarking Initiative to account for new cities and updated data from existing participants:

- Bus networks are present in all of the cities, while most are served by heavy rail. Some of the medium-sized and most of the larger cities have an urban heavy rail network, while tram and metro systems are much less common in the cities with smaller populations.
- The majority of cities with populations greater than 500,000 inhabitants have a metro system; Dublin, Merseyside and Belfast are notable exceptions to this trend.
- 9 cities demonstrated a public transport modal share of more than 50%; Madrid, Warsaw, Bucharest, Budapest, Prague, Merseyside, Lisbon, Gdansk and Oxford. Five of these 9 cities are located in New Member States (NMS) or Accession Countries.
- Of the six NMS and Accession Country cities, three have less than 20% modal splits for walking and none of them has a walking modal share greater than 30%.
- The least populous of the benchmarking cities have the largest cycling modal shares.
- With the exception of Rome, the levels of car ownership are generally greatest in smaller cities located in more rural surrounding areas, rather than in large urban areas.
- Santander and Preston are two of the new cities which submitted common indicator data in year three of the benchmarking initiative. Santander displays a high level of walking (30% of all trips) while both cities have large car modal shares in relation to their public transport modal share figures. Preston has the largest car modal share of all the benchmarking cities, with almost 90% of all trips in the city being made by car.
- The cities in the initiative with the largest populations consistently display the highest densities of urban transport infrastructure and routes, although this trend is less apparent when considered in terms of population coverage.
- The cities with the smallest populations in the benchmarking initiative have the largest cycle networks in relation to the total road network length and appear to be better equipped to encourage cycling as a mode of transport.

3.3 Key urban transport trends identified

The trends identified in years one and two of the Urban Transport Benchmarking Initiative were revisited and developed in the Common Indicator report (Annex A1). Section 3.3.1 focuses upon core urban transport trends which have underpinned all three years of the benchmarking initiative. The trends have been re-tested using the latest, most concise dataset available.

In response to participant requests for the common indicator analysis to be targeted more specifically towards the work of the thematic working groups. Section 3.3.2 considers public transport trends and section 3.3.3 focuses upon the accessibility of urban transport fleets for disabled people. Section 3.3.4 explores the data collected by the benchmarking cities in relation to cycling, while section 3.3.5 focuses upon employment in cities and the effects of commuter travel. Section 3.3.6 utilises new data collected on the topic of clean vehicle fleets and section 3.3.7 draws comparisons between cities located in New Member States, Accession Countries and EU 25 states.

3.3.1 Core urban transport trends revisited

The key trends identified in years one and two of the Urban Transport Benchmarking Initiative have been re-evaluated in this section of the report, using the updated data-set. The principle trends identified during the course of the project are:

- A positive relationship between GDP per capita (i.e. indicator for affluence) and the level of car use in a city.
- The positive relationship between GDP per capita, the size of a city's cycle network and the modal share of cycling in a city.
- The strong positive relationship between the population of a city, the presence and size of a metro system.

These trends are covered in significant detail in the common indicator report (Annex A1) from year three of the Urban Transport Benchmarking Initiative. As a result the graphs have not been reproduced in the final report.

3.3.2 Public transport trends

Section 3.3.2 of the report considers the public transport trends evident in the cities involved in year three of the benchmarking initiative and links to Annex A4 of the Urban Transport Benchmarking Initiative final reports, which detail the activities of the Public Transport Organisation & Policy working group. A number of interesting comparisons have been made between the cities and, where possible cities of a similar size have been contrasted. The modal share figures, which form the basis for public transport performance in the benchmarking cities, have already been presented in section 3.3.1 of this report and therefore will not be repeated here. The figures in this section represent a more in-depth look at interesting public transport trends in the benchmarking cities.

Figure 3.9 outlines the responses to an indicator collected only by cities involved in the second and third years of the benchmarking initiative. The graph illustrates the proportional breakdown of passenger kilometres travelled by each mode of public transport in the benchmarking cities in 2004.

The key observations from Figure 3.9 are:

- Cities with populations of less than 300,000 inhabitants are particularly reliant upon bus services for the delivery of their public transport. Bietigheim-Bissingen appears to be the main exception, displaying a wide range of public transport modes, with the largest share of passenger kilometres attributed to trains. This is because the data provided relates to the region of Baden-Württemberg.
- Glasgow and Merseyside have very similar proportions for passengers carried by each mode, with approximately 70% of the total passenger kilometres being travelled by bus. Both having similarly populated urban areas, these two cities appear to be reasonably comparable.
- Bucharest and Prague are similarly sized cities which also demonstrate similar shares of bus, metro and tram passenger kilometres in relation to the totals for their cities. In Budapest the number of passenger kilometres travelled is much greater than in Prague and Bucharest, although considerably less distance is travelled by train in Budapest.
- Metro and tram systems, which account for significant proportions of the total number of passenger kilometres travelled, are more prevalent in cities with populations greater than 600,000 inhabitants. In the case metro systems, this reflects the high volume, high frequency

nature of this mode of urban transport and the fact that they are present in most of the cities with populations of more than 1 million inhabitants.

- In the majority of the cities where there is a metro system present the proportion of passenger kilometres travelled by metro is in the region of 25-30%. The key exceptions are Glasgow (which has a relatively small metro system) and Bietigheim-Bissingen (where the figures have been obtained for the region).
- In Greater London a very large proportion of trips are made by metro, although because the data for train passenger kilometres was not available (it is individually retained by each train operating company in the city) the proportional figures for London are skewed towards the metro and buses.
- In the Ile de France region the train makes up the largest proportion of total passenger kilometres, followed by the metro. This reflects the well developed RER network in the city, which operates across The Ile de France region.
- The Hague demonstrates a very high level of tram use, with 65% of all public transport passenger kilometres being undertaken by tram trips.

Figure 3.9: The proportion of total passenger kilometres travelled by mode in 2003

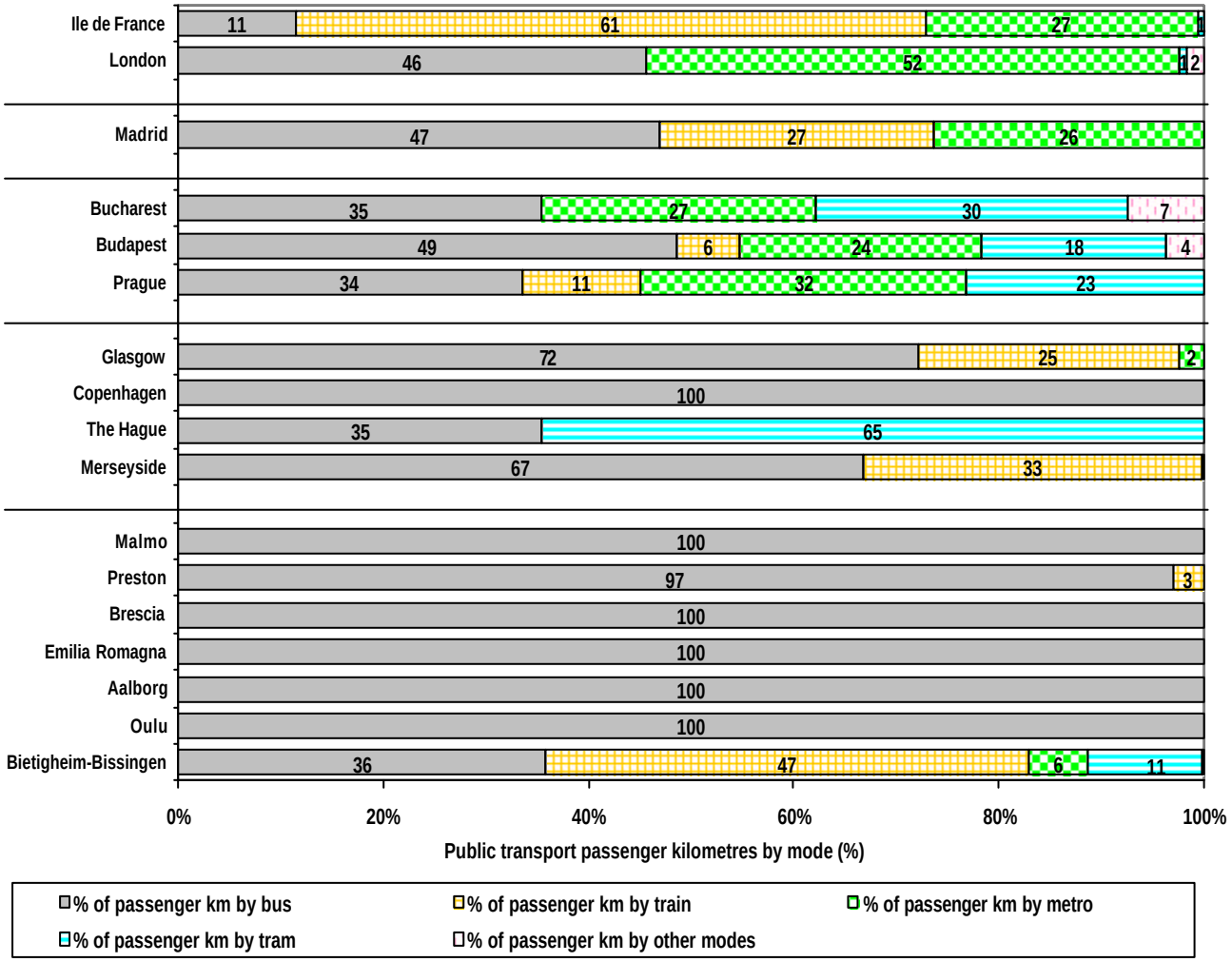


Figure 3.9: Key data notes

- Data for Bietigheim-Bissingen relates to the regional area of Baden-Württemberg.

- Data relates to 2004, except for; Ile de France, Prague, Bucharest, Budapest, Madrid, London, and Merseyside (2003)

As in previous years of the benchmarking initiative, the nature of the data collected and the wide range of factors that influence the use of public transport make it impossible to draw direct causal links between the modal share for public transport and the factors that affect it. Developing the observation that metro systems account for significant proportions of the total number of passenger kilometres travelled, Figure 3.10 reveals a trend between the presence of a metro system and public transport modal share.

The graph shows that, on average, the cities with metro systems have larger public transport modal shares than those which do not. There are a few notable exceptions to this trend; The Hague, Gdansk, Oxford, Merseyside, Glasgow, Brussels, Lyon and Rome, but the trend is otherwise very pronounced. The multiple factors which have an effect upon the modal share for public transport mean it is not possible to determine whether the metro system is a cause or an effect of high public transport modal shares. Nonetheless the data does suggest that metro systems stimulate public transport use.

Figure 3.10: Modal share of all public transport modes with metro cities identified

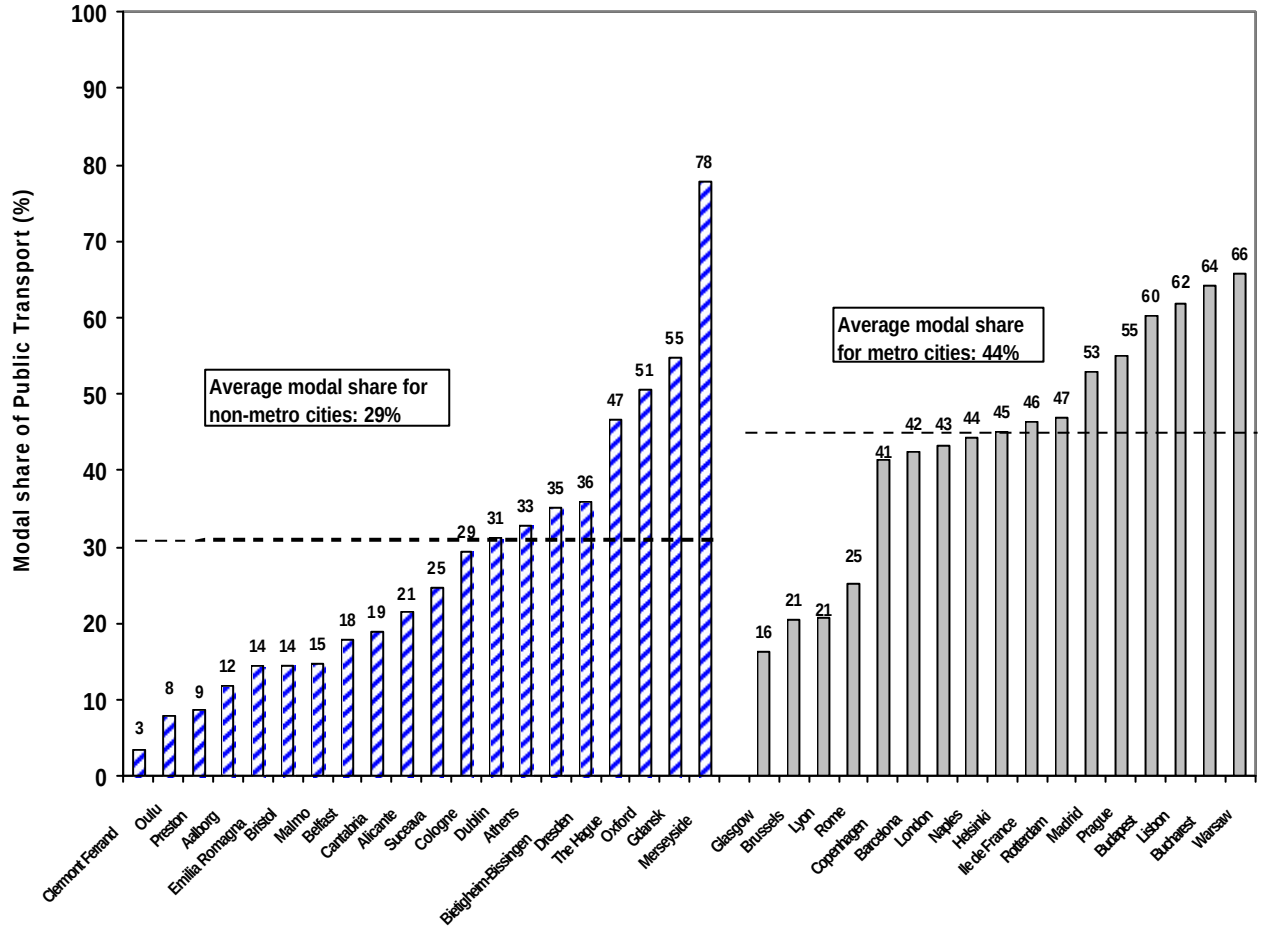
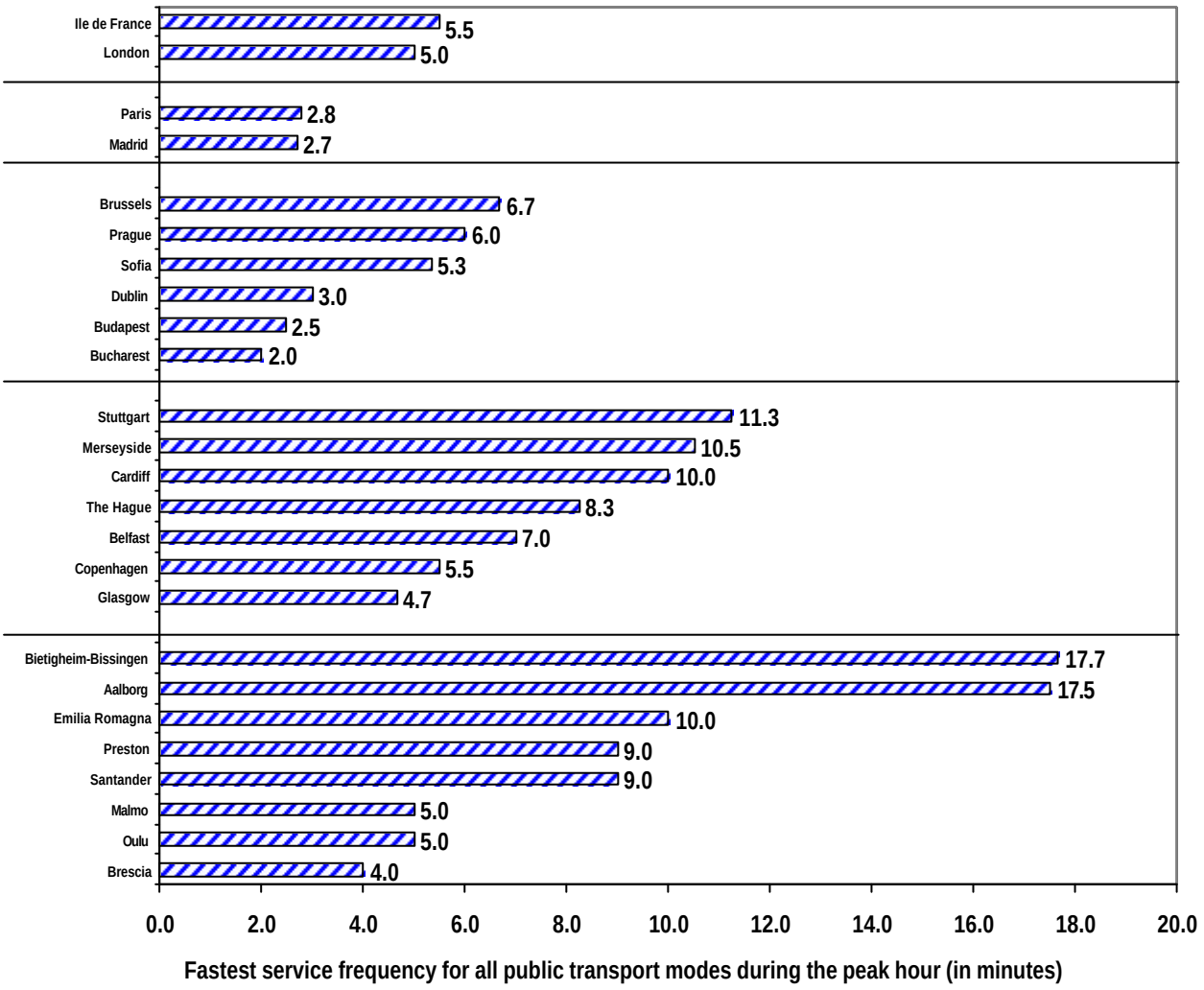


Figure 3.11 illustrates the most frequent service interval as an average for all public transport modes in each of the benchmarking cities which submitted this data. The collected data indicates that:

- When averaged for all modes of public transport, the smaller cities (in terms of population) are more likely to have less frequent peak hour services than larger cities. This is logical since larger cities have greater critical mass of public transport users and a greater range of public transport modes, with high volume, high frequency routes into the central areas of the city.
- The data for Merseyside also bears an interesting comparison, because the city has a public transport modal share of almost 80%, yet on average the fastest peak hour service interval is once every ten minutes.

Figure 3.11: Most frequent peak hour service intervals (averaged for all modes of public transport) in 2004



Figures 3.12a and 3.12b indicate that no clear trend exists for the average speeds of public and private transport modes. The key observations from the graphs are;

- In Aalborg, Bristol, Copenhagen, Belfast, Glasgow, The Hague, Vienna, Preston, Santander, Budapest, Barcelona, Brussels and Greater London the average speed of public transport modes exceeds that of private motorised transport.
- London, Preston and The Hague are the two cities where there is the largest difference between the peak-hour speed of public transport modes and the peak hour-speed of private motorised modes.

- In 7 of the 10 cities with populations of less than 300,000 inhabitants it is quicker to travel by car or motorcycle than by public transport during peak hour. This is likely to be related to the fact that smaller cities often rely upon bus services which, due to the need to stop regularly, tend to circulate at a slower rate than private cars can.
- Bucharest and Dresden displayed the slowest peak-hour public transport speeds of all of the cities (15km/h) while Bristol and London had the slowest peak-hour private motorised speeds (also 15km/h).
- Cologne demonstrated the fastest peak-hour private motorised speed (40km/h) and The Hague has the fastest peak hour public transport speed (38km/h).
- As in year two of the Urban Transport Benchmarking Initiative these figures can be compared to the data presented in Figures 4.6a and 4.6b. Of the 4 cities which achieved public transport modal shares in excess of 50% and were able to provide the average speed data for Figure 5.13 (Budapest, Madrid, Oxford and Warsaw) only Budapest demonstrated a faster average peak-hour speed for public transport than private motorised modes.
- This finding suggests that the urban traveller does not base his/her decisions solely upon the speed of the transport modes available to them. Issues such as the cost of and access to suitable public transport services are also likely to influence these decisions.

This data indicates the cities which have been most successful at making public transport an attractive option to travellers during peak public transport hours (most likely to be commuters) in respect of the comparative speed of private motorised modes. Some cities face a distinct disadvantage in this respect, because the road network affords the private motorised traveller a faster journey than the public transport system. This finding appears to advocate the need for greater demand management measures in cities where peak-hour public transport average speeds are severely inferior to the speed of private motorised modes during the same period. Slowing the speed of private motorised modes and/or improving the rapidity of public transport in isolation is unlikely to guarantee improved public transport patronage.

Figure 3.12a: Average peak-hour speeds of public transport and private motorised modes in the benchmarking cities (continued in Figure 3.12b)

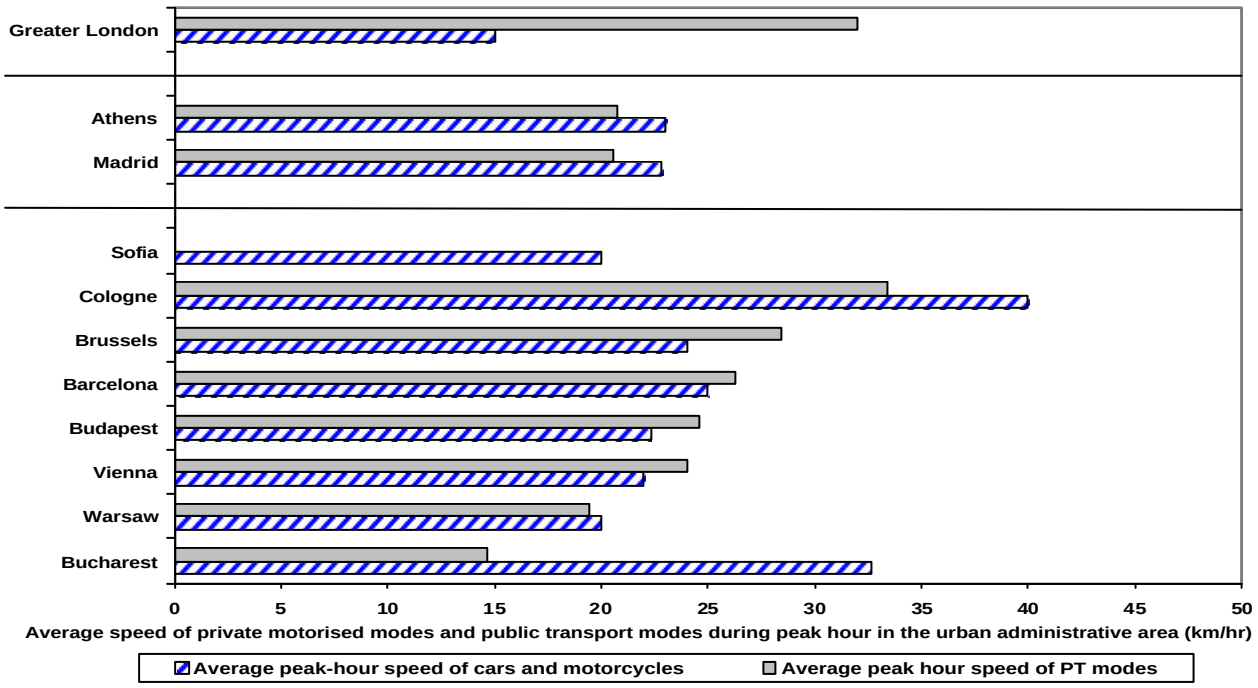
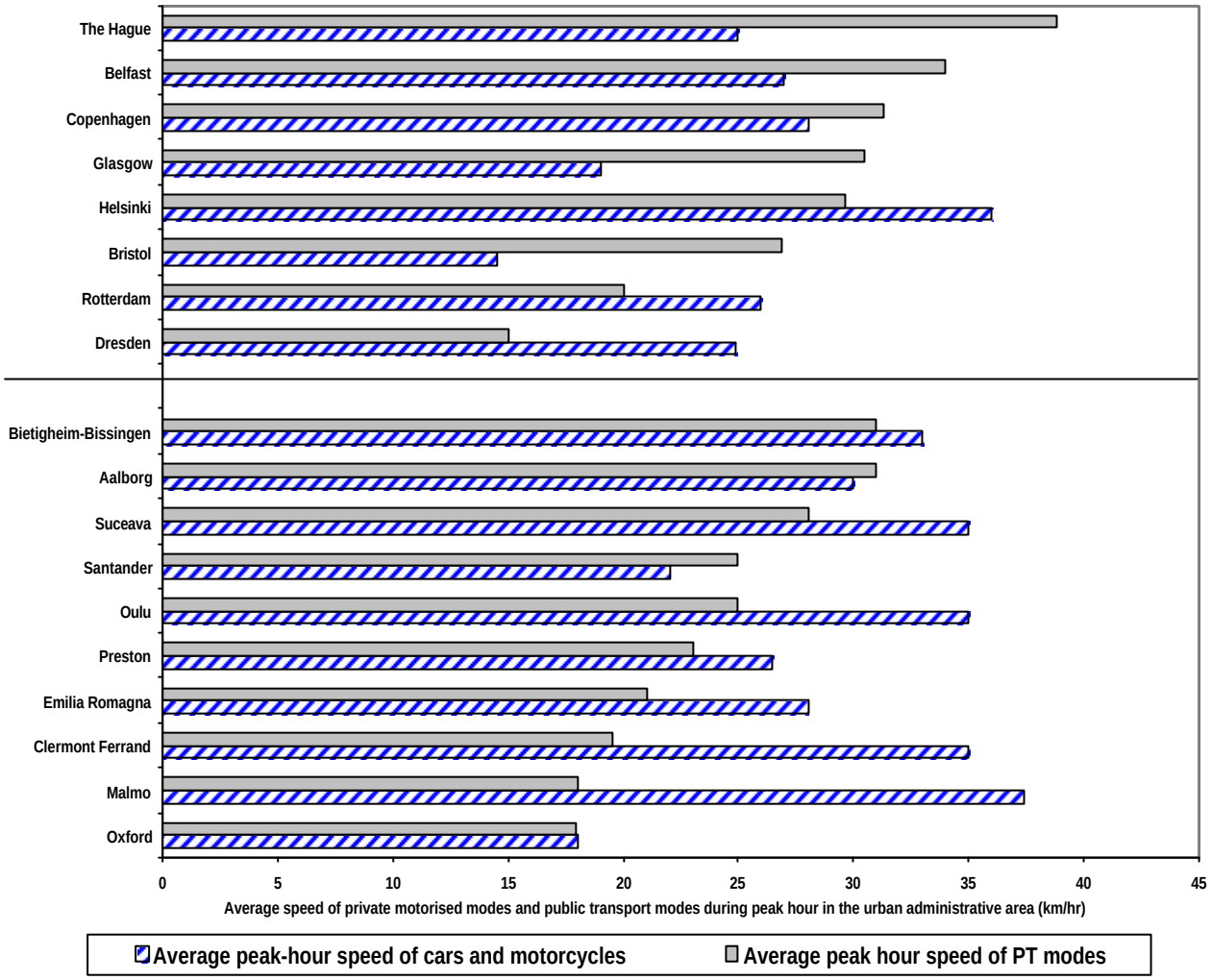


Figure 3.12b: Average peak-hour speeds of public transport and private motorised modes in the benchmarking cities (continued)



Key data notes for Figure 3.12a and 3.12b:

Data relates to 2003, except for; Oxford, Clermont Ferrand, Suceava, Dresden, Rotterdam, Helsinki, Bristol, Warsaw, Vienna, Barcelona and Cologne (2002) and Preston, Santander and Sofia (2004).

In all three years of the Urban Transport Benchmarking Initiative the participants have provided information relating to the number of public transport vehicles in their cities. In the year two final reports the population data for the cities was used in order to calculate a figure for the approximate number of people per public transport vehicle in each of the benchmarking cities. These figures provide an abstract, but useful, basis for comparing the cities' public transport fleets and have been presented using the updated data from year three of the initiative in Figures 3.13a and 3.13b.

Figure 3.13a: Size of public transport fleets in relation to urban population (continued in Figure 3.13b)

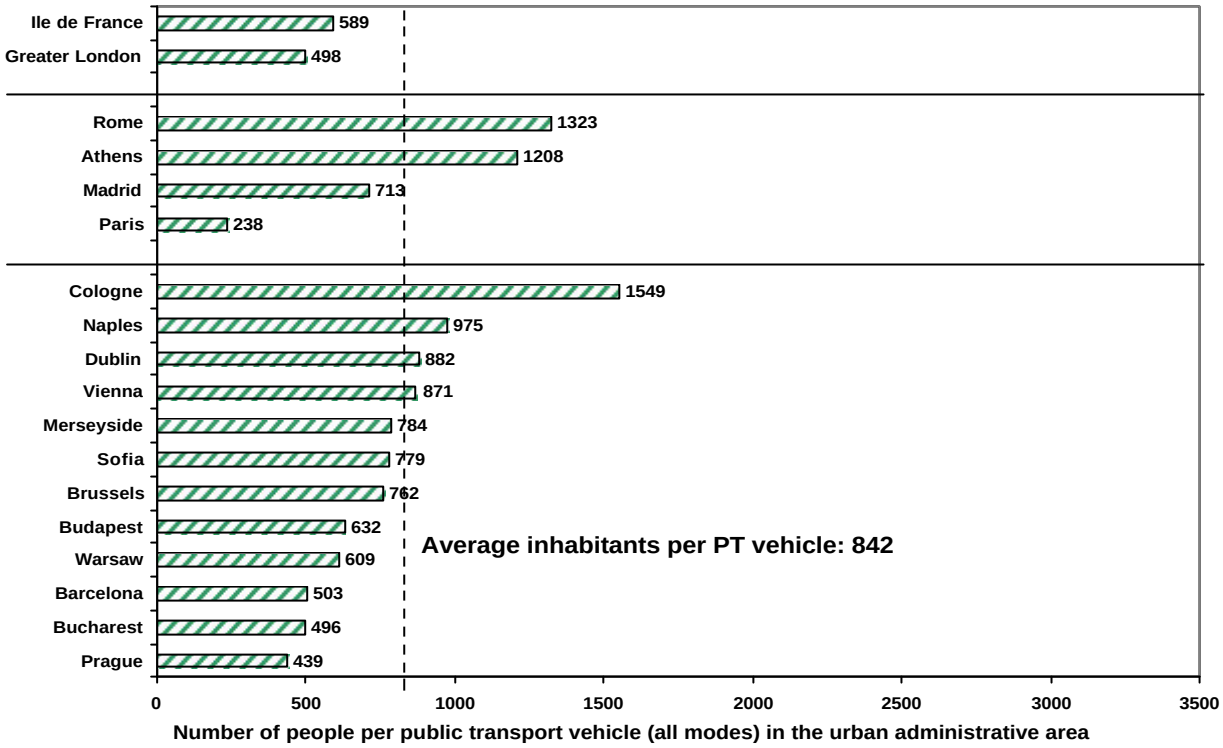


Figure 3.13b: Size of public transport fleets in relation to urban population (continued)

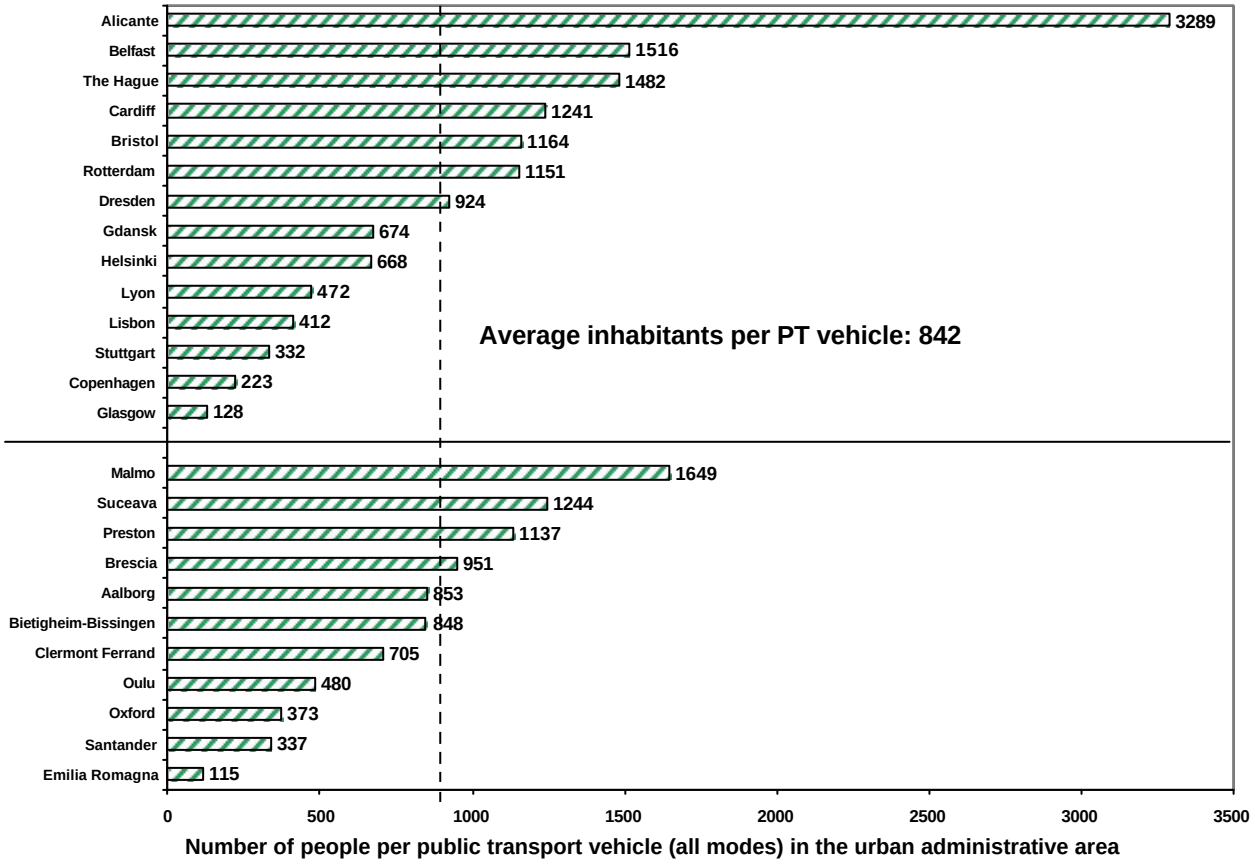


Figure 3.13 key data notes

Data refers to 2003, except for Oxford, Helsinki, Bristol, Gdansk, Clermont Ferrand, Rotterdam, Lyon, Lisbon, Dresden, Naples, Suceava, Warsaw, Barcelona, Vienna Cologne and Rome (2002), Santander, Cardiff, Malmo, Brescia, Preston, Copenhagen, Prague, Emilia Romagna, Glasgow and Paris (2004), Aalborg and Merseyside (2005) and The Hague (2006).

The key observations from Figure 3.13 are that:

- The average number of inhabitants per public transport vehicle in all of the benchmarking cities is 842.
- The two largest cities in the data-set, Greater London and the Ile de France, both fall below this average with fewer inhabitants per public transport vehicle (i.e. a relatively high level of public transport supply).
- With the exception of the two most populous cities in the data-set there appears to be no specific link between the size of the city and the number of inhabitants per public transport vehicle.
- Alicante is well above the average level of inhabitants per public transport vehicle, as are Malmö, Cardiff, Belfast, The Hague and Cologne.
- The 10 main cities of the Emilia Romagna region, Glasgow and Copenhagen all demonstrate a very low number of inhabitants per public transport vehicle.

Overview of public transport trends evident in the benchmarking cities

The data presented in section 3.3.2 has outlined a number of trends relating to the public transport provision in the cities involved in the third year of the Urban Transport Benchmarking Initiative. These include:

- Smaller cities largely reliant upon bus services for the delivery of their public transport.
- Metro and tram systems, which generally account for significant proportions of the total number of passenger kilometres travelled, are more prevalent in cities with populations greater than 600,000 inhabitants.
- In 6 out of 8 of the cities where there is a metro system present the proportion of passenger kilometres travelled by metro is roughly 25-30% of total passenger kilometres travelled.
- The smallest cities in terms of population generally demonstrate the lowest levels of public transport use and this is reflected in the modal share figures.
- Of the 4 cities which achieved public transport modal shares in excess of 50% and were also able to provide the average speed data for Figure 3.12 (Budapest, Madrid, Oxford and Warsaw), only Budapest demonstrated a faster average peak-hour speed for public transport than private motorised modes.
- This finding suggests that the urban traveller does not base his/her decisions solely upon the speed of the transport modes available to them. Issues such as the cost of and access to suitable public transport services are also likely to influence these decisions.
- The average number of inhabitants per public transport vehicle in all of the benchmarking cities is 842.
- With the exception of the two most populous cities in the data-set (which both have fewer inhabitants per vehicle) there appears to be no specific link between the size of the city and the number of inhabitants per public transport vehicle.

3.3.3 Accessible urban transport for disabled people - trends

Two of the common indicator questions focused upon the accessibility of urban transport fleets and infrastructure in the cities. Accessibility is often considered as a key feature of bus fleets, and most of the participants in the initiative were able to provide this information. Given the social commitment in most European cities to develop accessible urban transport for all, the benchmarking cities were asked to provide this information for all urban transport modes. This information has been presented in this section of the report and links closely to the work undertaken by the Urban Transport for Disabled People working group during year three of the initiative. The full report from this working group is available in Annex A5 of the final reports of the benchmarking initiative.

It is important to note that the data collected has used the term "wheelchair accessible" as a means of ensuring comparability across the benchmarking cities. While it is acknowledged that wheelchair users only represent one group of disabled travellers in cities, this distinction was essential in order to make use of available and comparable data.

Figures 3.14a and 3.14b show the proportion of bus fleets which are wheelchair accessible in each of the benchmarking cities, while Figure 3.15 focuses on the accessibility of bus infrastructure in the cities. Key observations from Figures 3.14a, 3.14b and 3.15 include:

- Figures 3.14a and 3.14b indicate a broad level of variation between the wheelchair accessibility of bus fleets in the benchmarking cities, with many of the less populous cities demonstrating greater proportions of wheelchair accessible bus fleets than the largest cities involved in the initiative.
- This may be related to the fact that a smaller city, with fewer buses, can more easily renew its fleet than a large city with a large bus fleet. However this suggestion can be offset by the fact that there is often a bias for public transport funding to larger cities.
- As the Urban Transport for Disabled People working group has researched during year three, it is also likely that funding decisions relating to the specialised urban transport services for disabled people and accessible public transport systems have an impact upon the variations observed in Figures 3.14a and 3.14b.
- UK and German cities generally demonstrate high levels of bus fleet accessibility. In particular Dresden, Cologne and Bietigheim-Bissingen all having 100% wheelchair accessible bus fleets.
- Eastern European cities demonstrated significantly smaller proportions of bus fleet access for wheelchairs. The figures for Bucharest, Budapest, Prague and Suceava highlight this trend.
- In several cities the infrastructure available for buses (e.g. bus stops) does not appear to provide to provide adequate wheelchair access in relation to the proportion of the bus fleet that is wheelchair accessible. Examples of these cities include Dublin (41% of fleet in relation to 8% of infrastructure) and Greater London (55% of fleet in relation to 13% of infrastructure).
- It is possible to suggest that in these cities a high proportion (if not all) of the accessible bus fleet may operate on a limited number of routes. In some cases these may be referred to as "Quality Bus Corridors" and examples of these have been observed in Dublin during working group site visits by the Public Transport Organisation & Policy working group and the Demand Management Working group.
- In other cities (e.g. Prague and Brescia) the bus infrastructure is accessible for wheelchair users to a greater degree than the bus fleet is.

Figure 3.14a: Accessibility of bus vehicles operating in the benchmarking cities (continued in Figure 3.14b)

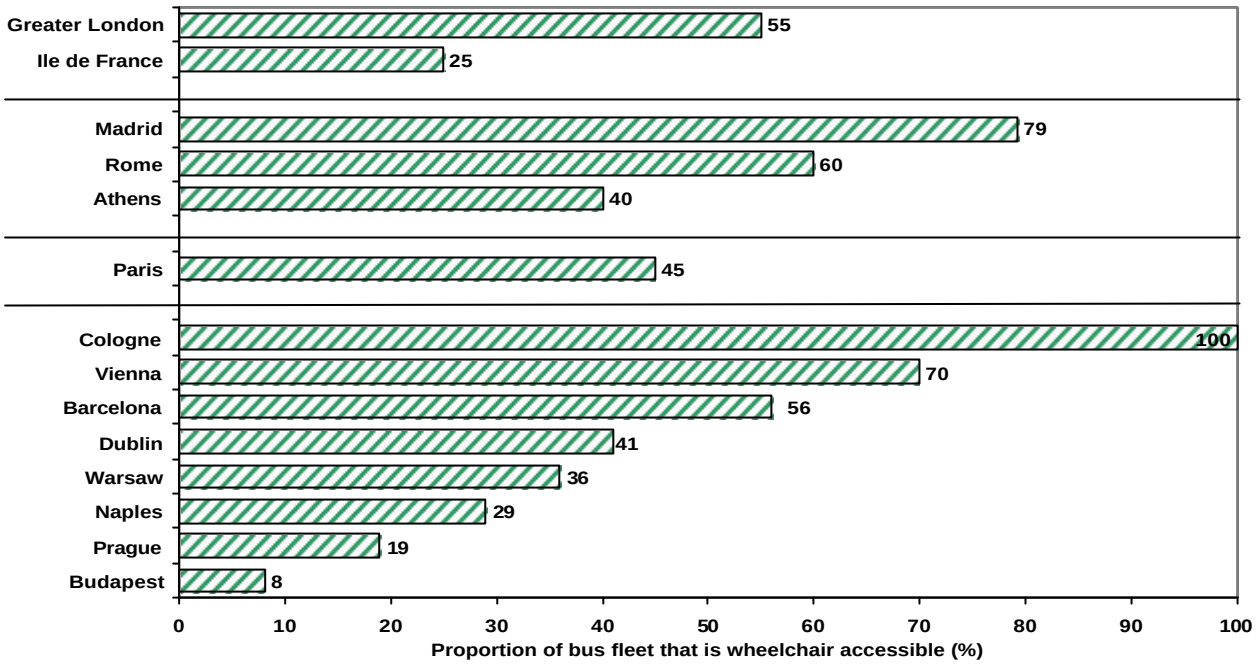
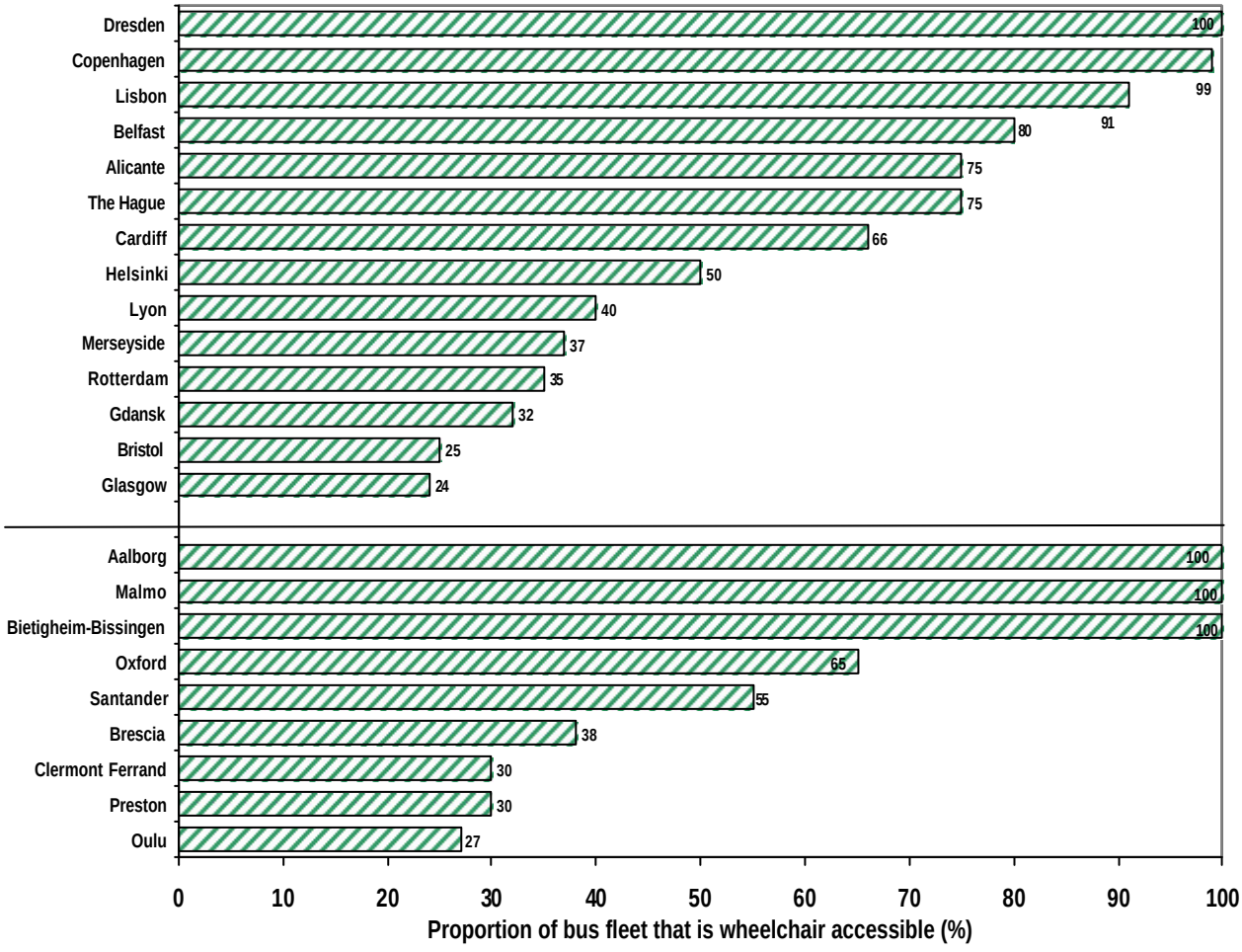


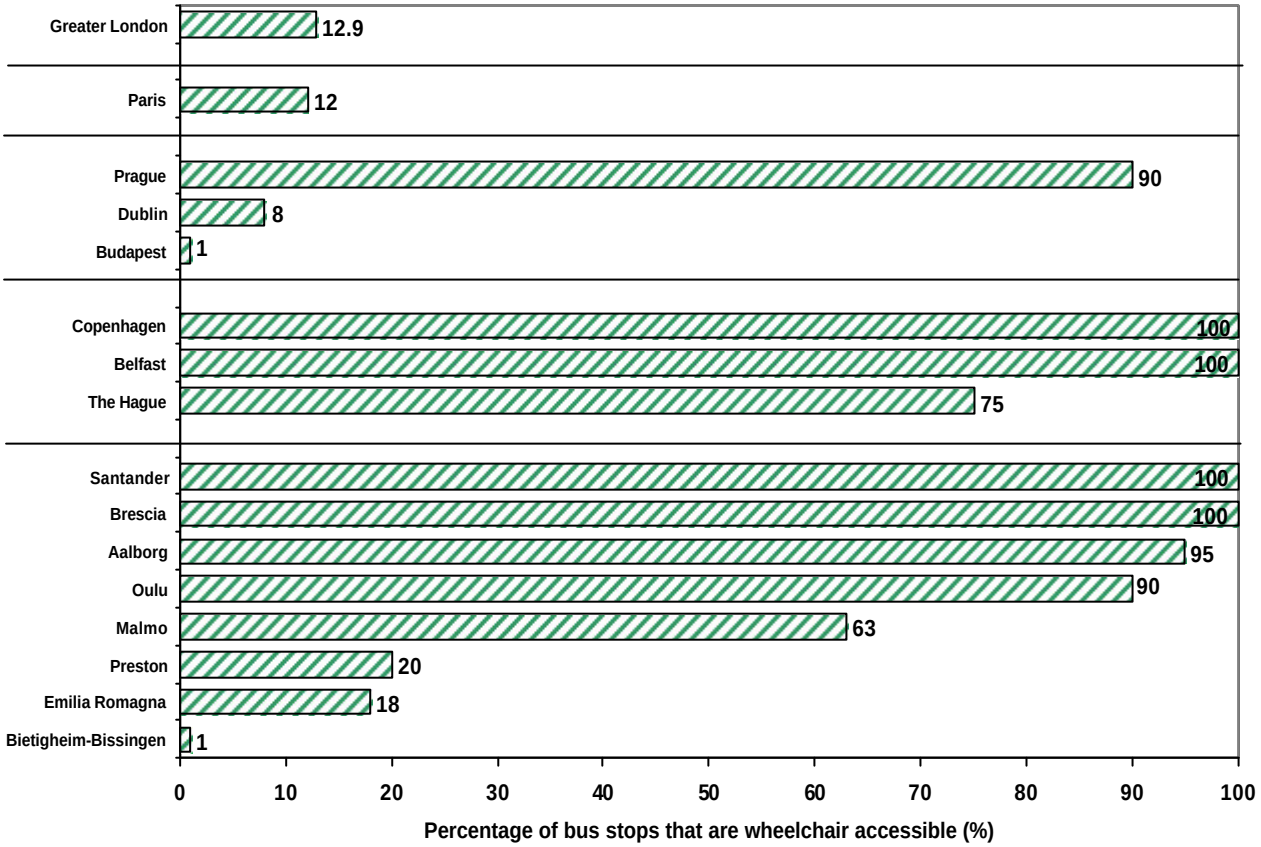
Figure 3.14b: Accessibility of bus vehicles operating in the benchmarking cities (continued)



Key data notes for Figure 3.14a and 3.14b:

Data refers to 2003, except for Oxford, Helsinki, Bristol, Gdansk, Rotterdam, Lyon, Lisbon, Dresden, Naples, Warsaw, Suceava, Barcelona, Vienna Cologne and Rome (2002), Belfast, Brescia, Bristol, Brussels, Cardiff, Copenhagen, Glasgow, Malmo, Merseyside, Paris, Prague, Preston, Santander, Sofia and The Hague (2004) and Aalborg (2005).

Figure 3.15: Accessibility of bus infrastructure in the benchmarking cities



Key data notes for Figure 3.15:

Data refers to 2003, except for Aalborg, Belfast, Copenhagen, London, Malmo, Prague, Preston, Santander, The Hague and Paris (2004)

In the Common Indicator Report (Annex A1) a series of graphs (not included here) show that heavy or light rail modes of public transport are generally less accessible modes of transport than buses. Preston and Copenhagen are the only cities which have totally accessible train networks and none of the cities have 100% accessible tram or metro vehicles and infrastructure. These figures indicate that the development of wheelchair accessible urban transport systems, and the collection of data relating to accessibility, is not taking place in a joined up manner.

Overview of accessible urban transport for disabled people trends

- Many cities with smaller populations demonstrate greater proportions of wheelchair accessible bus fleets than the largest cities involved in the initiative.
- UK and German cities generally demonstrate high levels of bus fleet accessibility.
- Central and Eastern European cities demonstrated significantly smaller proportions of bus fleet access for wheelchairs.
- It is possible to suggest that in cities a high proportion (if not all) of the accessible bus fleet may operate on a limited number of routes. In some cases these may be referred to as "Quality Bus Corridors" and examples of these have been observed in Dublin during working group site visits by the Public Transport Organisation & Policy working group and the Demand Management Working group.
- In several cities the infrastructure available for buses (e.g. bus stops) does not appear to provide to provide adequate wheelchair access in relation to the proportion of the bus fleet that is wheelchair accessible.
- Cities with the highest levels of wheelchair accessible urban transport fleets are likely to have been undertaking vehicle renewal programmes and made use of accessible design principles. The provision of accessible infrastructure (e.g. stops and stations) lags behind the availability of accessible vehicles.

3.3.4 Cycling trends

This section considers trends related to the mode of cycling and links closely to the work undertaken by the Cycling working group during year three of the initiative. The full report from this working group is available in Annex A3 of the final reports of the benchmarking initiative. The data presented in this section considers; cycling modal share, the length of urban cycle networks in relation to the length of the total road network and the relationship between cycle network length, GDP per capita and cycle use in cities.

Figures 3.16a and 3.16b show the modal share of cycling in the benchmarking cities when considered as a proportion of all trips (both motorised and non-motorised). The graphs show a wide range of cycling modal shares, with Oxford (30.3%) and Copenhagen (30.1%) being the only two cities to record more than a 30% cycling modal share. For the majority of cities the modal share for cycling is less than 5% and this demonstrates the relatively recent development of cycle networks and a pro-cycling culture in many European cities. Cities from Scandinavia, the Nordic region and the Netherlands were among those with the highest modal shares for cycling. Oxford, the city with the largest cycling modal share, is renowned in the UK for its cycle culture, with the bicycle being the traditional way for students and academics at the city's university to get around. The average cycling modal share for all the benchmarking cities was 9%.

Figure 3.16a: Cycling Modal Share (continued in Figure 3.16b)

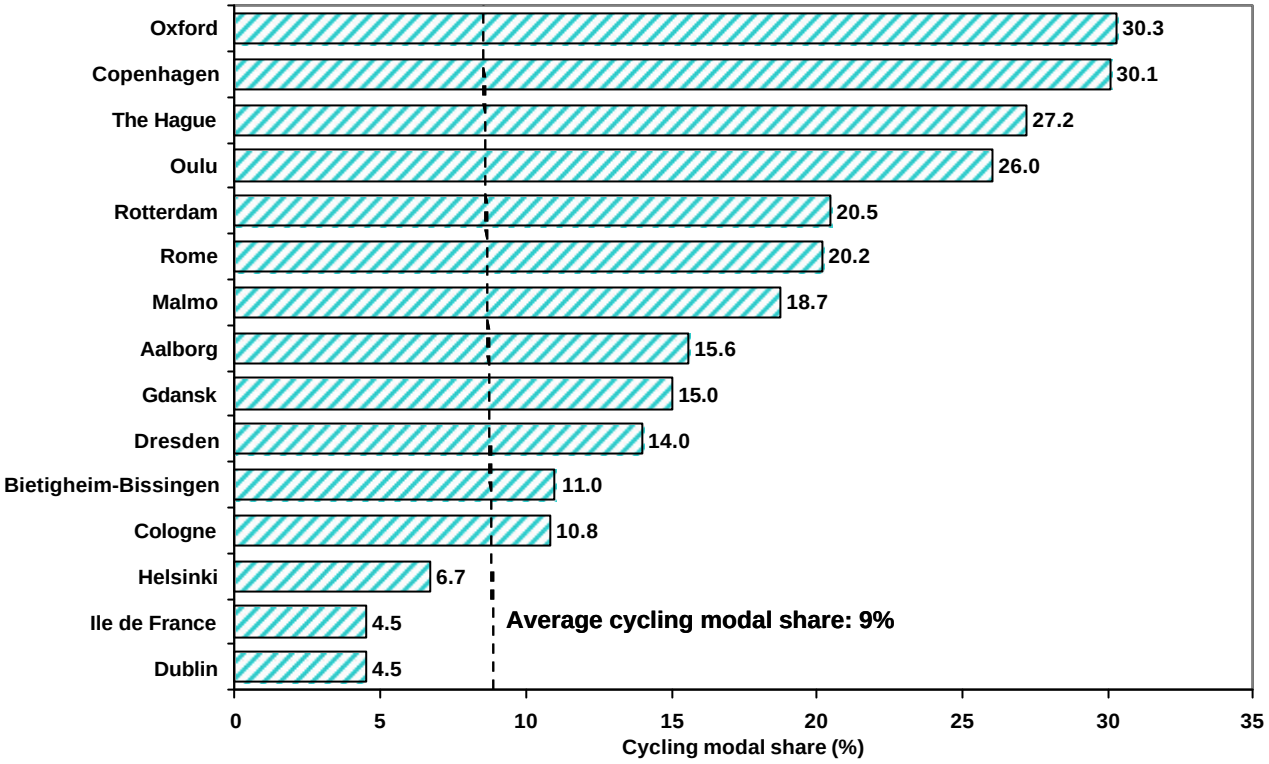
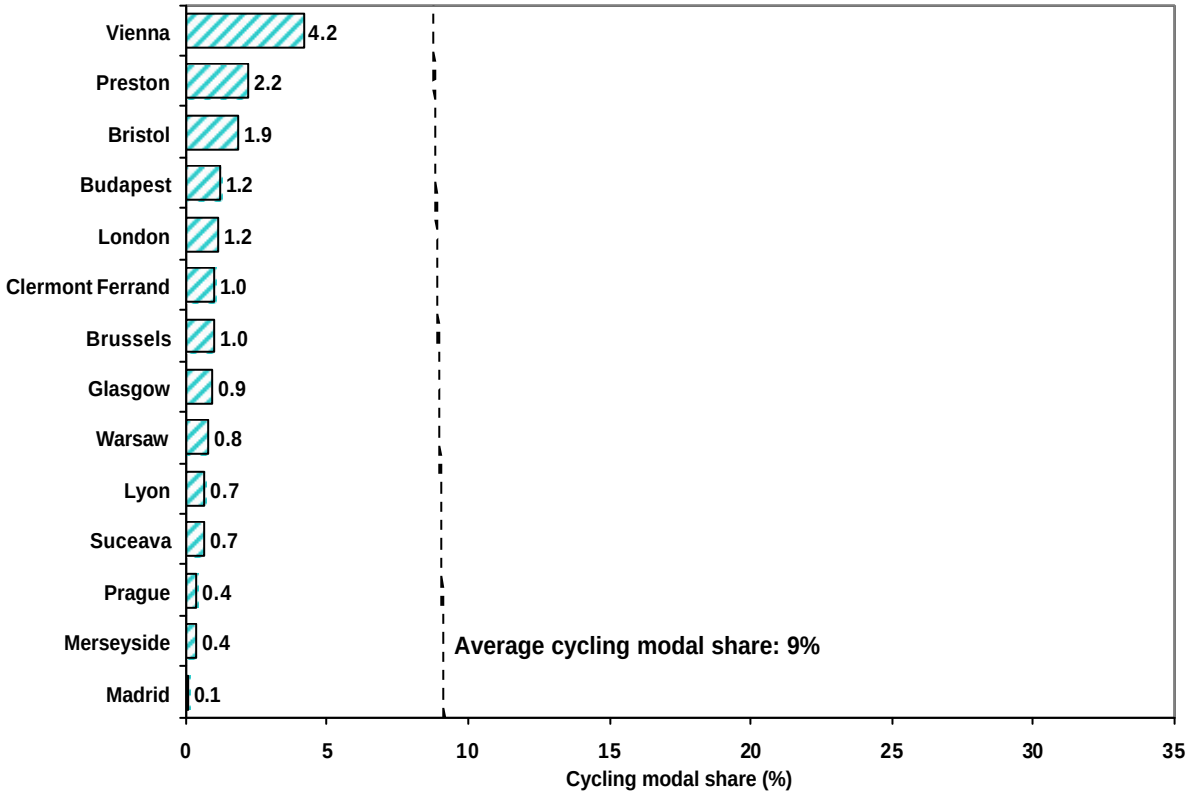


Figure 3.16b: Cycling Modal Share (continued)



Key Data Issues

- The data displayed relates to the study year of 2003 except for: Budapest (1994), Lyon (1995) Madrid (1996), Lisbon and Warsaw (1998), Athens and Rome (1999), Bucharest (2000), Emilia

Romagna and Rotterdam (2001), Dublin, Bristol, Oxford, Naples, Gdansk, Clermont Ferrand, Suceava, Helsinki, Cologne, Dresden, Barcelona and Vienna (2002) and The Hague, Copenhagen and Preston (2004).

- Data for Dublin reflects all the daily trips that are made to places of work, school and university only (irrespective of start time) do not therefore reflect the total level of daily trips. The figures are therefore of more non-car based modes, because the majority of these types of trips take place during the peak daily transport hours.
- Data for the Emilia Romagna region related to daily systematic trips (e.g. commuting and school trips).

The data in Figures 3.17a and 3.17b outlines the length of cycle networks in the benchmarking cities as a proportion of the total road network length. As also noted in the analysis of data collected in year two of the Urban Transport Benchmarking Initiative, it is the smaller cities that have the largest cycle networks as a proportion of total road space. This appears to suggest that smaller cities are naturally better suited for the development of cycle networks, because there is less pressure upon urban land space than there is in the larger cities. New data has been added to this graph for the cities of Sofia, Preston and Santander. In Preston the city's cycle network equates to almost 10% of the city's road network, while this figure is much lower for Santander and Sofia.

Figure 3.17a: Cycle-route network as a proportion of total road network

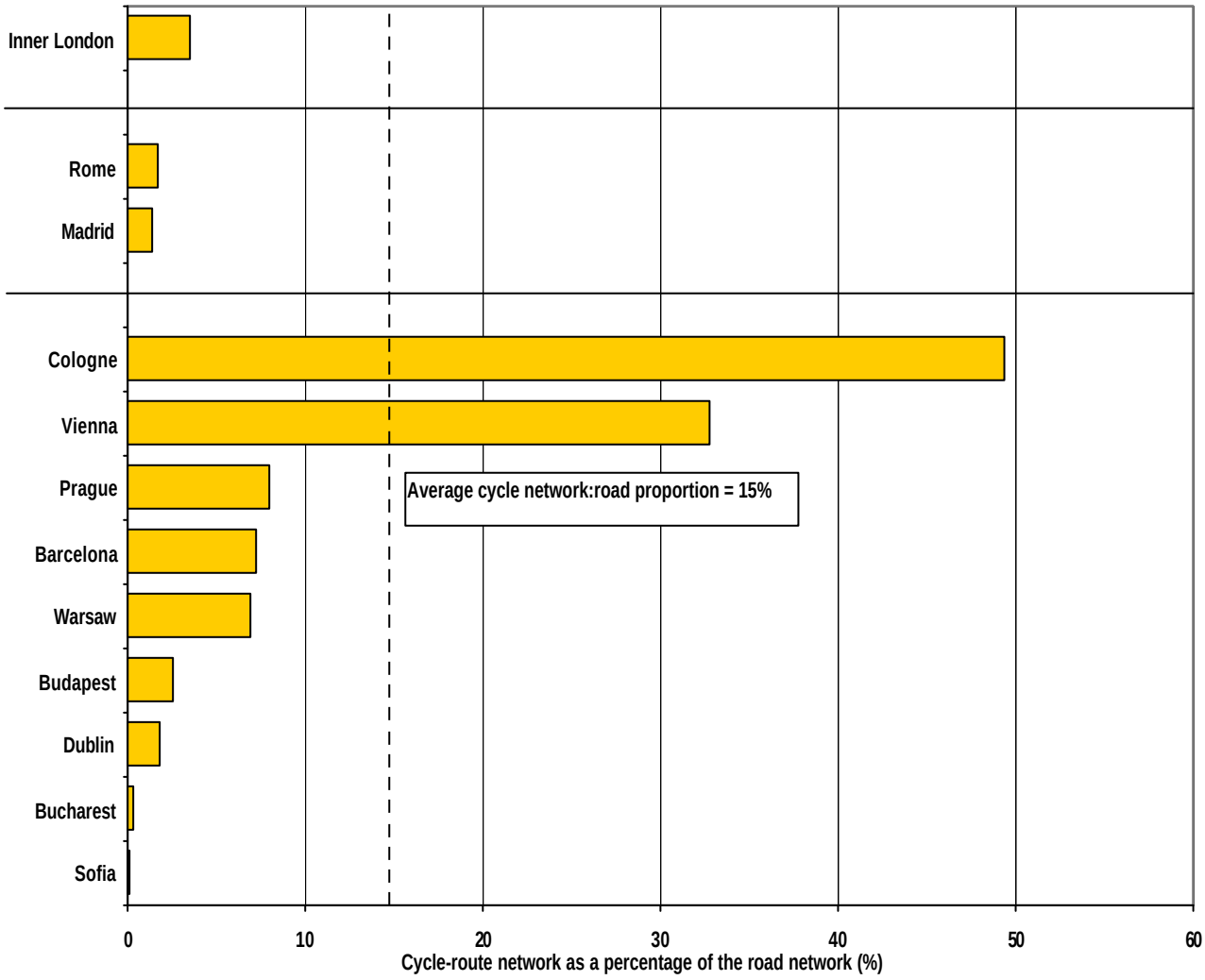
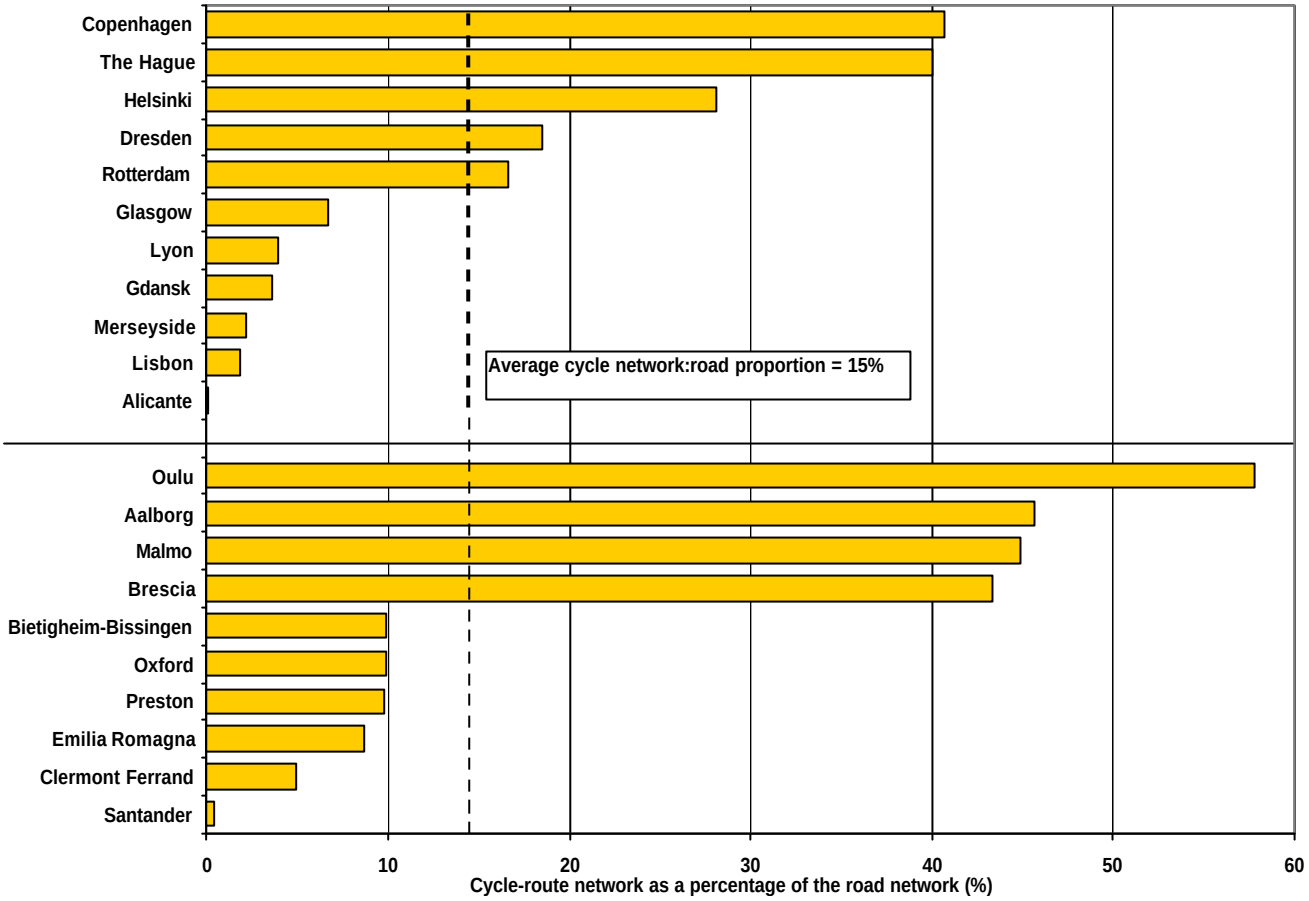


Figure 3.17b: Cycle-route network as a proportion of total road network



Key data issues:

- Data relates to 2003, except for; Greater London (1998), Rome (1999), Lisbon and Rotterdam (2001), Barcelona, Clermont Ferrand, Cologne, Dresden, Gdansk, Lyon, Madrid metropolitan area, Malmö, Oulu, the Ile de France, Suceava and Vienna (2002), Santander, Brussels, Brescia, Copenhagen, Preston, Glasgow, Paris, Inner London, Malmo, Cardiff and Prague (2004), Bietigheim-Bissingen, The Hague, Aalborg and Merseyside (2005).
- The data has been grouped by the size of the city in order to enable like-for-like comparisons to be made between similarly sized cities.

Figures 3.18 and 3.19 explore the relationship between the supply of urban cycle paths, GDP per capita and the modal share of cycling. Figure 3.18 indicates a medium strength positive relationship between GDP per capita and the length of cycle paths in the benchmarking cities, which suggests that the cities with higher levels of GDP per capita are more likely to have invested in cycle path networks. Cities above the trend line have a smaller cycle network in relation to the city's GDP per capita data than the trend suggests, while those below the line have a larger cycle path network when the relationship with GDP per capita data is taken into account.

Figure 3.18: The relationship between GDP per capita and the length of cycle path networks

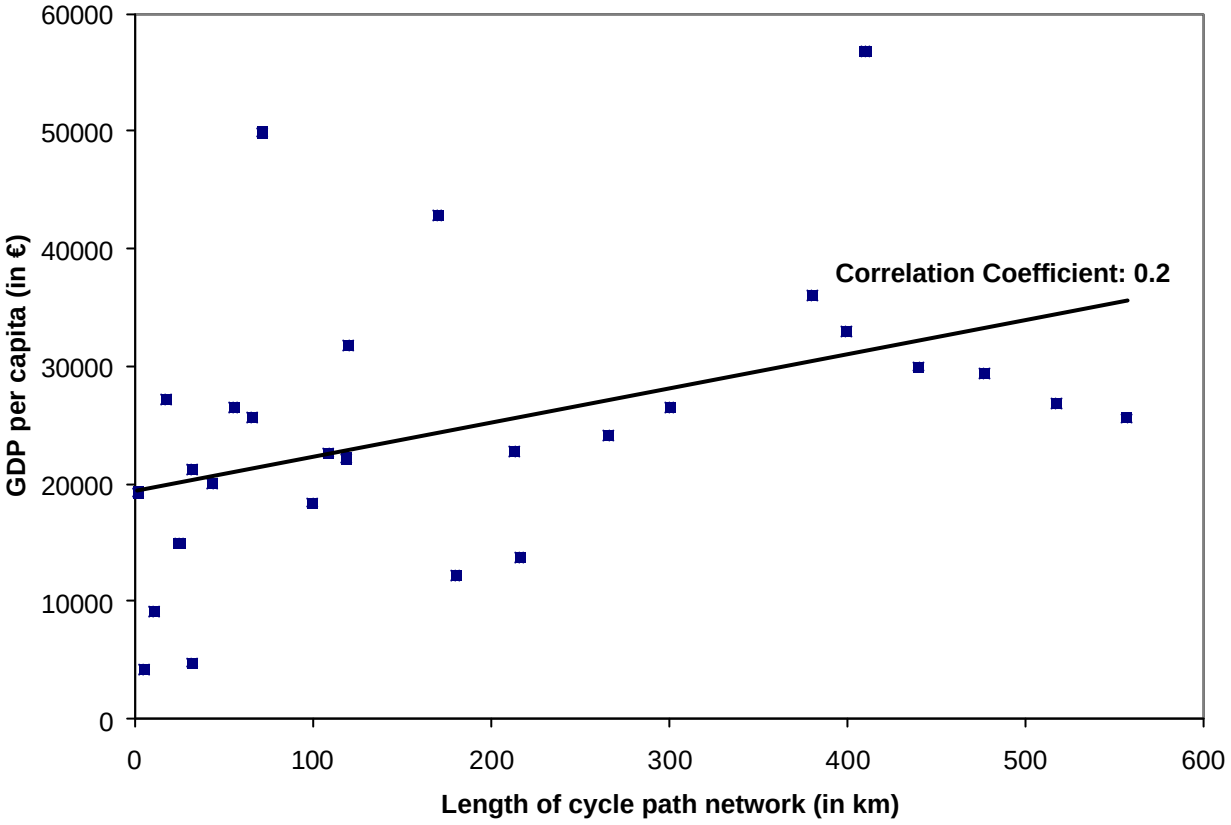


Figure 3.19: The relationship between the length of cycle path networks and cycle modal share

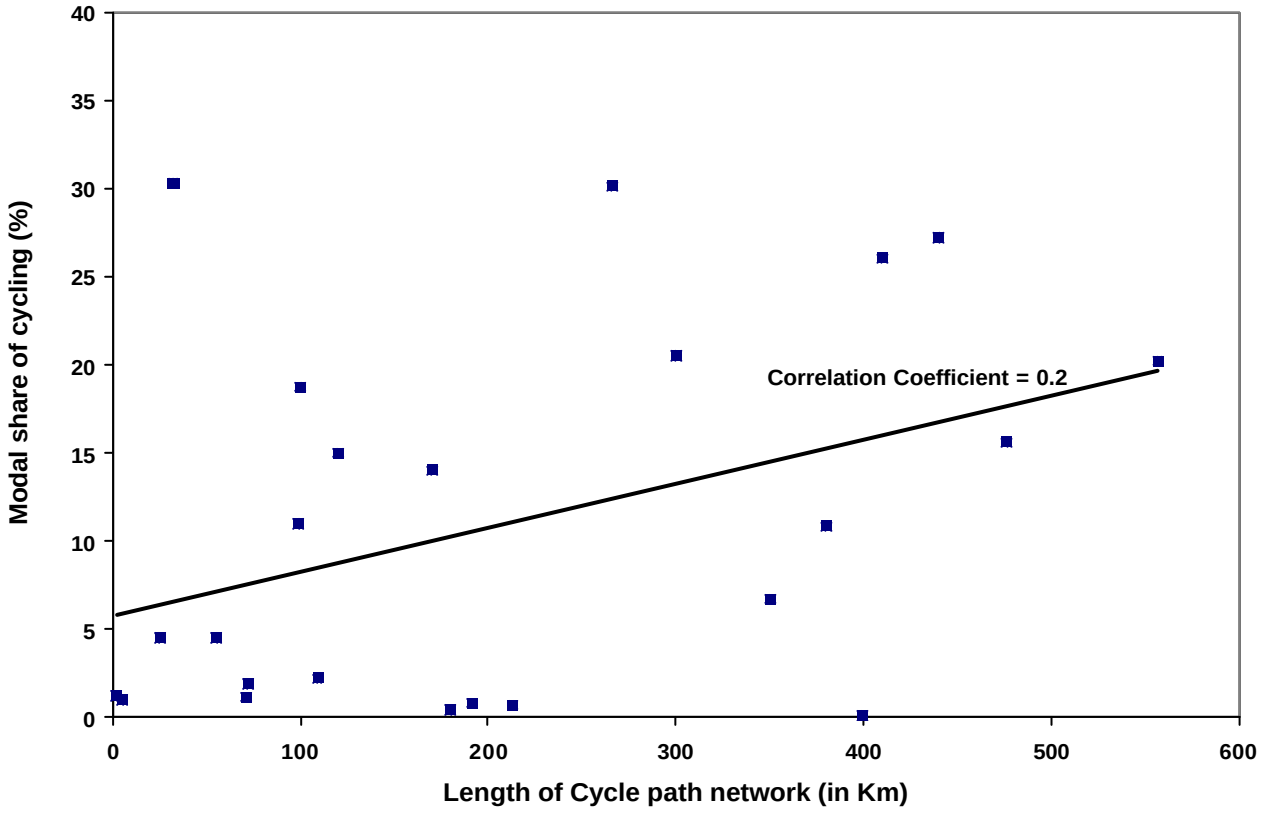


Figure 3.19 reveals a similar moderate positive relationship between the modal share for cycling and the length of cycle path networks in the benchmarking cities. The trend indicates that cities with larger cycle path networks are generally more likely to have higher levels of cycling modal share than those cities which have smaller cycle networks.

Overview of cycling trends

- The average cycling modal share for all of the benchmarking cities was 9%.
- On average, the cycle networks are roughly 15% of the size of urban road networks in the benchmarking cities.
- The smaller cities have the largest cycle networks as a proportion of total road space. This suggests that smaller cities are better suited to the development of cycle networks, possibly because there is less pressure upon urban land space than there is in the larger cities
- The common indicator data suggests that cycling is most popular as a mode of transport in cities where it is encouraged through the supply of urban cycle paths.
- A feature of these cities is that the level of GDP per capita is often greater than in cities which have developed larger cycle path networks.

3.3.5 Urban employment and commuter travel

This section of the report considers trends related to commuting in the benchmarking cities and links with the work undertaken by the Cycling working group during year three of the initiative. The full report from this working group is available in Annex A2 of the final reports of the benchmarking initiative. The data presented in this section considers; employment in the benchmarking cities, being the main driver behind commuter flows, and makes cost comparisons between private and public urban transport modes. Data relating specifically to commuter flows into and out of cities were not collected in the common indicators since this information was not readily available for many of the benchmarking cities.

A range of different types of employment data were collected throughout the first two years of the Urban Transport Benchmarking Initiative and in the PLUME benchmarking activity. During year one of the Urban Transport Benchmarking Initiative and for PLUME benchmarking the data collected referred to the percentage of residents in the urban administrative area that were in employment. These figures were reported in the year one report of the Urban Transport Benchmarking Initiative. The broad range of available statistics which relate to employment data in the participating cities meant that the data submitted for this indicator is relatively incomparable and, as a result, have not been used in years two or three for further analysis.

Figure 3.20 displays the data collected in years 2 and 3 of the initiative, which refers to the number of positions held in the urban administrative areas of the participating cities. This data is more useful since it can be used in further analyses to make inferences about the commuter flows into the urban administrative area. Given that employment is one of the main reasons for travel in cities, and that the Behavioural and Social Issues in Public Transport working group considered commuter travel behaviour in year three of the benchmarking initiative, this indicator gives an indication of the number of people likely to be travelling to jobs in the benchmarking cities.

Figure 3.20: The number of positions held in the urban administrative area

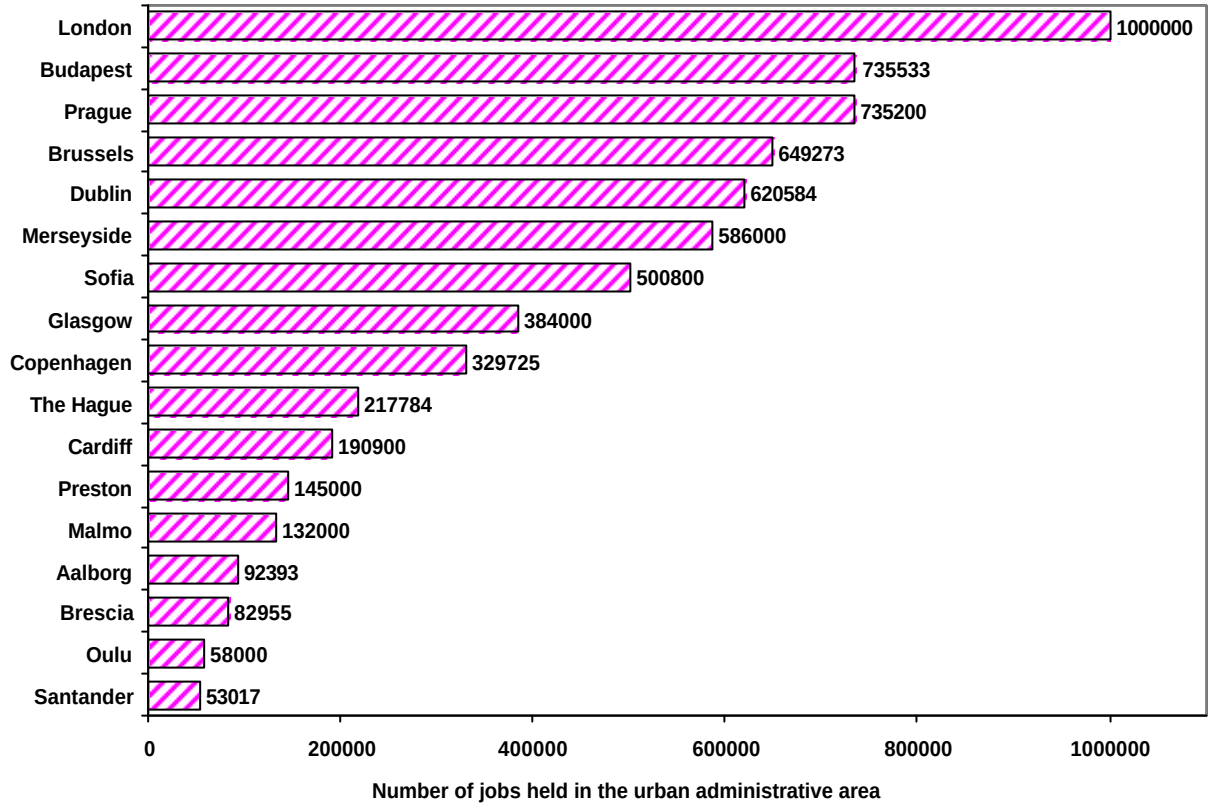
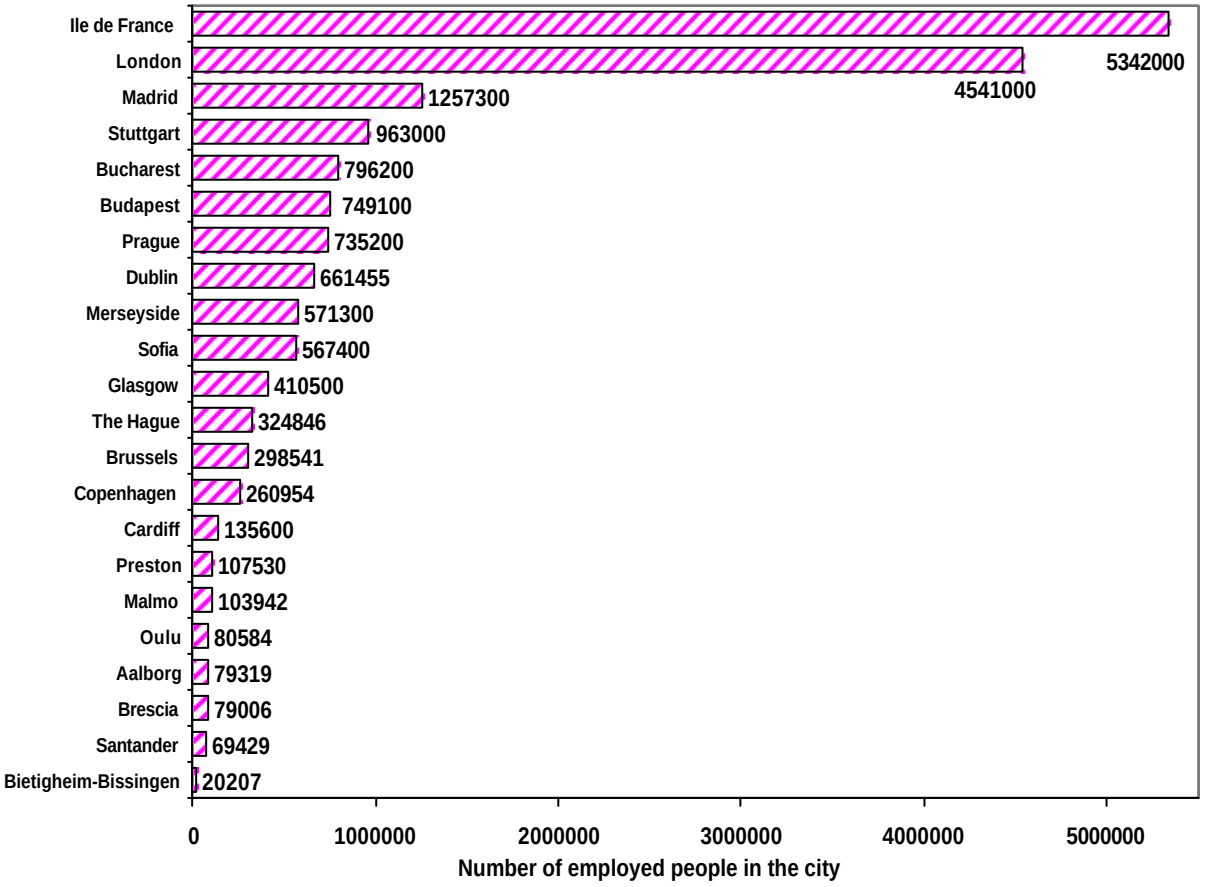


Figure 3.21: Number of people employed in the benchmarking cities



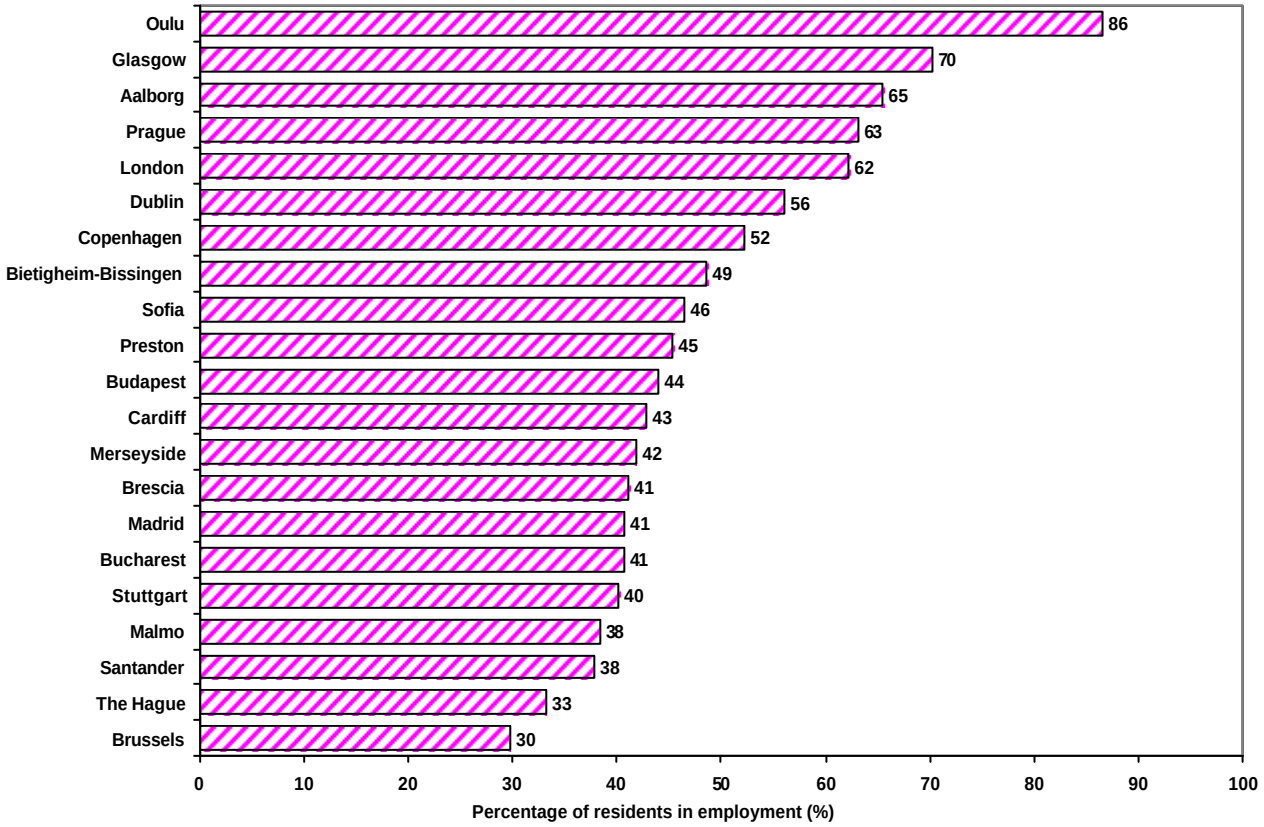
Key Data Issues (Figure 3.20 and Figure 3.21):

Data refers to 2003, except for Brussels (2000), Prague (2001), Malmo, Glasgow and Dublin (2003) and London, Aalborg, The Hague, Cardiff and Merseyside (2004).

Figure 3.21 shows the number of people employed in each of the benchmarking cities, while Figure 3.22 presents these figures as a percentage of the urban population. It is clear from Figures 3.20-3.22 that, as one would expect the largest cities in terms of population also have the most employment positions and the largest number of people in employment. These cities are therefore likely to experience the largest commuter flows and, given their status as globally important cities, London and Paris, in particular, are likely to experience significant inward commuter flows.

When considered as a proportion of total urban population (as in Figure 3.22) the figures for employment in urban areas can be interpreted as a measure of the likely intensity of commuter flows given the size of the cities. Surprisingly, Oulu and Aalborg, two of the smaller cities to have participated in the Urban Transport Benchmarking Initiative, demonstrate a high proportion of people employed in their urban areas in relation to the urban population. This suggests that these cities experience relatively intense commuter movements in relation to their size. Despite being the capital city of Belgium and a major centre for employment, Brussels appears to have a relatively small proportion of people in employment in the urban area in relation to its urban population.

Figure 3.22: Number of people employed in benchmarking cities as a proportion of urban population



In the Common Indicator Report a series of graphs explore some of the information collected in relation to the relative cost of urban transport modes in the benchmarking cities in order to provide an indication of likely costs associated with commuting. These have not been included in the final report, but can be found on pages 69-71 of Annex A1.

Overview

The following trends relating to commuting in the benchmarking cities are evident:

- Oulu and Aalborg, two of the smaller cities to have participated in the Urban Transport Benchmarking Initiative, demonstrate a high proportion of people employed in their urban areas in relation to the urban population. This suggests that these cities experience relatively intense commuter movements in relation to their size.
- For most of the benchmarking cities the average cost is between 0.0025% and 0.0075% of GDP per capita, but in Bucharest it is greater than 0.02%.
- Of the sixteen cities which were able to provide data for these indicators a total of seven (Cardiff, London, Dublin, Madrid, Brescia, Budapest and Prague) showed that one hour's parking in the city centre was more expensive than a 5 km trip to the city centre.
- The cities of Merseyside, Prague, Bucharest and Budapest all have relatively expensive parking and petrol costs (as a percentage of GDP per capita) and these cities all display greater modal shares for public transport than they do for car use. Conversely the city of Oulu has the cheapest petrol prices and car parking facilities as a percentage of GDP per capita and also displays a very large car modal share of 90%.
- Although the data available and limited number of cities that collected the information means that it is not possible to link these two issues more thoroughly, it appears logical that the real-term cost of parking and petrol in cities does have a significant impact upon car and public transport use.

3.3.6 Clean vehicles and intelligent energy use in urban transport

In year three of the Urban Transport Benchmarking Initiative a new series of data was collected in relation to the cleanliness of urban vehicles fleets, specifically buses, the types of fuel used by the fleets and the age of the bus fleet. These indicators were included in order to address a research gap identified by the project team over the 3 years of the benchmarking initiative. In year one of the benchmarking initiative the project team did try to establish a working group based on the topic of Energy and the Environment. There was insufficient interest in this topic to establish a working group and since then there has been relatively little focus from within the benchmarking initiative upon clean vehicle and sustainable fuel technology issues. The remainder of this section outlines the findings from these indicators.

Figure 3.23 shows the breakdown of the bus fleets powered by conventional bus fuels (Euro Diesel) according to the Euro rating assigned to the buses. Sofia, Brescia, Brussels, Santander, Malmo and Preston have the bus fleets containing the largest proportions of bus vehicles with older Euro ratings from before 1996. Conversely, Aalborg, Copenhagen and Cardiff have bus fleets with the largest proportions of buses with Euro ratings from 2003 onwards. Not only do these ratings indicate which cities have the most sustainably fuelled bus fleets, but also gives an indication of the recent investment in bus fleets in the cities which provided data.

Table 3.3 displays the data submitted in relation to sustainable fuel technologies. Brescia, Copenhagen and Paris have significant numbers of Liquid Petroleum Gas (LPG) powered vehicles in their bus fleets. Compressed Natural Gas (CNG) has been more widely adopted, with six of the eight cities that provided data having compressed natural gas buses. In particular Malmo and Paris have large numbers of CNG powered buses. Bio fuel bus fleets appear to be much rarer, with only

Santander having these buses in its bus vehicle fleet. Three cities had buses powered by other types of sustainable fuel. The city of Paris has 310 buses which use the Aquazole emulsified diesel variant, while in Merseyside and Brussels diesel and electric hybrid buses have been utilised as part of the fleet.

Figure 3.23: Euro ratings of 2004 bus fleets in the benchmarking cities

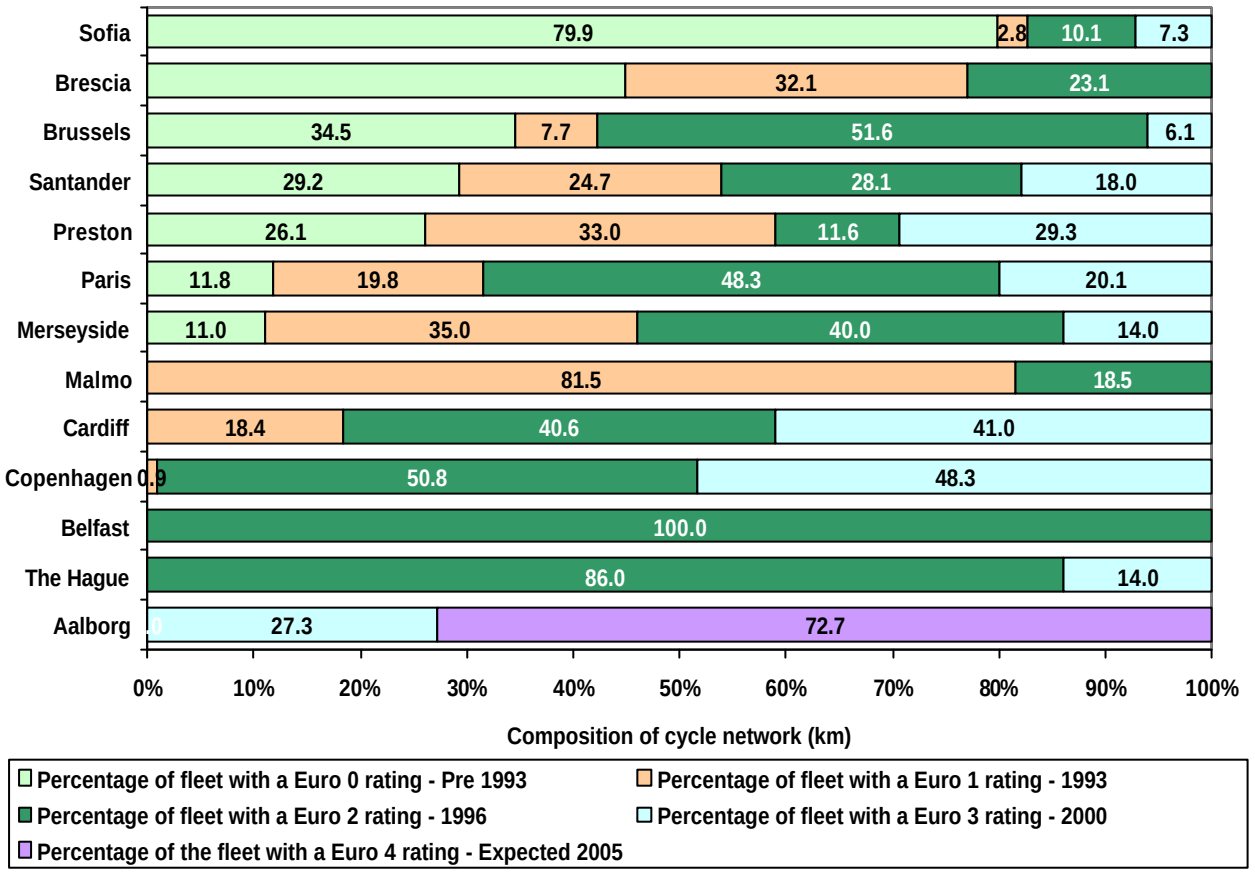


Table 3.3: Sustainable fuel technologies for urban bus fleets

City	No. of vehicles in the fleet powered with liquid petroleum gas (LPG)	No. of vehicles in the fleet powered with compressed natural gas (CNG)	No. of vehicles in the fleet powered with Bio fuel	No. of vehicles in the fleet powered with another sustainable fuel (please state)
Brescia	157	41	0	0
Brussels	0	20	0	12 (Hybrid)
Copenhagen	150	0	0	0
Malmo	0	162	0	0
Merseyside	0	2	0	6 (Hybrid)
Paris	57	90	0	310 (Aquazole)
Santander	0	0	66	0
Sofia	0	60	0	0

Table 3.4 lists the range of additional pollution reduction technologies which are used in the benchmarking cities. Most of the cities widely use particulate traps on their bus fleets, although

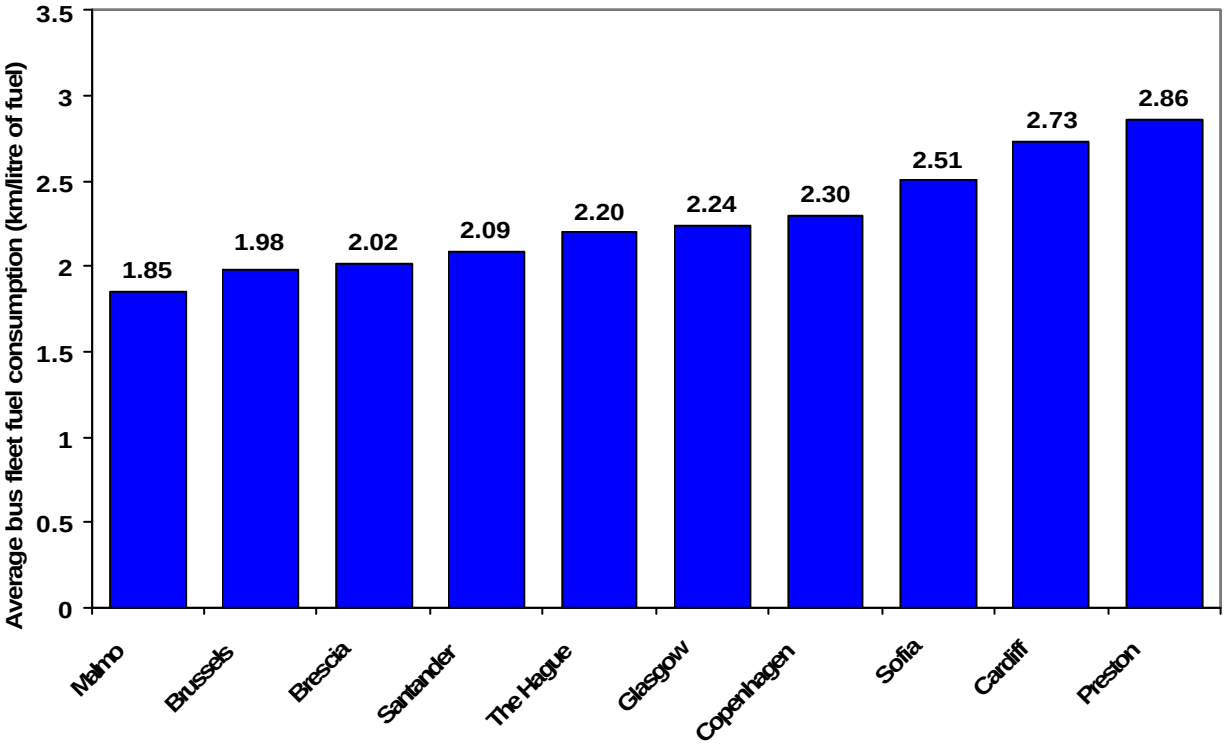
oxidisation catalysts are only used in Brescia, buses in Cardiff use Ultra Low Sulphur Diesel, 60 buses in Brussels are equipped with CRT particulate filters and 64 buses in the Paris fleet are fitted with Diester particulate filters.

Table 3.4: Additional pollution reduction technologies for vehicles in the bus fleet

City	No. of vehicles in the fleet with particulate traps	No. of vehicles in the fleet with oxidization catalysts	No. of vehicles in the fleet with another pollution reduction technology (please state)
Copenhagen	630	0	0
Cardiff	0	0	Ultra Low Sulphur Diesel
Brussels	0	0	60 (CRT))
Brescia	0	54	0
Aalborg	132	0	0
The Hague	121	0	0
Paris	3000	0	64 (DIESTER)
Sofia	624	0	0
Merseyside	116	0	0

The final indicator regarding clean vehicles focused upon the average fuel consumption of the vehicle fleet in terms of the number of kilometres travelled per litre of fuel used. Figure 3.24 indicates that Preston and Cardiff had the most efficient bus fleet, while Malmo had marginally the least efficient fleet.

Figure 3.24: Average fuel consumption of bus fleets (kilometres per litre of fuel) in 2004



As described earlier in this section of the report, the EURO ratings applied to classify the cleanliness of vehicles give an indication of the age of bus fleets. The final indicator added in year

three of the benchmarking initiative asked the participants to provide information relating to the age of the bus fleet in their city. Figure 3.25 illustrates the average age of bus fleets in the benchmarking cities and shows that, on average, the majority of cities that submitted data have a bus fleet with an average age of less than 10 years. Sofia and Brussels are the only exceptions, both having significantly higher bus fleet average ages, which suggests less recent, or less frequent bus fleet renewal. The cities of Aalborg and The Hague demonstrate relatively "young" bus fleets.

Figure 3.25: Average age of bus fleets (in years) in 2004

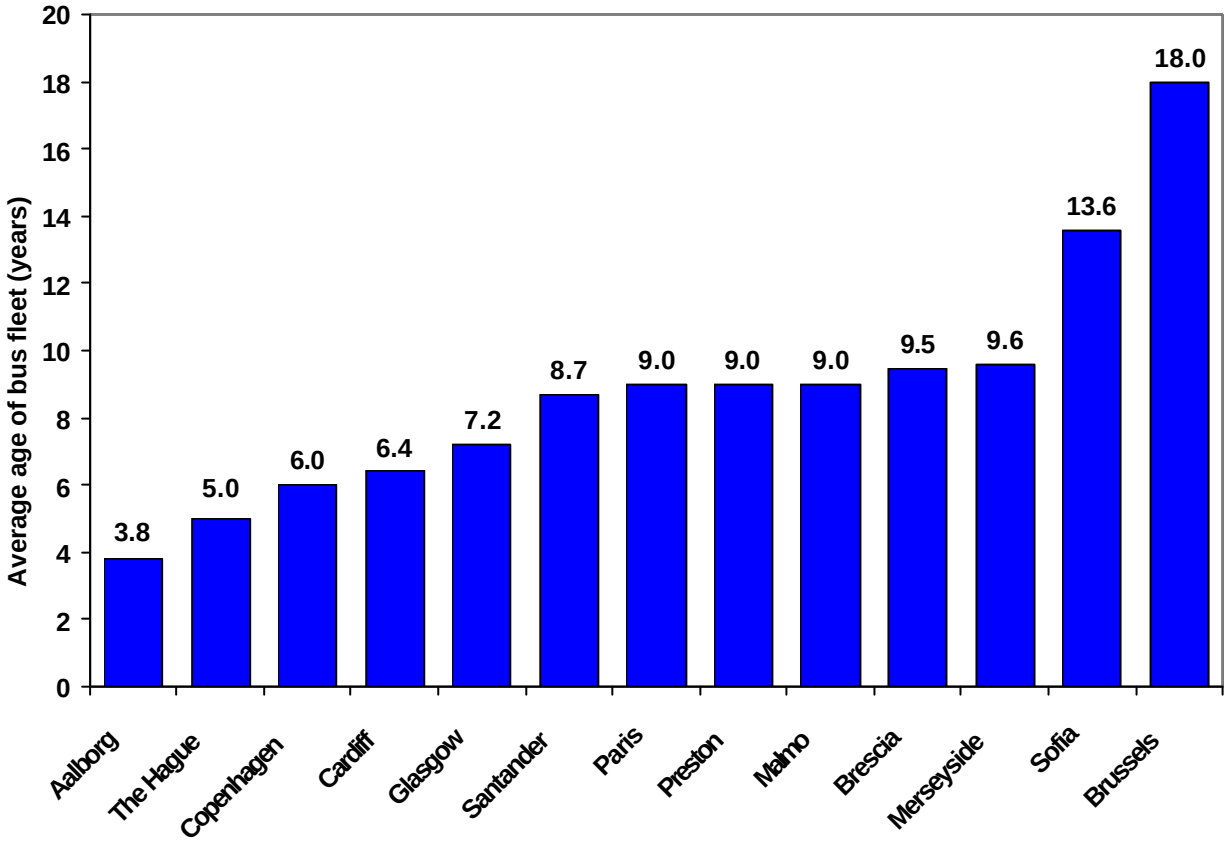
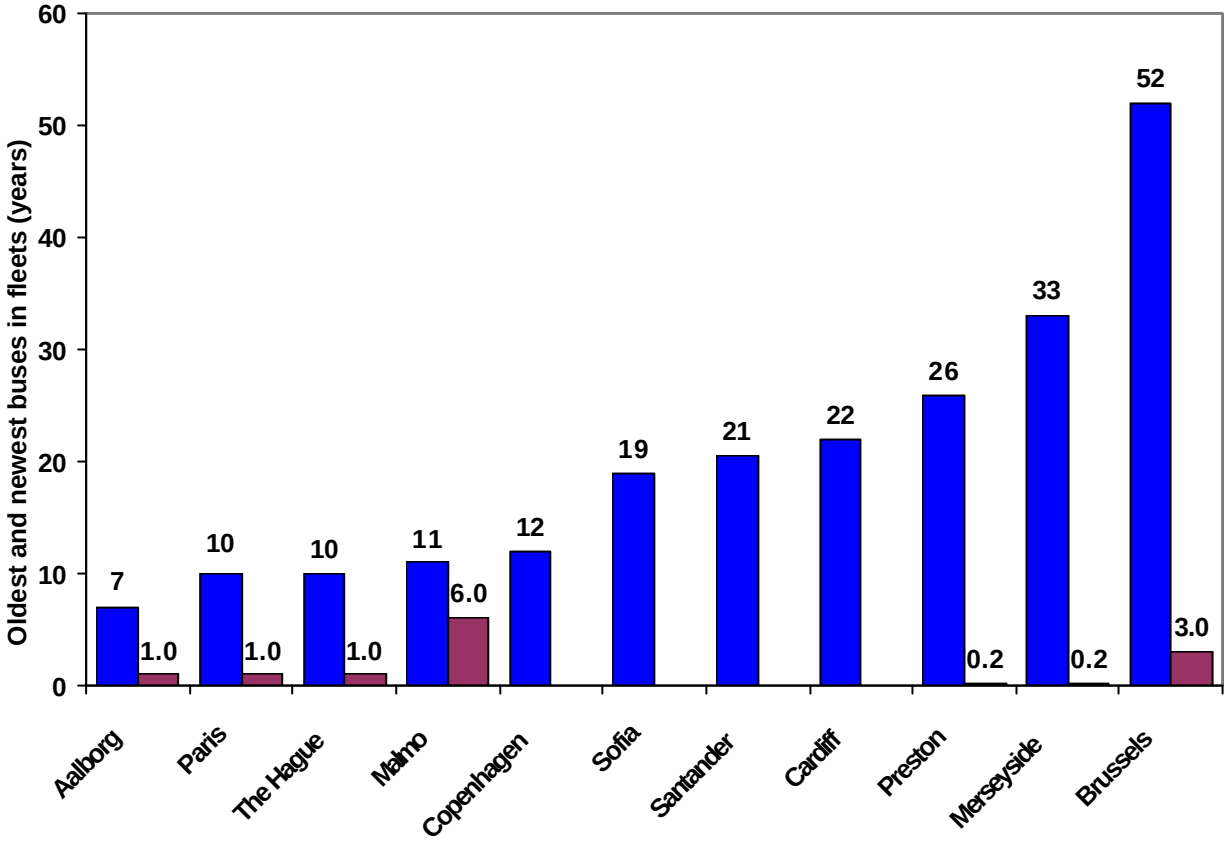


Figure 5.26 shows the ages of the newest and the oldest buses contained in the fleet, since the averages displayed in Figure 5.25 can be slightly misleading. Figure 3.26 shows that some of the cities oldest buses are particularly old (e.g. Brussels and Merseyside) and it is possible that these "heritage" buses are maintained as part of the city bus fleet for tourists and to maintain a local sense of place. A good example of this is that, until December 2005, Routemaster buses operated in Central London as part of timetabled services despite having been in service since 1958 (47 years). Two heritage routes continue to be served by Routemaster buses in London. Most of the cities that were able to provide data indicated that new buses had been purchased and added to the city's bus fleet within the last year.

Figure 3.26: Age of oldest and newest buses in urban bus fleets (in years) in 2004



Overview

The data relating to clean vehicles has filled an important research gap in the dataset developed by the common indicators of the Urban Transport Benchmarking Initiative. While the data only provide a snapshot of the situation regarding the cleanliness and efficiency of bus fleets in the benchmarking cities, a number of key findings are evident. These include:

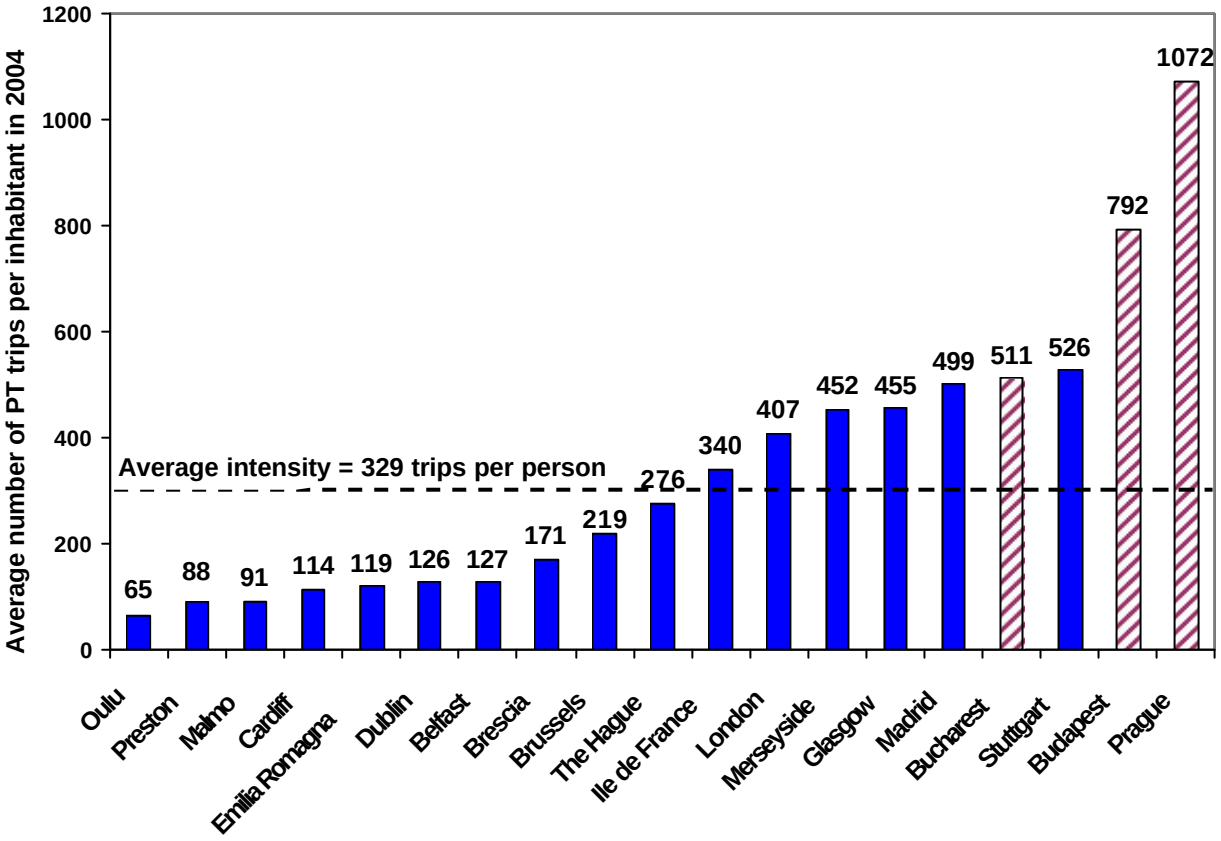
- Sofia, Brescia, Brussels, Santander, Malmo and Preston have the bus fleets containing the largest proportions of bus vehicles with older Euro ratings from before 1996. Conversely, Aalborg, Copenhagen and Cardiff have bus fleets with the largest proportions of buses with Euro ratings from 2003 onwards.
- The EURO ratings indicate which cities have the most sustainably fuelled bus fleets, as well as giving an indication of the recent investment in bus fleets in the cities which provided data.
- Brescia, Copenhagen and Paris have significant numbers of Liquid Petroleum Gas (LPG) powered vehicles in their bus fleets.
- Compressed Natural Gas (CNG) has been more widely adopted, with six of the eight cities that provided data having compressed natural gas buses. In particular Malmo and Paris have large numbers of CNG powered buses.
- Bio fuel bus fleets and other types of sustainable fuel are much less common.
- Particulate traps are widely used on bus fleets in the benchmarking cities, being fitted to most buses in each of the cities.
- In 11 of the 13 cities which submitted data, the average age of the bus fleet was less than 10 years.

3.3.7 Comparisons between New Member States, Accession Countries and EU 15 States

Developing the comparisons from the year two common indicator report, Figures 3.27 to 3.30 in this section outline some of the key differences between the urban transport systems found in cities in New Member States (NMS) and Accession Countries of the European Union and those found in EU15 states.

Figure 3.27 outlines the "intensity" of public transport use in the year three benchmarking cities by contrasting the number of public transport trips made in 2004 with the population of the city. This calculation presents an indicative "number of public transport trips per inhabitant" for 2004 and, although the figures do not consider issues such as suburban commuter flows or tourist trips, this is the same for all of the cities and therefore the figures are broadly comparable.

Figure 3.27: The intensity of public transport patronage (total passengers carried by all PT modes ÷ urban population) in 2004



The key observations from Figure 3.27 are:

- The average level of public transport use across the 17 cities which submitted data was 249 trips per person.
- As in year two of the initiative, public transport intensity was particularly high in Bucharest (Accession Country), Budapest and Prague (New Member States - NMS) all of which are located in Central and Eastern Europe.
- As one would expect these three cities all have high levels of public transport modal share, with more than 50% of all motorised trips being made by public transport in Prague, Bucharest and Budapest.

- The smallest cities in terms of population (Preston, Oulu and Malmö) demonstrate the lowest levels of public transport use and this is reflected by much smaller motorised modal share figures of less than 20% for public transport trips (Figure 4.6a and 4.6b).

Figure 3.28 provides a comparison of the cost of an annual bus season pass as a percentage of GDP per capita in the benchmarking cities. The key observation is that the cities from New Member States and Accession Countries (highlighted blue) do not all have inexpensive fares when considered in real terms. This dismisses the perception that public transport in Central and Eastern Europe is "cheap" and a factor that encourages high public transport use. Figure 3.28 indicates that Gdansk, Suceava and Bucharest display similar, if not more costly annual bus pass fares when compared to the real costs in the EU15 cities involved in the benchmarking initiative.

Figure 3.28: Comparison of the cost of an annual bus pass (percentage of GDP per capita)

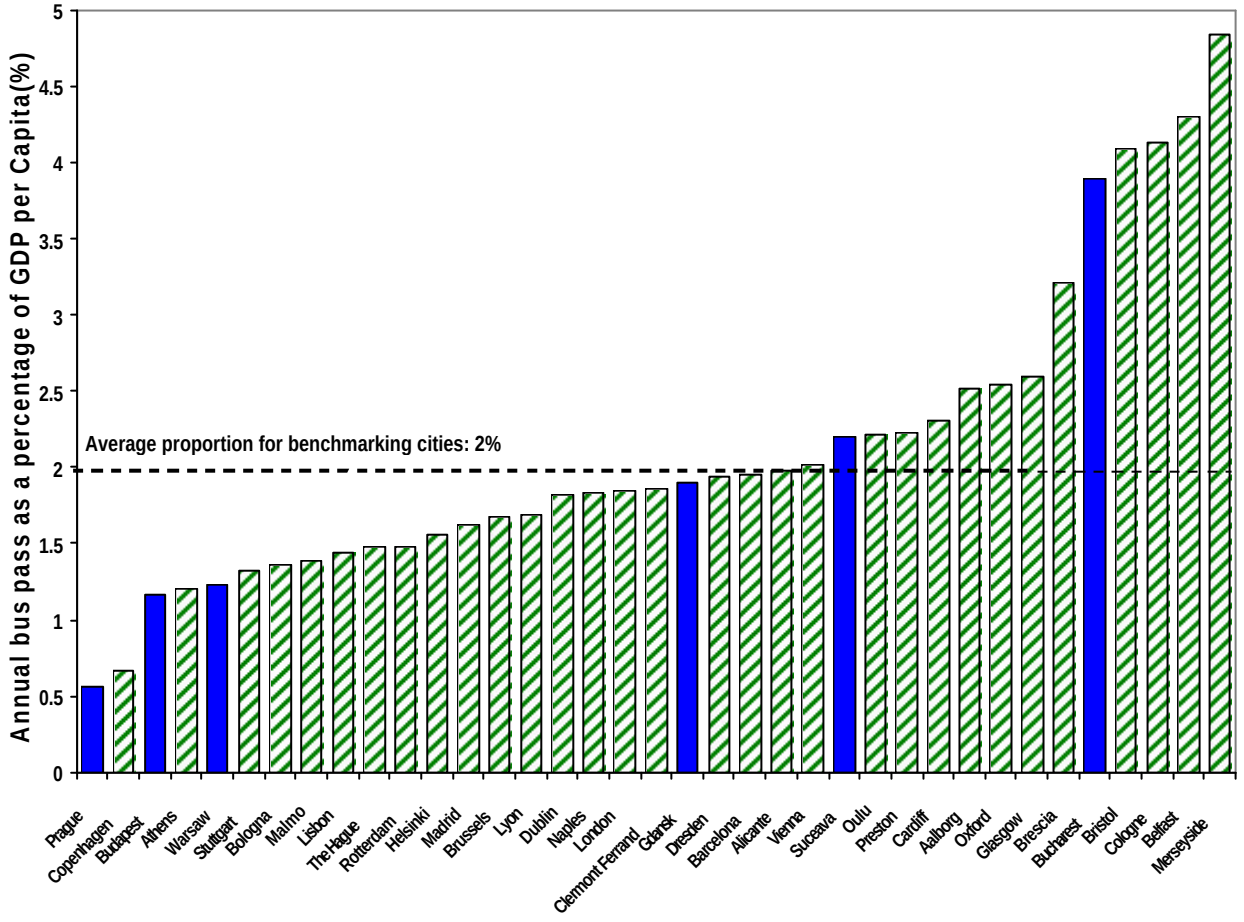


Figure 3.27 and 3.28: Key data issues

Data relates to 2003 except for; Budapest, Warsaw, Lisbon, Rotterdam, Helsinki, Lyon, Naples, Clermont Ferrand, Gdansk, Dresden, Barcelona, Vienna, Suceava, Oxford, Bristol and Cologne (2002) and Preston (2004).

Figure 3.29 displays the proportion of the bus fleets in the benchmarking cities that are made up of low floor buses which can be considered as wheelchair accessible and highlights the fact that cities from New Member States and Accession Countries generally have significantly smaller proportions

of wheelchair accessible bus fleets than cities in EU 15 states. It is possible that this pattern reflects a trend for more regular bus-fleet renewal in EU 15 cities than New Member State and Accession Country cities. This seems to be supported in the analysis of the average age of the bus fleet in Figure 3.28, although since data was only available from once Sofia this finding is relatively inconclusive, but could be developed further through further data collection and analysis comparing EU15 cities with New Member State and Accession Country cities.

Figure 3.29: Comparison of the percentage of bus fleets which are low floor accessible

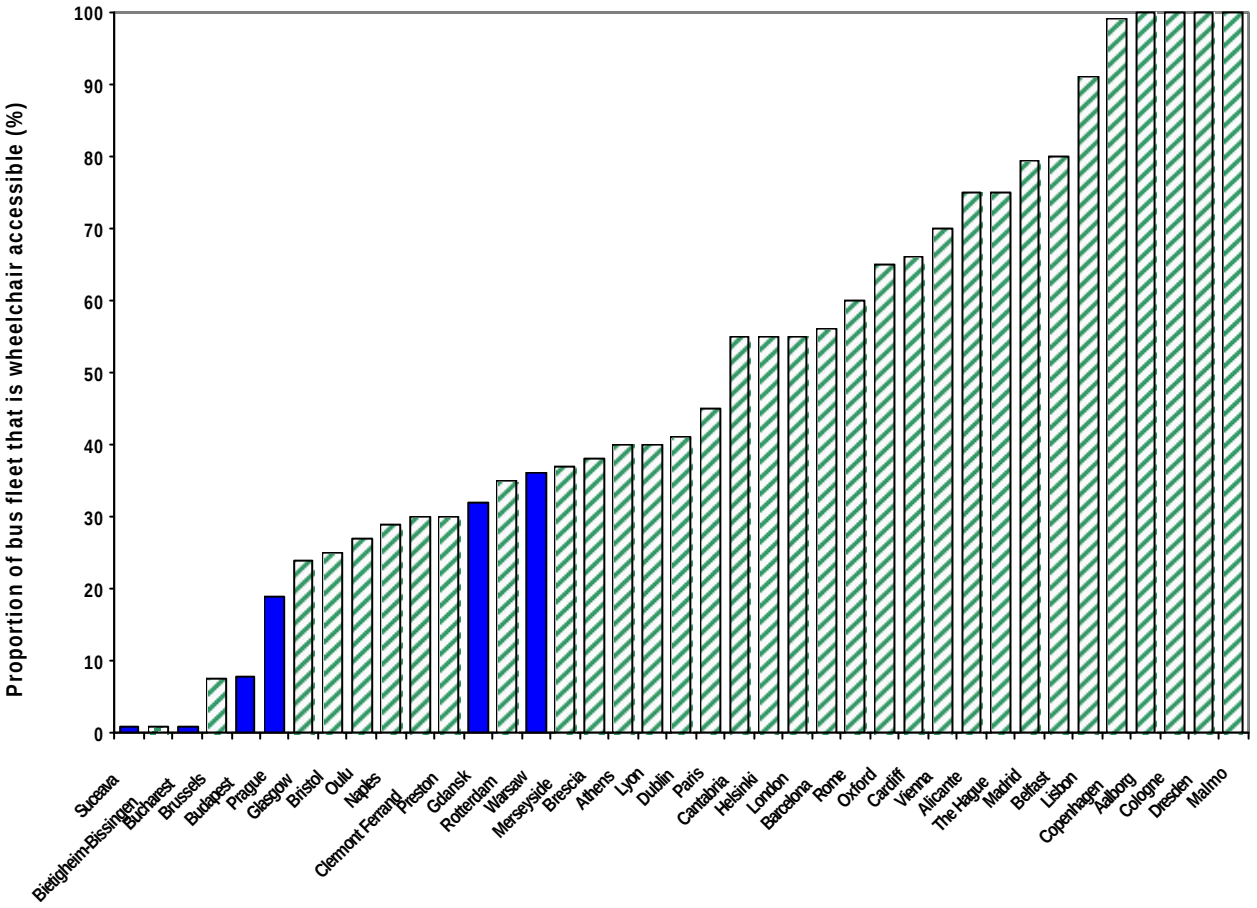


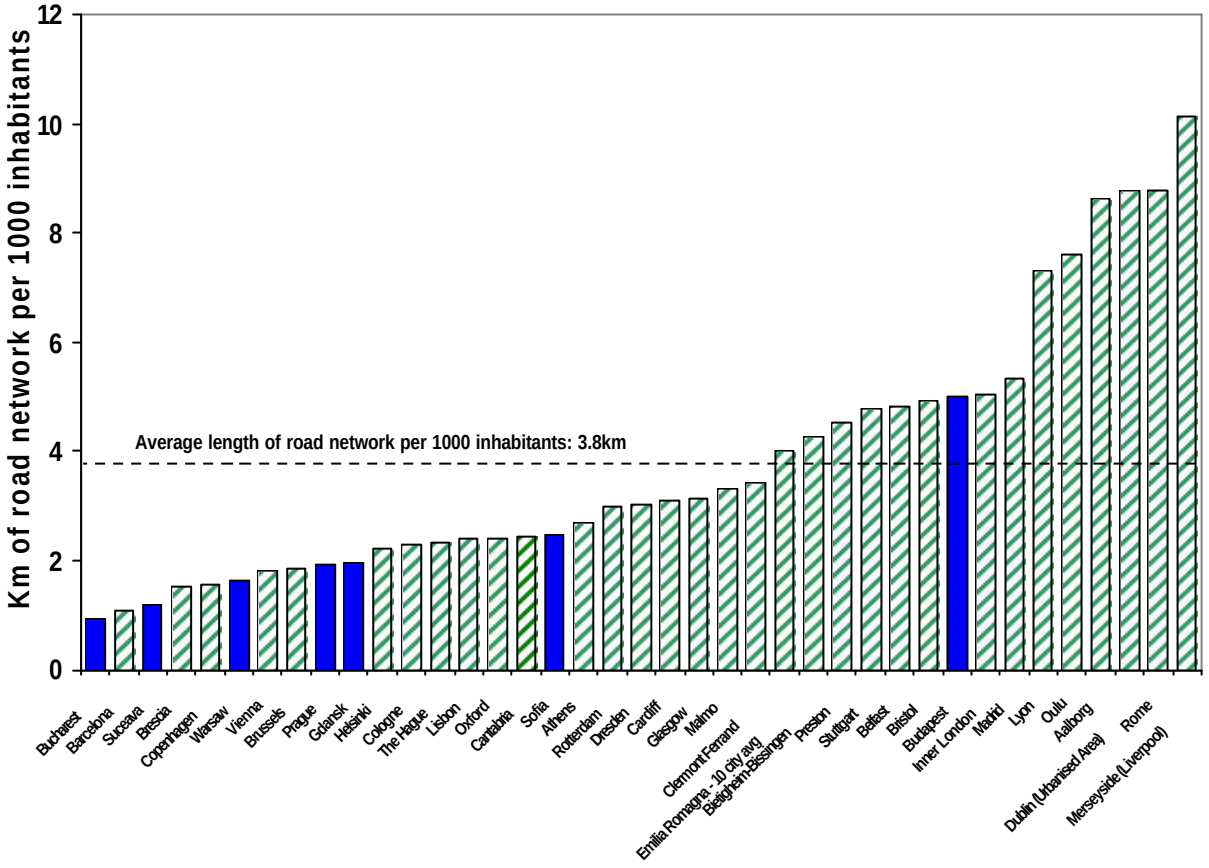
Figure 3.29: Key data issues

Data relates to 2003 except for; Budapest, Warsaw, Lisbon, Rotterdam, Helsinki, Lyon, Naples, Clermont Ferrand, Gdansk, Dresden, Barcelona, Vienna, Suceava, Oxford, Bristol and Cologne (2002), Brussels, Glasgow, Preston, Merseyside, Brescia, Paris, Santander, Cardiff, The Hague, Belfast, Copenhagen, Aalborg and The Hague (2004).

Figure 3.30 is the final graph in this section of the report and illustrates the differences in the road space in cities, which was first noted during year two of the benchmarking initiative. Figure 3.30 indicates that, as in year two of the benchmarking initiative, New Member State and Accession Country cities tend to have less densely developed urban road networks than those in EU15 cities. With the exception of Suceava, the New Member State and Accession Country cities with less densely developed road networks also demonstrate very large public transport modal shares of more than 50% of all trips made in the cities.

The common indicator report from year two of the Urban Transport Benchmarking Initiative proposed that the limited road space in the New Member State and Accession Country cities could act as a natural form of demand management measure which, combined with the lower levels of car ownership, served to stimulate a higher public transport modal share. The data presented in Figure 3.30 also appears to support this observation.

Figure 3.30: Comparison of the average length of road space per 1000 inhabitants



Overview of EU15, New Member State and Accession Country comparisons

This section has reiterated a number of the trends identified which have involved comparisons being drawn between New Member State and Accession Country and EU15 cities. The findings from this section of the common indicator report suggest there is scope to develop the research into comparisons between urban transport provision in New Member States, Accession Countries and EU15 states. Such a topic would be an ideal subject for a European research and demonstration initiative involving cities from the EU25 and Accession Countries, focusing specifically upon the transfer of good urban transport practice to cities New Member States and Accession Countries. In order for the uptake of good practices to be ensured, a series of funded demonstration projects could formalise the exchange of knowledge, information and experiences between cities in the EU15, Accession Countries and New Member States.

The key findings are:

- The average level of public transport use across the 17 cities which submitted data was 249 trips per person in 2003, although this figure was significantly higher in Bucharest, Budapest and

Prague, which are located in Central and Eastern European New Member States and Accession Countries.

- Cities from New Member States and Accession Countries do not necessarily have inexpensive fares when considered in real terms. This dismisses the perception that public transport in Central and Eastern Europe is "cheap" and a factor that encourages high public transport use.
- Cities from New Member States and Accession Countries generally have significantly smaller proportions of wheelchair accessible bus fleets than cities in EU 15 states. It is possible that this pattern reflects a trend for more regular bus-fleet renewal in EU 15 cities than New Member State and Accession Country cities. This seems to be supported in the analysis of the average age of the bus fleet.
- As in year two of the benchmarking initiative, New Member State and Accession Country cities tend to have less densely developed urban road networks than those in EU15 cities. With the exception of Suceava, the New Member State and Accession Country cities with less densely developed road networks also demonstrate very large public transport modal shares of more than 50% of all trips made in the cities.

4. THEMATIC WORKING GROUPS

The four working groups that took part in the Urban Transport Benchmarking Initiative have each produced individual working group reports (Annexes A2-A5). These reports and relevant data annexes are downloadable from the project website (www.transportbenchmarks.org) and this section of the summary reports represents an overview of the key findings from each working group.

4.1 Definition of interesting practice

The aims of the Urban Transport Benchmarking Initiative data analysis were clearly defined at the outset of year one and these remain unchanged at the end of year three of the project:

- To look for best practices and try to establish reasons for variations between data.
- To encourage all participants to take part in this process in order to ensure a set of findings supported by reasoned analysis rather than a collection of statistics.

As a result the approach to the term 'Best Practice' has been retained for the third year of the Urban Transport Benchmarking Initiative. What constitutes a 'Best Practice' has been heavily debated over the course of previous benchmarking projects. The major problem is that there is no all-encompassing definition which clearly defines 'Best Practice'. In the case of this initiative the term 'Best Practice' is applied more loosely to include interesting practices that are displayed in the operations of the participant's urban transport systems.

From the outset it has not been the goal of the Urban Transport Benchmarking Initiative to create a competitive atmosphere among the participants and at the launch conference it was clearly stated that this is not a competition with 'winners' and 'losers'. Promoting interesting practices, through the use of benchmarking, so that a wide audience of cities, operators and local authorities may benefit from them is a concept with huge potential. Creating a set of 'winners' and 'losers' does not help to achieve this, because it may dishearten those perceived to have 'bad practices', whereas these groups of participants probably have the most to gain from this type of project.

The aim of the project is therefore to try to offer the participants the chance to benefit from the project by presenting a set of findings that will interest all of the participants. Disseminating a range of interesting practices is also likely to be of wider interest to those not participating in the project.

4.2 Overview of the working groups and key findings from year three

4.2.1 Cycling

The Cycling working group continued its work from years one and two of the Urban Transport Benchmarking Initiative and benefited greatly from having keen and committed set of participants:

- Malmö
- Copenhagen
- The Hague
- London
- Brescia
- Glasgow

The site visits to Santander, The Hague and Malmö provided a very useful insight into cycling practices applied in other European cities and gave participants the opportunity to exchange good practice and experiences. The site visit to Santander was the first site visit in year three where both

the 'Cycling' and the 'behavioural and social issues in public transport' working groups met to jointly discuss the links between their chosen themes, thus continuing the cooperation between the groups initiated in year two. The visit to The Hague was also a joint site visit and the groups subsequently held separate events for the final site visit in order to discuss their individual analyses.

There were two main recommendations from year two of the Urban Transport Benchmarking Initiative and the group decided that the research topics for year three should be defined in order to meet these aims. The following research questions were subsequently chosen:

1) How can cities monitor and evaluate cycling?
2) How to encourage intermodality for cyclists and public transport users so that both can benefit?

The following conclusions and observations can be drawn from the analysis of the cycling working group's activities during year three:

How can cities monitor and evaluate cycling?

Cycling policies in participant cities are quite a recent feature over the last decade of their governmental agendas. However, Malmö has had a cycle plan since 1976.

The development of different measures within a cycling policy framework takes a different emphasis in each of the cities. Measures employed include upgrading infrastructure and network length, reducing car emissions by promoting cycling through soft measures, producing cycle quality targets, secure cycle parking, developing best practice, improving cycling safety, encouraging cycle training and action to help cyclists. Priorities for the cycle networks covered in the working group reflected the maturity of the cycle network and the strength of the underlying cycle culture in each of the cities

Action plans are an essential component in making a city's cycling policy work. All but one participating city has one or is developing one. Most have been developed within the last 5 years, but Malmö has had an action plan since 1976. The range and number of elements used in cycle action plans varies greatly between participating cities. This ranges from The Hague which does not have a specific plan, to London which has a comprehensive plan featuring both a strategic vision for the London cycle network, as well as Borough specific objectives.

All cities in the working group monitor policy objectives, particularly the use of the cycle network, in order to demonstrate the utilisation of investment and assure decision makers that value for money is being delivered. Approaches to cycling policy monitoring ranged from informal site visits to the cycle network with cycling associations, to detailed data collection in order to measure cycling policy delivery against a series of targets. Commonly used techniques for monitoring are cordon counts (both manual and through the use of automated counters), personal surveys and travel diaries. In most cities, cycle counts are regarded as an important indicator and are collected either by people counting the bicycles or automated counters. The reasons for monitoring objectives are similar in each of the participating cities cases. They are usually to gauge success or impact of strategies, to see if targets are being met and to inform policy improvements that need to be made to improve strategies. Policy monitoring frequency varied from every quarter to every second year.

Indicators used in cycle policy monitoring were ranked as follows with regards to their value in cycle policy monitoring:

1.Cycle accidents
2. Network length
3. Mode share (% of trips)
4. Risk (KSI/trip length)
5. Cycle parking
6. Bridges/tunnels for bikes
7. Signing strategy
8. Engaging schools
9. Cordon counts
10. Use of cycle parking
11. % of children received cycle training
12. Cycle shops
13. Cycle training programme
14. Behaviour surveys
15. Cycle theft
16. Cycle training
17. Risk (KSI per trip)

Ranking the indicators by usefulness, then difficulty to collect enabled the group to develop a priority list of cycling indicators which should form the basis of cycling policy monitoring activities. The indicators at the bottom of the list are not necessarily regarded as less important for collection than those at the top of the rank. They are merely considered as indicators that should be collected only when a monitoring programme is fully developed having already collected the indicators at the top of the rank. They provide data to back up any trends shown by initially collected data. Safety is regarded as the most important factor to monitor along cycle routes and therefore, data on cycle accidents must be collected in order to see what areas need attention with regards to safety. Modal share and network length are regarded as the most representative measures of progress in cycling policies. Cycling facilities are also regarded as an important indicator of cycle network development.

The Cycling group cities were encouraged to test themselves against the Velo.Info system. Malmö, The Hague and Brescia all completed the Velo Info questions. Malmö received a platinum award, The Hague Gold, and Brescia Silver.

Monitoring indicators are used to check progress on a wide variety of policies and programmes including:

- Copenhagen: Cycling infrastructure and environment.
- Brescia: Sustainable mobility.
- The Hague: Infrastructure.
- The Hague: Bicycle parking.
- London: School cycle parking.

The most frequently used indicators to monitor and evaluate these policies and programmes include:

- Network length.
- Cordon counts (modal share).
- Cycle parking spaces.
- Qualitative opinions on improving infrastructure and policy.

In general, the indicators have been used to give a background for improvement of the various different cycling infrastructures. They are used to predict demand for cycle parking, to justify cycle network extensions, to identify safety black spots and to monitor cycle targets. Monitoring attitudes and satisfaction levels with regards to cycling in the participating cities is also important to progress as they reflect the status of cycling culture in the cities.

There were a variety of difficulties encountered when implementing these policies and programmes which include:

- Revision of initial strategies.
- Limited experience and technical competence.
- High expectations.
- Lack of commercial understanding with regards to the need for cycle parking.
- Lack of consideration when planning for physical obstacles and other infrastructure.
- The need for planning permission, causing delays.

In general, the policies and programmes implemented for cycling in the working group cities were deemed to have been successful. The use of the most appropriate indicators has engendered greater understanding, comprehension and acceptance of policies and programmes, resulting in new infrastructure and facilities being implemented in appropriate locations in order to encourage cycling in cities.

This improved awareness can assist in the maximisation of value from investment in infrastructure, research, promotion and maintenance relating to a city's cycle network. In most cases, the majority of cycle spending is on infrastructure. The only exception to this is Malmö who already have an extensive cycle infrastructure and whose spending goes mainly on maintenance of it. This trend reflects the maturity of the Malmö cycle network and shows that, as cycling is growing as a mode of transport and networks are expanding, the purpose of funding cycle networks changes.

Maintenance uses the second biggest portion of cycle spending budgets. Existing cycle routes need to be maintained to keep them safe and desirable for the public to use. The proportion of spending on maintenance should increase when the cycle network is nearing completion, as demonstrated by Malmö. The majority of cities tend to spend approximately 5% on the promotional sector. Again, similar to maintenance, the significance of spending in this sector increases as the cycling network nears completion and maturity. For example, in Malmö, the percentage spent on promotion is approximately 12%. The development of the cycling infrastructure in cities is of prime priority, as once this is comprehensive enough; it can then be marketed to increase usage by the public.

4.3.2 Behavioural and Social Issues in Public Transport

The Behavioural and Social Issues in Public Transport working group was made up of representatives of 6 cities which are listed below.

- Delft
- Glasgow
- Paris
- The Hague
- Nottingham
- Santander

The site visits which took place in Santander, The Hague and Nottingham provided a very useful insight into public transport practices applied across Europe, and were tailored with particular reference to commuters, in line with the groups year three theme. The site visits held in Santander and The Hague were joint site visits, held in conjunction with the Cycling Working Group. These site visits continued the joint working started by these two groups, during their joint site visit to

Brescia during year two of the project. The third site visit to Nottingham was attended just by members of the Behavioural and Social Issues in Public Transport working group.

One of the main recommendations from year two of the Urban Transport Benchmarking Initiative was that a logical development from the working group's year two research on 'young people' would be to take into consideration commuter aspects of transport planning and public transport promotion. Thus, during the year three launch conference in Brussels, it was decided that the research questions for year three, would be focused on the research topic of "Commuter Travel". During the Behavioural and Social Issues in Public Transport working group's first site visit, to Santander in December 2005, the research question was finalised and phrased:

"How can we influence the travel behaviour of commuters in order to increase the market share of sustainable modes and retain existing customers?"

Following discussions with the Cycling working group, it became clear that the topic of interchanges was something that both groups were interested in and therefore elected to research together. The results of this joint research are dealt with separately, in a jointly prepared document titled; "Interesting Practice at Interchanges", which is Annex 6 of the Urban Transport Benchmarking Initiative's year three reports.

Following this the list of thematic data indicators used for the working groups year two research, were reviewed and it was felt that in order to allow for consistent comparison, these should be kept the same. From the analysis of the working group's activities and data collection during year three of the Urban Transport Benchmarking Initiative, the following key conclusions and recommendations have been identified;

Conclusions:

- Initially, the situation in all of the different cities involved in the Behavioural and Social Issues in Public Transport working group, appeared vastly different. However closer analysis allows for some recognisable patterns and common issues across the group.

- Analysis across the cities identified that commuter's form the largest public transport user group in all cities that took part in the Urban Transport Benchmarking Project. It is also clear that the car is still the most popular mode choice of commuters across Europe.

- Marketing in all of the cities is sporadic, with each city having a different, quite complicated, fare structure. It is likely that the complex array of fare options open to commuters may serve to reduce the attractiveness of public transport.

- The effort and resources put into the communication of public transport resources for commuters also varied greatly across the working group. Only two cities provided a specific service for journey planning and few hold specific events throughout the year to encourage commuter travel by public transport.

- Specifically funded posts, to deal with 'Travel Plans' appear to be a feature of cities from the UK and the Netherlands and there is great potential for cities in these countries to share their good experiences and spread knowledge of the benefits of behavioural measures, such as travel planning, to other cities in the EU, New Member States and Accessions Countries. It is likely that New Member States in particular, may be able to adopt travel planning approaches to

encourage continued use of public transport in the face of increased economic prosperity, rising car ownership levels and greater levels of commuting.

- In terms of responding to the group's year three research question:

  "How can we influence the travel behaviour of commuters in order to increase the market share of sustainable modes and retain existing customers?"

  - It is clear that the key lies in the provision of funding and resources for the promotion and marketing of public transport.
  - Without a staffed position (or department) within a local authority that can take responsibility for encouraging sustainable commuting, there is significantly less chance that commuters will become aware of the alternative modes of commuting at their disposal.
  - Without undertaking specific activities to raise the awareness of commuters and deliver meaningful incentives to employers, it is likely that private car use will continue to appear to be the easiest commuting option for the vast majority of citizens.

4.3.3 Public Transport Organisation and Policy

The Public Transport Organisation and Policy working group was made up of representatives from 7 cities. These were:

- Athens
- Brussels
- Ile de France
- Bucharest
- Stuttgart
- Merseyside
- Belfast

Representatives of the Netherlands Ministry of Transport and the German Association of Cities also participated in meetings during year three. However, the representatives from Ile de France and from the Brussels Region authority were not able to attend any of the meetings. Site visits were held in Rotterdam (5th to 6th January 2006) and Berlin (13th to 14th March 2006). Originally, the last meeting was planned to take place in Paris, including a joint site visit with the Urban Transport for Disabled People Working Group on May 4th to 5th. Since only a small number of Working Group members could attend this meeting, an additional working group meeting was held in the UITP premises on June 6th 2006 (a one day event without site visit).

During the first year of the Urban Transport Benchmarking Initiative, the participants of the Working Group on Public Transport Organisation and Policy agreed on policy objectives (improving quality of service), defined and collected indicators measuring the performance against these policy objectives (age of fleet, frequency, accessibility, integration, etc.), compared their performance, and identified benchmarks (quality of supply, young and accessible fleet, fully integrated fare system, etc). During the second year, the objective was to look beyond those benchmarks and to explore practices that account for the best performance levels, with a particular focus on contracts between operators and authorities. The analysis of the benchmarks identified at the end of the first year had highlighted the role of contracts in the attainment of such high performance levels.

At the launch workshop for year three, the working group opted to focus upon issues relating to the financing of public transport. The group decided that it was less important to focus upon the

collection of the data and the comparability of quantitative indicators. Instead the group decided to pursue an exchange of good practices. Each site visit was used to focus upon one of the following three topics:

- Diversification of revenue sources
- Fare Policy
- Strategies to reduce costs of operations

Selection of the Working Group's research topic(s)

With respect to fare policy, the purpose was to identify good practices related to the fixation and the integration of fares and to reflect on their applicability to each network's respective situation.

On the issue of alternative approaches to Public Transport funding, the purpose was to identify good practices relating to non-conventional approaches to the funding of Public Transport (earmarked taxes, land value capture, advertising, supply of services, Public-Private Partnerships, debt finance) and to reflect on their applicability to each network's respective situation.

Finally, with respect to cost reduction, the purpose was to:

- identify good practices related to (1) cost reduction by operators, and (2) incentive provision for cost reduction in contracts between organising authorities and operators.
- reflect on their applicability to each network's respective situation.

Summary of key findings of the group's activities

- In some areas of public transport organisation and policy, practices were very similar across all participating networks:

  - With respect to the decision making process regarding fares, it is an almost general practice that the operator proposes but that the authority has the final say. Even in supposedly deregulated networks, the authority still retains the power to intervene if it is considered that the market outcome yields undesirable results.

  - Objectives are generally vague and there is no explicit treatment of the trade-offs between conflicting policy goals.

  - There is a rather general move towards fare integration and the use of smart cards. It is clear that the introduction of smart cards facilitates integration. The main obstacles are linked to important transition costs (and, in the case of the UK, to competition policy). There was a wide agreement within the group that this was one of the areas that offered the largest potential for improvement.

  - Public compensation for Public Service Requirements and concessionary fares are present in all networks, even those that are, in principle, deregulated. The details of the compensation schemes differ widely, however, and, due to differences in terminology, international comparisons can be difficult.

- Mainly due to legal obstacles, earmarking of specific tax revenues (including congestion charges) for public transport funding is not widespread. However, several participants expressed themselves clearly in favour of such mechanisms. Moreover, due to the increases in traffic speed they induce, congestion charges bring benefits to public transport, even if they are not earmarked for public transport.

- Public Private Partnerships are not widespread amongst participants in the working group, despite their potential for efficiency improvements. The main objections against these schemes are the higher cost of borrowing and the important transaction costs linked to complex long-term contracts.

- Except in the UK and in Ireland, there are no examples of land value capture, mainly because of a lack of appropriate legislation. Nevertheless, the examples from the UK and from Ireland show the potential of this approach.

- The relative importance of "non fare" commercial revenues (mainly from advertisement and from services linked to infrastructure provision) is limited (with the notable exception of advertisement revenue in Paris).

- In other areas of public transport organisation and policy, we see a huge variety in approaches. Maybe surprisingly, there is no clear link between fare structure (zonal-, distance- or time-based) and the regulatory regime.

- On the issue of cost reductions, operators emphasise the importance of an efficient fleet maintenance policy, active human resources management and of reducing the costs linked to fare collection. Monitoring and information management turns also out to be a crucial factor. However, some factors that influence cost efficiency are at least partially outside the scope of the operator and must also be tackled by the authority such as traffic conditions and fare policy.

- In theory, competition should provide strong incentives for cost reduction. However, due to high barriers to entry, actual competition in deregulated markets can be disappointing. In networks with a periodic award of concessions, the quality of the tendering process can have an important impact, both on the quality of the product that is finally offered and on the actual strength of the "competition for the market".

4.3.4 Urban Transport for Disabled People

The Urban Transport for Disabled People working group was made up of 7 cities, including;

- Aalborg
- Bucharest
- Uppsala
- Paris
- Fife
- Hasselt
- London Borough of Camden

The Urban Transport for Disabled People working group was founded at the beginning of the third and final year of the Urban Transport Benchmarking Project. The group consisted of three active participants: the cities of Aalborg (Denmark), Hasselt (Belgium) and Paris (i.e. the Ile-de-France region). "Follower cities" have included Bucharest (Romania), Fife (Scotland), the London Borough of Camden and Uppsala (Sweden).

Because of the constrained timescale, of less than one year, in which the working group had to operate (during which the group had to establish its objectives and priorities) only two site visits were completed. Nevertheless, these visits, to Hasselt and Paris, provided an interesting contrast in approaches towards the provision of accessible public transport in urban areas, illustrating two different policy options in relation to the group's chosen focus. This related to the trade-off between investing in improving the accessibility of mainstream public transport rolling stock and infrastructure, and funding a specialised, but dedicated, service that meets the needs of all disabled people, including wheelchair users.

All group members found it very useful to be able to compare the experiences and policy priorities of transport practitioners in other European cities, and to discuss different means of providing accessible urban public transport services, in a constructive, non-competitive environment. In this context, the working group contributed to achieving the wider project's objectives of sharing knowledge among urban transport providers, and disseminating best practice throughout Europe.

Key findings and conclusions from the working group's activities include:

Hasselt: Accessible Public Transport System

- There was much evidence from the site visit to Hasselt of a commitment to making mainstream public transport services accessible for all members of society.
- Translating such a commitment into the delivery of an accessible travel environment is facilitated by the fact that one operator, De Lijn, has control over all public transport in the city, and in the surrounding area. There is also the advantage of there being a strong commitment to the achievement of full accessibility at the level of the Limburg regional government.
- As a result, the site visit hosts were able to demonstrate a great deal of progress that had been made in providing public transport services in Hasselt that were both accessible and free to the end-user.

Ile de France: Specialised Demand Responsive System

- Whilst Hasselt is a city of some 70,000 population, the problem faced by STIF (The regional authority for the Ile de France) in delivering "fully accessible" public transport services in both the city of Paris and the wider Ile-de-France region – by 2015 - is somewhat greater.
- Although plans are in place to invest in the mainstream public transport network, in order to make as much of the network accessible to as many people as possible – and there has recently been investment in new tram rolling stock and infrastructure – it is widely accepted that achieving "full" accessibility throughout the Ile-de-France region by 2015 is probably unrealistic.
- Accessibility for all of the region's citizens has instead been secured, in the mean time, through investment in a showcase, accessible demand responsive transport service – the PAM system (Paris Accompagnement Mobilité). This service consists of a large fleet of lift-equipped minibuses, staffed by full-time, uniformed drivers and escorts, and controlled by a state-of-the-art booking and control facility.

Comparison between the Accessible Urban Transport Policy Approaches

- In spite of the difference in emphasis apparent in the two policy approaches, it should be pointed out that, in both locations, work continues to be done to address both individual needs and the accessibility of mainstream services.
- Whilst it has already been noted that much investment is, and continues to be, channelled into mainstream public transport provision in Ile-de-France, De Lijn also provides a demand responsive back-up service for its urban bus system.
- Since there are limitations to the extent to which "full" accessibility can be achieved in Hasselt, because bus stop infrastructure does not yet provide level access at each stop, and because the city's buses provide a designated spaces for just one wheelchair user, there is a lift-equipped, wheelchair accessible minibus service that can be called upon by passengers as a back-up.
- Because these minibuses are provided by De Lijn, which is constrained to being a provider of a public service, however, the limitation of this demand responsive back-up service is that it can only operate between bus stops, so cannot operate in a door-to-door capacity.

Staff Training

- One aspect of De Lijn's package of provisions that was demonstrated during the site visit to Hasselt was the commitment to the training and education of all members of the company's staff in disability awareness.
- It is recognised that a key element of providing an accessible public transport system is the ability of members of staff to have an understanding of the needs of people with different types of disability, including people with sensory impairments, and people with learning disabilities.
- Drivers in particular, represent the immediate point of contact that the travelling public has with the public transport provider, need to receive such training, so that they have knowledge of how best to assist disabled passengers.
- With strong support from the regional government, the city of Hasselt provided a good illustration of the importance of commitment both "at the top", and also "on the ground", at the public interface.

4.3.5 Joint working into Cycling and Public Transport Intermodality

The Behavioural and Social Issues in Urban Transport and the Cycling working groups both worked jointly to consider intermodality issues relating to public transport and cycling, through the use of a joint research question:

"How to encourage intermodality for cyclists and public transport users so that both can benefit?"

A number of interesting conclusions arose from the activities of the two working groups and a standalone case study document "Interesting Practices at Interchanges" has been produced as Annex A6 to this report. The key findings are:

In terms of intermodality, all of the cites involved in the Cycling and the Behavioural and Social Issues in Public Transport working groups, recognise the importance of providing user-friendly interchanges, in order to increase public transport use. From discussions at the joint working group meetings it became clear that the cities were keen to share 'interesting practice' on the good and bad aspects of design and usage of Interchanges, in-order to improve their best practise. The results of this joint research are presented with separately, by both groups in the Annex 6 report titled "Interesting Practice at Interchanges".

Allowing the carriage of bicycles on a wider array of public transport modes and without restrictions, or additional fares, would almost certainly encourage greater use of public transport modes as well as cycling in cities. At present bicycles are only regularly carried on trains and some metro systems in all but one of the working group cities. The municipal authorities in Malmö are trying to make it possible to take bicycles on regional services; although on the whole there is no planned agenda to improve intermodality. The Hague believes that there is low demand for the ability to take bicycles on buses and trams but maybe the ability to do so needs to be in place first before the demand can be seen.

Given the lack of enthusiasm for carriage of bicycles on all public transport modes and a distinct lack of cycle parking at interchanges in all of the working group cities, it appears that the most viable alternative to the carriage of bicycles in the short to medium term is to offer improved cycle storage and changing facilities at major interchanges and key transport nodes in cities. Security is a prime concern anywhere that bicycles are stored. It is therefore surprising to learn that only two of the cities in the group have manned cycle storage facilities, or have invested in purpose built cycle lockers to protect bicycles stored at interchanges.

On further investigation**, it appears that an impasse has currently been reached between public transport operators and cyclists on the topic of intermodailty**. Public transport operators are happy to provide cycling facilities and boost their modal share of passengers, but are eager to charge users for them when it comes to making significant investments in CCTV or secure cycle lockers. Cyclists are keen to use the facilities, but feel that their patronage on public transport entitles them to adequate, secure parking facilities equal to (if not *better than*, given the relative environmental merits of cycling and car use) those offered for car drivers at stops and stations.

Cycle hire facilities tend to be targeted primarily at tourists, rather than considered as an alternative to the issue of the difficulty of integrating public transport with cycling for a daily commute. Conventional cycle hire on a short term hourly to daily basis, keeps track of all the bicycles more easily and fewer are lost. However, as the examples from the working group illustrated, success can be varied when similar schemes are implemented in different cities.

Dedicated websites to promote cycling were established in four of the larger cities involved in the joint working exercise. **Websites are a great way to disseminate to potential customers and can be a persuasive marketing tool.** A total of five cities also have incentive schemes, such as awards, workplace travel plans with match funding and discretionary funding, aimed at employers in order to try to encourage commuters to cycle to their place of work.

Efforts have also been made to encourage employers in cities to provide cycle parking and facilities for their staff. In some cases employers have their own sustainable transport agenda and therefore provide spaces, while some local authorities have developed guidelines for how many cycle spaces should be provided per employee. In some locations these guidelines have been made mandatory by the local authority and employers are required to provide a certain amount of cycle parking.

Out of the eight participating cities, a total of three have other journey planning services but these are only to complement the services already covered in the form of maps, websites and route information.

It is clear that there is little or no coordination between public transport operators and city cycling departments in order to develop intermodal understanding when planning public transport

facilities in most cases. Only in London and The Hague can we see an advanced form of coordination between these two groups and this is mainly because they are part of the same organisation. It is also clear that this aspect of planning for interchanges needs to be worked on considerably in the future in order for interchanges to be developed with optimum efficiency and with less room for mistakes.

With regards to best practice, it is clear that participant cities have different opinions as to how to combine cycling and public transport trips, some cities are very accommodating and embrace the benefits that combining cycling and public transport has to offer and others are less accommodating. Maybe these cities are unclear about these benefits or how to go about implementing strategies relating to this concept. It is clear that trains generally accept bicycles onto them but buses rarely accommodate bicycles. If seating space is of primary importance on these buses, then maybe as in Malmö, cycle parking should be provided at bus stops. Overall, **cities increasingly recognise the advantages of the combination of cycles and public transport, and are making plans to maximise the possibilities, although there is still a long way to go**.

Unfortunately, there is currently little or no coordination between public transport operators and city cycling departments when planning public transport facilities in most cases. When designing interchanges, simple planning coordination can make a big difference. Participant cities have different opinions as to how to combine cycling and public transport trips, some cities embrace the benefits combining cycling and public transport, others less so. **Currently, there are no planned agendas for cities to improve intermodality in the manner discussed in the joint working group sessions and reported here.**

Space and finance are therefore considered to be the main barriers to taking cycles on public transport. Further research has the potential to unlock the potential of combining cycling with public transport and could create a powerful rival to private car use in cities and the park & ride culture being developed to protect cities from cars.

5. CONCLUSIONS

5.1 Overview of year three of the Urban Transport Benchmarking Initiative

During its third, and final, year the Urban Transport Benchmarking Initiative has continued to develop the theme of benchmarking in the European arena of urban transport by enlarging upon the baseline of data and good practices developed during the first two years of the project. A total of twenty five different cities and regions participated in the third year of the Urban Transport Benchmarking Initiative and fifteen submitted data for the project's common indicators. Supplementing data collected during year three with that collected during the first two years of the initiative and the PLUME benchmarking exercise (undertaken as part of the activities of the City of Tomorrow Cultural and Key Heritage Action funded by the EC DG RESEARCH), has enabled data from 45 different cities to be compared in year three of the benchmarking exercise.

Following the year three launch workshop, all five thematic working groups were quickly established but, owing to limited interest from city representatives, the Demand Management working group did not proceed beyond February 2006. The remaining four working groups all completed successful comparative analyses of their collected data sets, which were defined entirely by the cities in the working groups with guidance from the respective experts.

In year three of the Urban Transport Benchmarking Initiative the continued shift in emphasis towards reporting good practices and evaluating how they could be applied in other cities has given greater importance to the site visits. In particular, the Public Transport Organisation and Policy working group wholeheartedly adopted the approach and elected not to collect data, but to share information on public transport finance issues through a series of three focused working group discussion sessions. Many of the groups have included detailed summaries of good practices observed during site visits in the annexes of their final reports (A2.1 through to A5.1) and some working groups have included case study sections in the main bodies of their reports (Annex A2 to A5). The site visit reports are also available on the Urban Transport Benchmarking Initiative website at: http://www.transportbenchmarks.org/events/site-visits.html. Some images from the cities visited over the course of year 3 are included in Figure 2.3 of this report.

The 25 participants provided new/updated data for the thematic working groups and a total of 15 sets of data were received for the year three common indicators. This disparity reflects the fact that some cities were effectively duplicated by representation from a regional level as well as at the city level (e.g. Paris / Ile de France region and Bietigheim-Bissingen / Stuttgart) as well as the fact that some cities did not update their common indicators from the first two years of the initiative. Following feedback received from participants at the end of year two conference, the common indicators were left relatively unchanged from year two. The data indicators were significantly re-worked at the start of year two of the benchmarking initiative and most participants felt that further revisions were unnecessary. The only new indicators for year three focused upon the clean vehicle component of the bus fleets in cities involved in the initiative.

The findings of each of the working groups are described in full in Annexes A2 through A5 and the full report of the common indicators is available in Annex A1. The headline results covered in these reports were presented at the Urban Transport Benchmarking Initiative final conference, which took place in Budapest on June 16th 2006. Presentations from this event and the reports described above can be found on the project website www.transportbenchmarks.org which is the main dissemination point for the project.

Due to the fact that there were four working groups during year three of the Urban Transport Benchmarking Initiative, the project team was able to use the additional resources to produce a Good Practice Case Study Handbook, which summarises good practices from all three years of the project. In addition, the development of joint working between the individual groups has been furthered through a significant link between the Behavioural & Social Issues in Urban Transport and the Cycling working groups.

The issue of greater joint-working between groups was initially facilitated during year two of the project and in year three the integration between the Behavioural & Social Issues in Urban Transport and the Cycling working groups has been underpinned by joint data collection and two joint site visits. Discussions between the Behavioural & Social Issues in Urban Transport and the Cycling working group, held at the year three launch workshop, made it clear that the topics of interchanges and intermodality were of mutual interest to both working groups. As a result the two groups elected to research this topic together. The results of this joint research are documented fully, in a jointly prepared document titled; 'Interesting Practice at Interchanges', which is Annex 6 of the Urban Transport Benchmarking Initiative year three reports.

In addition to supporting a greater degree of cross-over between the working groups the project team was also able to maintain the interactive benchmarking tool which is available online, via the project website: http://www.transportbenchmarks.org/tool/benchmarking-tool.php.

The remainder of the concluding section of this report contains a summary of potential policy implications (section 5.2) which have arisen from the findings identified from year two of the Urban Transport Benchmarking Initiative. Section 5.3 contains recommendations from the working groups and section 5.4 to 5.5 contains recommendations for future research and for cities seeking to implement the findings of the Urban Transport Benchmarking Initiative.

5.2 Policy implications

One of the wider aims of the Urban Transport Benchmarking Initiative has been to try and link the findings of the project to urban transport policy and suggest some factors that may have an impact upon these policies. The findings from the common indicators have provoked a series of policy implications which have been identified according to the size of a city's population as well as for cities in Central and Eastern European states. These policy implications were developed in year two of the Urban Transport Benchmarking Initiative and remain largely unchanged as a result of the updated information from year three of the initiative. Although they were included in the common indicator report from year two, the salience of these policy objectives means that they are worthy of inclusion in the year three common indicator report and are summarised in the remainder of this section.

Policy implications for larger cities (populations of more than 1 million inhabitants)

Larger cities demonstrate the most densely developed transport networks with the widest variety of public transport modes and are most likely to have metro systems and urban heavy rail networks, which provide rapid transit in central areas and are unaffected by road traffic congestion. Bus networks in larger cities often act as feeder services for tram/heavy rail/metro systems and, compared to those in less populated cities, a smaller proportion of the bus fleet in larger cities is wheelchair accessible. The findings of the Urban Transport Benchmarking Initiative suggest that metro systems coincide with greater public transport modal shares in cities. The presence of a metro encourages greater public transport use, because it is rapid, efficient, segregated and easy to

use. The cities with the largest populations and population densities have all introduced metro systems, because they represent the most efficient way of transporting large numbers of passengers. The need for a sufficient critical mass of citizens (or potential metro users) is a basic requirement for successfully introducing a metro system. In this respect larger cities have a distinct advantage over medium-sized and smaller cities, because their densely developed central areas and larger populations provide the ideal conditions for sustainable transport use compared to private car travel for urban trips.

The larger cities involved in the Urban Transport Benchmarking Initiative tend to be national or regional economic centres which face the issue of managing the demand for travel into their metropolitan areas. Unlike in less-populated cities policy makers in large cities, which are usually core zones of economic growth and inward investment, have greater potential to make bold transport policy decisions. The fact that larger cities often have public transport networks in place which provide better access to central areas than is possible by car means that policy makers in these cities have the potential to implement demand management measures aimed at encouraging further modal shift to public transport and sustainable modes. Rome and London are good examples where demand management measures have been successfully adopted in order to discourage car use and encourage public transport travel.

Larger cities provide less support for cycling as a mode of transport, demonstrating relatively small cycle networks as a proportion of the total road network. Two main types of barriers prevent city authorities from promoting cycle use in the same manner as medium-sized and smaller cities as outlined below;

- Land space is at a premium in the centre of large cities as a result of the dense urban development. As a result there is often insufficient space to integrate cycling infrastructure into the existing environment without severe disruption and cost. It is hard to promote cycling or to develop a cycling culture when the physical infrastructure required by cyclists is not in place.

- Road traffic congestion, pollution and the lack of safe routes deter people from attempting to cycle.

These barriers need to be addressed through bold policy making to encourage cycling in larger cities. The findings from smaller cities suggest that the uptake of cycling is often infrastructure-led and therefore if larger cities can engineer solutions which overcome the lack of space for cycling infrastructure then it should be possible to generate a cycling culture and increase the uptake of cycling.

A key finding of the research of the Urban Transport Benchmarking Initiative is that the challenge for policy makers in larger cities is to manage the existing transport infrastructure in order to optimise the use of public transport and reduce car use, primarily through the implementation of demand management measures. Larger cities should focus upon creating opportunities for sustainable modes of transport (walking and cycling) to increase their modal share and improve the accessibility of the existing public transport system in order to open up urban transport systems to provide equality of access for disabled people.

Policy implications for medium-sized cities (300,000 – 1 million inhabitants)

The cities with between 300,000 and 1 million inhabitants (medium sized cities) demonstrate a broad range of urban transport issues which overlap with both the smallest and largest cities involved in the Urban Transport Benchmarking Initiative. The medium-sized cities are often local or regional economic centres, which are likely to have bus and light rail networks and approximately half have metro systems, some of which are being expanded or are planned for expansion to meet the needs of growing populations and nearby conurbations (e.g. Rotterdam, Helsinki, Lisbon).

These medium-sized cities therefore share the policy implications for both smaller and larger cities, since many are large enough to support high-load mass transit systems, but are not as densely developed as the largest cities in the initiative and therefore also display relatively high levels of car use. The resultant challenge for policy makers in medium-sized cities is to balance the pressure of car use through careful demand management and parking controls which increase the cost and reduce the accessibility of private motorised travel, yet simultaneously seek to encourage greater levels of public transport use, walking and cycling through the development of infrastructure which reflects the size and stature of the city.

Policy implications for smaller cities (less than 300,000 inhabitants)

Smaller cities involved in the benchmarking initiative demonstrate much lower density public transport networks and are largely reliant upon bus networks to provide public transport services. A key obstacle for transport policy makers in these cities is that the road network can often provide the car/motorcycle user with a faster, more convenient journey than the public transport system can offer. As a result car use is generally higher in the less populated cities and, although there is considerable potential for demand management measures to be applied in these cities, it is possible that local authorities are often reluctant to use them because of the risk of reducing the attractiveness of the city to businesses and visitors.

In terms of cycle use in cities a key finding was that the highest levels of cycle use and the largest cycle networks as a proportion of total road space were found to exist in smaller cities. The lower densities demonstrated by less populated cities and greater availability of land for traffic-free cycle routes have provided transport policy makers with ideal conditions to encourage cycling. Urban planners in larger cities may seek to learn from the practices of smaller cities in this field in order to encourage greater use of cycling.

Transport policy makers in cities with smaller populations are faced with the challenge of encouraging public transport use where there may be an insufficient critical mass to provide an extensive, high frequency public transport network and where car use is very high. Subtle use of demand management measures aimed primarily at reallocating road space to sustainable modes, the continued development of sustainable modes (walking and cycling) through pedestrian and cycling infrastructure and the development of high quality, accessible bus services could be considered as key challenges for policy makers in cities with smaller populations.

Policy implications for cities in Central and Eastern Europe

Cities in New Member States consistently display large public transport modal shares relative to car use, although levels of car ownership are increasing in these cities. The experiences of cities located in Southern Europe (e.g. Lisbon) suggest that levels of car ownership dramatically increase

following accession to the EU, primarily as a result of the growth in income levels. The Urban Transport Benchmarking Initiative has demonstrated a link between the selection of modes and the level of GDP per capita (a proxy indicator for economic activity and, indirectly, the average income level) and it is therefore possible that cities in New Member States will experience similarly rapid growth in the level of car use.

One challenge for transport policy makers in Central and Eastern European Countries is therefore to continue to maintain the high levels of public transport use in the face of rising car ownership. One way of assisting this process is to carefully benchmark the development of new road space in cities in Central and Eastern Europe, because these cities currently demonstrate significantly less road space per square kilometre when compared to EU15 cities. It is possible that continuing to constrain the size of the urban road networks in these cities could act as a natural form of demand management measure. Integrating the development of urban transport systems with land-use planning in cities in Central and Eastern Europe may also help to regulate the pressure for rapid development which many observers are predicting as an outcome of accession to the EU.

Promotional and awareness campaigns are likely to be a useful tool in encouraging sustainable travel in cities in New Member States and Accession Countries. While it seems inevitable that levels of car ownership will rise in these countries, it is possible that excessive car use can be deterred by encouraging citizens to consider using alternative modes of travel by marketing and promotion campaigns and innovative transport planning.

5.3 Working group recommendations

The working groups also identified a number of policy implications as a result of their research from year three of the Urban Transport Benchmarking Initiative:

Cycling

City cycle-hire schemes – There is potential for research into different hire schemes (subscription, coin operated, conventional) to be undertaken in order to explore which type of schemes are appropriate in cities of different sizes and with different existing levels of cycle use. Pilot demonstration projects could form part of this approach.

Cycle parking at interchanges – Exploring the amount of parking required when installing cycle parking could also form the basis of an interesting research project. The distance of cycle parking from interchanges could also be considered, because as the distance of cycle parking increases from the interchange the likelihood is that cyclists will be discouraged from using the facility.

Funding staffed cycling facilities – There is also an opportunity to demonstrate the potential of staffed cycling facilities and consider who should fund these installations. Pilot schemes to assess the 'preparedness to pay' of users and demand for such services would greatly assist in this debate.

Foldable bicycles – There is scope for the foldable bicycle to become an important tool in the research into their advantages and disadvantages, usability and design.

Bicycles on trains, trams and buses – There is clear potential for bicycle use on trains, trams and buses to be explored through research and demonstration projects. Malmö has already begun to trial the carriage of bicycles on public transport and there is clear potential for other cities to embrace this approach.

Incentives given to employers by Local Authorities to encourage sustainable travel – A comparative research project exploring the relative merits and effectiveness of sustainable travel incentives offered by local authorities would greatly assist local authorities seeking to identify and develop travel incentives which will work in their city.

Innovation in cycling – With such a wide variety of innovation in cycling occurring across Europe, research into the creation of a good practice guide should be implemented. A particular emphasis should be placed on transport interchanges to create coherent good practices in the way that interchanges are developed.

Cycling spending – Identifying the most productive levels of spending in cycle infrastructure, maintenance and promotion at varying levels of cycling and cycle network development in cities would be beneficial for cities with ambitions, and funds, to develop cycling as a mode of urban transport.

Behavioural and Social Issues in Public Transport

- The lack of awareness among the group's participants of the size of the commuter user group, and potential for encouraging commuting by public transport, in their own cities indicates that people commuting to work is a surprisingly overlooked target group for publicity and marketing activities. This highlights a clear need for further behavioural research into commuting and the comparative values of public transport users and car drivers when accessing their place of work.

- It is clear that proactively promoting public transport fares and services with direct comparisons against the full cost of car use could help to encourage public transport commuting in cities. This would need to be undertaken strategically, through a concerted campaign of marketing and incentives, rather than sporadic offers and could form the subject of an EC funded demonstration project.

- Simplifying fare options available to commuters may also help to promote greater uptake of commuting by public transport. It is clear from the typology of fares available in this document, that such an array of options is likely to confuse potential public transport users.

- Greater effort must be made to involve employers in campaigns to encourage sustainable commuting. Legislation to encourage employers to be more responsible in their choice of site location and the information they provide to staff in relation to travel to work has mainly been permissive to date, although the UK and The Netherlands have begun to realise the potential of these approaches. Across Europe some employers have recognised the benefits of encouraging their staff to travel sustainably and are making cost savings through proactive travel planning activities (e.g. such as reducing land-take and car parking requirements, as detailed in the DfT Smarter Choices case studies[7]). An EU-wide version of this publication, accompanied by a concerted effort to influence company legislation in EU Member States would have a significant impact upon sustainable commuting.

[7] DfT (2004), Smarter Choices - Changing the way we travel:, available online at: http://www.dft.gov.uk/stellent/groups/dft_control/documents/contentservertemplate/dft_index.hcst?n=13850&l=2, last accessed 10/07/06

- The key challenge to encouraging sustainable commuting stems from the need to change people's culture. This requires continuous campaigning at a European level in order that the benefits of commuting sustainably, by public transport, walking and cycling are linked to issues which affect everyone. As well as the environment and health benefits associated with sustainable commuting there is a key need to underline the personal financial benefits of travelling sustainably.

- The private car remains the cheapest and fastest transport option in some EU states and cities. As a result complementary Demand Management measures, to influence both the supply of, and demand for, road capacity (e.g. pricing disincentives), will ultimately be required in most cities if sustainable modes are to be considered to be 'better' than private car use.

Public Transport Organisation & Policy

- Given the approach adopted, there are few general recommendations, because the principal benefit of participation in the working group was the identification of measures which could be applied elsewhere.

- One clear lesson from the project is that there is no single best approach and that 'best' practices should suit local requirements. However, elements of good practice can be implemented and problems avoided.

- It is also clear that, in almost every network, some potential has remained untapped, both for increasing revenue and for cost reduction.

- Change is a long-term issue.

- Finally, it cannot be overemphasised that all participants agreed that *an ongoing informal dialogue between practitioners is seen as essential for dissemination of experience*.

Urban Transport for Disabled People

- The European Commission should recognise the valuable contribution that the Urban Transport Benchmarking Initiative has made to the sharing of knowledge, and to the dissemination of good practice, throughout the European Union, and should consider funding similar activities in the future.

- The European Commission, and the European transport community as a whole, should seek to develop a standardised definition, or series of definitions, to identify the accessibility of urban transport systems. The varying definitions present in the four cities involved in this working group made it very difficult to formally compare the 'true' degree of urban transport accessibility being provided for disabled people.

- There should also be recognition that the Urban Transport for Disabled People working group has shown the particular benefits of sharing knowledge of different approaches towards, and priorities for, the provision of accessible public transport services. This is particularly relevant in the context of a growing level of interest, both in Europe and the USA, in the benchmarking of the accessibility of environments for disabled people.

- Any future initiatives to benchmark accessibility in different cities should consider ways of measuring the social benefits of providing transport services that are accessible for everyone.

Intermodality Issues and the Role of Interchanges in Urban Transport

- No aspect of transport (cycling, public transport or anything else) exists within itself and can ignore the wider view. While this could simply be considered as a truism, it is especially true for sustainable transport modes whereby, in order for cycling / walking to be both successful and achieve their potential, they have to be fully integrated with other modes.

- Stakeholders working in cycling know well from personal experience that the integration, cooperation and understanding between city cycle departments and the public transport department / operators can often be very bad. Often it is the case that cycling stakeholders wish to influence, change or at least be involved in decision-making. However these efforts are frequently blocked or the stakeholders experience difficulties in getting different parts of big city administrations to talk to each other. The perception of most of the stakeholders involved in the Cycling working group was that the process of coordinating different local authority departments very rarely happens, and when it does it is often only in a limited manner.

- There were set aims for the joint working group meetings and a structure was defined before the groups began work in year three of the project, but there was little concept of what the evaluation of intermodality issues would offer the two groups in terms of outputs and findings. This was a positive aspect, because it demonstrated the willingness of the group's participants to work cooperatively. In addition it has served to demonstrate the potential of intermodality for cycling and other modes, highlighting what can be achieved when cooperation is initiated.

- Following the initial joint working group meeting in year two, both groups indicated a desire to have a more formal working link. While this was partly achieved during year three, the groups both felt that this is only a small indication of what could be done, and everyone wanted to do more research in this direction.

- There is not only willingness, but also an expressed interest, to investigate intermodality issues further among the participants of the two working groups. Developing the approach of joint discussion and data gathering with public transport operators and cycling stakeholders is therefore important for the successful evolution of attitudes and approaches to urban transport provision.

- Several ideas were mooted for further study by the working group participants. These include;

    - Interchange facilities and the role they can play in improving the efficiency and seamlessness of urban travel.
    - Intermodality between cycling and public transport and how this can be encouraged
    - Marketing intermodal travel, including online route planners which offer cycling route options as well as public transport and car routes.

- For sustainable transport modes to reach their potential there needs to be maximum understanding of both the issues of integration and intermodality and also how they can be implemented in a practical manner. Given that the findings from the 11 cities involved in the joint working activity highlighted that not much is currently done on this issue, it is clear that

there needs to be not only more research, but also the development of a method for involving and engaging with cities on this issue.

- There is considerable potential for seamless intermodal travel to encourage commuters to combine cycling and public transport modes in order to rival the cost and efficiency of private car use. Developing improved interchange facilities at important commuter stops (e.g. entry and exit points from the public transport network, such as suburbs and business districts), which are complemented by integrated, real-time information and parking provision for bicycles, would be of particular benefit.

- This subject of intermodality and interchange is recognised in the mid-term reviews of the European Commission's 2001 Transport White Paper – 'Keep Europe Moving' as being important in the very recent European Commission communication. In the conclusion, it states that 'the efficient use of different modes on their own and in combination will result in an optimal and sustainable utilisation of resources'[8]. The working group's belief is that without further study and encouragement (both also supported in the EC review), there is little chance that there will be an improvement in the efficient use of different modes. It is also a subject that could help to inform the upcoming Urban Transport Green Paper next year. The group therefore strongly urges more research in this field, drawing on the body of work already undertaken by the cities involved in the Cycling working group of the Urban Transport Benchmarking Initiative.

5.4 Recommendations for Implementing Benchmarking Findings

Year three is the final year of the Urban Transport Benchmarking Initiative and, at this stage of the project, the data and information collected by participants from cities across Europe becomes a resource for urban transport stakeholders to use. As in previous years of the Urban Transport Benchmarking Initiative the data collected to produce this report will be published on the project website through the online benchmarking tool (http://www.transportbenchmarks.org/online-tool.html).

The benchmarking tool not only provides instantaneous comparisons between the cities which have submitted common indicator data during the course of the benchmarking initiative, but also affords stakeholders with the opportunity to submit their own information and interactively benchmark their city against those contained in the database.

The raw data collected through the initiative will also be made available on the benchmarking website (www.transportbenchmarks.org) in order that it can be used in other urban transport research work. This will open the data up to wider analysis and interpretation, as well as provide a baseline against which any future urban transport benchmarking activities can be contrasted.

[8] European Commission (2006) *Keep Europe Moving – Mid term review of the 2001 Transport White Paper*, p21. Available at: http://ec.europa.eu/transport/transport_policy_review/doc/com_2006_0314_transport_policy_review_en.pdf, last accessed on 21-07-06.

Recommendations for organisations or individuals wishing to use the data for further research have been summarised below:

- Take into account the recognised data limitations which are identified in section 3.4 of this report and seek to minimise the impact of these issues using the approach identified in the same section of the report.

- Exercise caution when seeking to supplement information from additional cities into the existing dataset.

- The data indicator definitions used in the Urban Transport Benchmarking Initiative are freely available in Annex A1.1 to the final report and utilising these will assist with the collection of comparable data.

- The good practices identified through the Urban Transport Benchmarking Initiative's working groups are also very a useful resource. The Good Practice Case Study Handbook provides a summary of the most innovative and interesting good practices from the three years of the initiative.

- Care should be taken when utilising complex statistical procedures (e.g. regression analysis) since the dataset does not contain enough entries (cities), nor is the data collected likely to be suitably robust, to support complex analysis or interrogation (e.g. regression modelling).

Ad-hoc support for questions relating to the Urban Transport Benchmarking Initiative, the definitions used for indicator collection and the data collected will continue to be available via the e-mail address benchmarking@ttr-ltd.com.

5.5 Future Research Opportunities

The following opportunities for future research have been identified following the completion of the Urban Transport Benchmarking Initiative:

- Undertake a repeat Urban Transport Benchmarking Initiative, involving the same cities which participated in this initiative. This repeat benchmarking exercise could be undertaken in 2008 in order to provide a 5 year time series dataset. This would be particularly interesting for the cities which are currently proactive in improving their urban transport network and for those likely to experience significant changes during this time period (e.g. New Member States and Accession Countries).

- Funded demonstration projects could be established by drawing on the combined body of quantitative data and qualitative examples which highlight good practices in Urban Transport. This represents a logical step for the research since it would enable participants to implement good practices which address problems identified in their city and monitor the impacts. This would effectively test the potential of the good practices which the Urban Transport Benchmarking Initiative identified and enable real-life guidance to be developed based on the experiences of transferring good practices.

  The transferability of good practice is a key issue and one that should be given serious consideration for development. While it has proved relatively straightforward to identify good

practices, it is less simple to determine whether a solution will work well when transferred to other cities. This would be of particular benefit to New Member States and Accession Countries seeking to draw upon good practice experience from EU15 states and vice-versa.

- The initiative's working groups could be developed to form individual projects, which continue to research good practice and act as knowledge centres for their urban transport themes. This type of research activity could be privately funded by the participants (as the CoMET[9] metro benchmarking has continued to be) or through European Commission funds. The topic of benchmarking accessible urban transport for people with reduced mobility has already raised considerable interest in the UK and has the potential to be extended across the EU.

- The innovative work on interchanges and intermodality, developed through joint working between the Behavioural & Social Issues in Urban Transport and the Cycling working groups, could be developed into a project in its own right. This work has so far focused upon the combination of cycling and public transport modes, and specifically commuting, but could be broadened to include all modes of urban transport as well as topics such as car sharing and car clubs, which have not been considered so far. The two groups involved in this research suggested that a design guide focusing upon integrated public transport interchanges would be widely beneficial to urban transport stakeholders in Europe and the development of such a guide could provide the objective for a research and/or demonstration project.

[9] Community of Metros International Railway Benchmarking Group website available at: http://www.comet-metros.org/, last accessed on 27-07-06