

**THEMATIC SYNTHESIS OF  
TRANSPORT RESEARCH RESULTS**

**PAPER 3 OF 10**

**SOCIAL ASPECTS OF SUSTAINABLE  
MOBILITY**

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**European Commission  
Transport RTD Programme  
Fourth Framework Programme**

## Contents

<b>EXECUTIVE SUMMARY</b>	<b>3</b>
<b>1. INTRODUCTION – HOW TO USE THIS PAPER</b>	<b>5</b>
<b>2. SCOPE OF THE THEME</b>	<b>6</b>
2.1 DEFINITION OF SOCIAL ASPECTS OF SUSTAINABLE MOBILITY	6
2.2 TOPICS INCLUDED IN THE THEME	10
2.3 SIGNIFICANCE OF THE THEME	10
<b>3. POLICY CONTEXT</b>	<b>12</b>
3.1 POLICY OBJECTIVES RELATED TO THE THEME	12
3.2 POLICY ISSUES RELATED TO THE THEME	13
<b>4. RTD OBJECTIVES</b>	<b>14</b>
<b>5. SUMMARY OF RESEARCH CLUSTERS</b>	<b>15</b>
5.1 OVERVIEW	15
5.2 RTD CLUSTERS	15
<b>6. SYNTHESIS OF FINDINGS FROM COMPLETED PROJECTS</b>	<b>17</b>
6.1 PHYSICAL ACCESSIBILITY	18
6.2 PRICING ACCEPTANCE AND EQUITY	22
6.3 SUPPORT FOR PUBLIC TRANSPORT	25
6.4 EUROPEAN COHESION	27
6.5 WORKING CONDITIONS	30
<b>7. REFERENCES</b>	<b>32</b>
<b>ANNEX 1 RTD PROJECTS CONTRIBUTING TO THE THEME</b>	<b>33</b>
<b>ANNEX 2 MAIN FINDINGS FROM COMPLETED RTD PROJECTS</b>	<b>40</b>

## EXECUTIVE SUMMARY

This paper provides a structured guide to the findings and policy implications of research carried out in the Transport RTD Programme<sup>1</sup> that relate to the social aspects of sustainable mobility. (See Section 1 for advice on how to use the paper.)

The transport sector plays a major role in the social fabric of Europe. It generates substantial employment, assists regional development, and provides access to all sorts of services, leisure activities and job opportunities. On the other hand, current trends are creating concerns. For example, greater car dependency is increasing the social exclusion of people dependent on public transport, while liberalisation of transport services could harm employment and working conditions. Changes in transport prices aimed at efficiency and environmental protection could reduce social equity by excessively penalising low-income groups. Therefore policy actions have to strike a balance between conflicting economic, environmental and social objectives. This includes taking account of longer-term impacts on patterns of regional development, employment, land use and working practices. RTD is providing a vital foundation for this, developing guidelines and tools to support the evaluation of policy measures and estimating their likely impacts.

In this paper, results are reviewed for “clusters” of research projects in five inter-related areas:

### *Physical accessibility*

Trends such as the ageing of the population and increasing dependency on the car create policy challenges. For example, people without access to a car and disabled people require attention to be given to declining public transport services and user-oriented design. Various research projects have surveyed the problems and identified options for dealing with them. For example, good practice in the design of public transport interchanges has been compiled, and guidance provided on urban planning measures to promote cycling and walking. Good practice has also been provided on the use of information measures to improve “accessibility” for different user and social groups, as well as traffic management measures that promote public transport.

### *Pricing acceptance and equity*

Getting prices right (in terms of the overall benefits to society) is seen as one of the most powerful ways of moving towards sustainable mobility, yet it is potentially one of the most difficult owing to public resistance. Therefore the Transport Research Programme has made detailed studies of the acceptability of pricing reform and how this can be increased. In addition, the distribution of the impacts of pricing has been evaluated, generating evidence of the potential for enhanced accessibility and economic benefits.

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<sup>1</sup> Part of the Fourth Framework Programme for Community activities in the field of research, technological development and demonstration for the period 1994 to 1998.

*Support for public transport*

Research into the organisational framework for urban public transport has concluded that “limited competition”, where authorities invite tenders for specified services, is to be preferred over full regulation or full deregulation. This approach achieves an appropriate balance between competitive efficiency and societal needs, and now forms the basis for Commission proposals to revise regulations in this area. Guidance has also been developed on the selection of rail services requiring subsidies in recognition of their social benefits.

*European cohesion*

The pursuit of European economic and social objectives through investment in the Trans-European Transport Network (TEN-T) requires policy evaluation to be done on a broad geographic scale, taking account of long-term and system-wide effects (i.e. going beyond the immediate impacts on traffic). In response, the Transport Research Programme has developed methods for assessing the socio-economic effects of investments in transport infrastructure, looking at regional economic development, employment and accessibility. These methods have been embodied in a number of software tools, for instance aimed at the appraisal of multi-modal corridors.

*Working conditions*

Many new technologies and working practices will be introduced to transport operations over the next couple of decades. Moreover, policy changes will be the driving force behind many of them – affecting safety systems and regulations, traffic management systems, and equipment to ensure interoperability. Research has identified the likely impacts on working conditions, and made recommendations on how to mitigate potential problems. Attention has been focused on specific sectors, such as the automation of air traffic management and the consequences of changing conditions in the maritime sector.

## 1. INTRODUCTION – HOW TO USE THIS PAPER

This paper provides a structured guide to the results of Research and Technical Development (RTD) projects relating to the *social aspects of sustainable mobility*, carried out in the European Community's Transport RTD Programme. It is one of a series of papers:

Paper no.	Theme
1	Sustainable mobility – integrated perspective
2	Sustainable mobility – economic perspective
3	Sustainable mobility – social perspective
4	Sustainable mobility – environmental perspective
5	Urban transport
6	Efficiency and quality
7	Safety and security
8	Human factors
9	Interoperability
10	Freight intermodality

Of the 275 projects within the Programme, 38 dealt (partly or fully) with specific social issues. Most of these projects were finalised in the year 2000.

### How to use this paper:

You are recommended to use this paper to locate RTD results on topics where you have a particular interest, rather than reading the paper from start to finish:

- Start in Section 5 to get an overview of the topics addressed by “clusters” of RTD projects.
- Read the part of Section 6 that summarises the findings for each topic of interest to you.
- Use Annex 1 to identify the individual projects relating to that topic.
- Use Annex 2 to review the key results from each of these projects.

Further details on individual projects can be obtained from their web sites (noted in Annex 2, where available) and from the following Commission web sites:

- <http://europa.eu.int/comm/transport/extra/home.html>, which includes summaries and the full final reports of individual projects, as well as a variety of analyses and publications prepared by the EXTRA project;
- <http://cordis.lu/transport/src/project.htm>, which provides the project objectives and summary results as compiled by the RTD project teams.

The other Sections of this paper can help you to gain an overall picture of the urban transport theme, associated policy issues and the objectives for RTD.

The analysis in this paper is the responsibility of the EXTRA project team, and does not represent the official viewpoint of the European Commission.

## 2. SCOPE OF THE THEME

### 2.1 Definition of social aspects of sustainable mobility

#### Mobility and sustainability

Mobility is playing an increasing role in human activities. While transportation infrastructure and services are increasing in efficiency, speed and comfort, with decreasing costs, a series of adverse impacts are leading to social concern. These impacts include pollution, accidents and car dependence. There is an emerging dilemma that growth in demand for transport (illustrated in Table 1) could slowly strangle the transport system itself, constraining economic growth, damaging the environment and threatening mobility.

**Table 1: Main modes of transport (in billions of passenger-kilometres)**

	Car	%	Bus and coach	%	Tram/metro	%	Rail	%	Air	%	Total pkm
<b>1970</b>	1583	74	270	13	38	2	217	10	43	2	2151
<b>1997</b>	3787	79	393	8	41	1	282	6	322	7	4825
<b>Growth</b>	140%		46%		8%		30%		650%		120%

Source: *EU transport in figures, Statistical pocketbook, European Commission, 1999.*

The negative side effects of the increasing demand for mobility have become widely known in the last two decades, triggered by air quality concerns and serious congestion problems. For example, Table 2 records nearly 200% growth in the transport of goods by road since 1970. This has led to a change in social and political attitudes, and to a series of changes in mobility policies.

**Table 2: Evolution of the transport of goods in the European Union (in tonne-km)**

	Road	Rail	Inland waterways	Pipelines	Intra-European sea	Total tkm
<b>1970</b>	412	283	103	66	472	1336
<b>1997</b>	1202	237	119	86	1124	2768
<b>Growth</b>	190%	-16%	16%	30%	140%	110%

Source: *EU transport in figures, Statistical pocketbook, European Commission, 1999.*

#### Concept of sustainable development

In parallel to the changes in attitudes to transport, a new consciousness towards the environment and the use of natural resources has led to the development of the concept of sustainable development. This was first put forward by the World Commission on Environment and Development (the 'Brundtland Commission') in 1987 and defined as:

*"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."*

Following the definition established by the World Commission, sustainable development is generally considered to comprise two main elements:

- minimising environmental impacts;
- making the best and *most equitable* use of resources.

Therefore, in promoting sustainable development, the challenge for policy-makers is to reconcile three objectives:

- securing higher standards of living through economic development;
- protecting and enhancing the environment;
- ensuring an equitable distribution of the benefits between present and future generations.

Subsequently, the Amsterdam Treaty explicitly included sustainable development for the first time as one of the European Union's main objectives.

### **Concept of sustainable mobility**

The concept of sustainable mobility is closely linked to the concept of sustainable development. Both aim to allow consumption needs linked to economic activity to be met without threatening other socio-economic priorities. Policy towards sustainable mobility therefore has to find an efficient and acceptable way of dealing with the negative impacts listed in Table 3.

**Table 3: List of potential negative impacts of mobility**

<p><b>Primary level (basic impacts)</b></p> <p><u>1 Nuisances affecting potentially everybody:</u></p> <p>a) <i>Localised</i> such as: smell, noise, visual disturbance, noxious emissions (toxic, corrosive), electro-magnetic disturbances, contamination, vibrations, risk of accident (fire, collision).</p> <p>b) <i>Non-localised</i> such as: reduction of non-renewable natural resources, non-recyclable waste, production of inferior quality energy or material, noxious emissions damaging the ozone layer.</p> <p><u>2 Nuisances affecting mobility in particular:</u></p> <p>Congestion of routes, severance of communication links, road accidents.</p> <p><b>Secondary level (effects of basic impacts)</b></p> <p><u>1 Nuisances affecting potentially everybody:</u></p> <p>a) <i>Localised</i> such as: weather change (local, regional), stress/health hazards (allergies, lung cancer), damage to natural resources (water, fish, game), increase of crime level/insecurity level (real and felt).</p> <p>b) <i>Non-localised</i> such as: climate change (global), floods, storms.</p> <p><u>2 Nuisances affecting mobility in particular:</u></p> <p>General increase in traffic (mainly road).</p> <p><b>Tertiary level (macro-economic long-term consequences)</b></p> <p><u>1 Nuisances affecting potentially everybody:</u></p> <p>Town centre disaffection/urban spread, social exclusion, need to adapt housing, segregation of functions (office/administrative quarters, housing areas, commercial centres), natural hazards due to weather/climate change, health hazards (skin cancer), diminution or extermination of species/break in food chains.</p> <p><u>2 Nuisances affecting mobility in particular:</u></p> <p>Need for more transport because of longer distances (between home and school/work).</p>
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The causes of these problems are relatively well known and solutions have been suggested. One notable example is the set of solutions defined at the UN Conference for Environment and Development in June 1992, and formulated in the document known as 'Agenda 21'.

In the formal Agenda 21 document, six objectives are set for transportation. In order to make transportation more sustainable or to make it less unsustainable, Agenda 21 requires society:

- to reduce transportation demand;
- to develop public transport;
- to promote non-motorised transport (cycling and walking);
- to integrate all aspects in planning and to maintain public infrastructure;
- to develop and communicate processes between the different countries/communities;
- to change the patterns of consumption and production in our societies.

Thus, the term sustainable mobility stands for a process and a path to be followed, rather than simply representing a vision of a future situation. The following objectives can be mapped out for this path:

1. *To provide access to goods, resources and services, while reducing the need to travel - such that economic, environmental and **social needs** can be met efficiently and in an integrated manner.*
2. *To ensure that transport infrastructure and travel do not exceed the capacity of the environment to withstand their impact.*
3. *To ensure that users pay the **social** and environmental costs of their transport decisions without making industry uncompetitive or preventing those on **low incomes** from meeting their transport needs.*
4. *To reduce the growth in car and lorry traffic to sustainable levels.*
5. *To ensure that transport infrastructure investments take proper account of environmental aspects.*
6. *To increase the choice, and encourage the use, of economically, environmentally and **socially efficient** transport modes.*
7. *To protect critical natural and physical capital.*
8. *To meet environmental quality standards based on critical ecological limits and precautionary public health requirements.*
9. *To ensure that renewable natural resources are used in ways which do not diminish the capacity of ecological systems to continue providing those resources over time.*
10. *To ensure that non-renewable natural resources are used in ways that account for future needs and the availability of alternative resources.*
11. *To **enhance public health and safety, reduce accidents and improve security.***
12. *To ensure the economic and **social acceptability** of new measures.*

Based on these objectives, sustainable mobility can be defined in practical terms as:

**A transport system and transport patterns that can provide the means and opportunities to meet economic, environmental and social needs efficiently and equitably, while minimising avoidable or unnecessary adverse impacts and their associated costs, over relevant spatial and time scales.**

### **Definition of social aspects of sustainable mobility**

The social aspects of sustainable mobility are primarily concerned with equity. Policy changes aimed at improving transport services for economic and environmental reasons have to take account of the effects on different social groups.

At a local level, this includes equity of access to transport and the effects of policy on household incomes. At a regional level, socio-economic impacts such as employment have to be taken into account. And at a national or European level, policy changes affect the working conditions of people within the transport sector.

## 2.2 Topics included in the theme

In this Thematic Paper, the main topic areas are:

- *social equity* of policy changes and the implications for public acceptability – depending on the effects on e.g. income distribution, regional development and employment;
- *accessibility* to transport services such as affordable public transport, and also access to destinations from different parts of the European Union;
- effects of the transport network on *social cohesion*;
- *care for marginal/disadvantaged/vulnerable groups* – for instance ensuring physical access to transport services for people with mobility difficulties;
- *working conditions* for operatives, who may for instance be affected by policies towards safety, new technologies and deregulation of services.

Related aspects are the training of workers, professional qualifications and adaptation to new technology. These topics are covered in detail in the accompanying Thematic Paper on human factors.

## 2.3 Significance of the theme

The amount of traffic has reached a level where society is increasingly questioning its necessity, the means used and their consequences. A good illustration of the scale of this daily movement is given by the time spent commuting to and from work, shown in Table 4.

**Table 4:** *Average time spent commuting to and from work (minutes per day, 1996)*

	B	DK	D	GR	E	F	IRL	I	L	NL	A	P	FI	S	UK	EU
Average time to commute	39	38	45	40	33	36	40	23	40	44	36	33	41	40	46	38
Time relative to EU=100	103	100	118	105	87	95	105	61	105	116	95	87	108	105	121	100

Source: *EU transport in figures, Statistical pocketbook, European Commission, 1999.*

On average, European citizens spend 38 minutes each day in commuting to and from work. There are major differences between the Member States of the European Union, reaching an average of 46 minutes in the United Kingdom. Intuitively, such commuting must have a social impact.

Impacts of a social nature are often difficult to isolate or quantify. However, there is a strong interest in estimating social costs in terms of their monetary value, in order to internalise them in the cost of transport through pricing or taxation. This is also important in determining the appropriate level of subsidy for public transport, aimed at ensuring access to viable and affordable transport services for the whole of society.

Social impacts are also becoming a major issue for transport infrastructure investments at a European level. Investments such as the Trans-European Transport Network (TEN-T) could

bring improved social cohesion by increasing the access to and from different regions. It could also enhance employment and quality of life through the economic opportunities of better access to markets. On the other hand, regional access could lead to greater polarisation, with existing economic centres gaining at the expense of peripheral regions. A key challenge for policy-makers is therefore to quantify and consider the more strategic socio-economic impacts of their actions with respect to:

- areas of low population density and rural areas;
- less developed regions in Europe;
- integration of Central and Eastern European countries into the European Union.

Finally, the transport sector itself has a big impact on society through the jobs it creates, not only through construction of infrastructure but also through the delivery of transport services. More than 10 million people across Europe work in the transportation sector, contributing 10% of European gross domestic product. With the increasing impact of new technologies and deregulation, working conditions have changed. Therefore, the application of social policies in the transport sector will be essential in protecting employees and their working conditions, while facilitating economic growth and competitiveness.

### 3. POLICY CONTEXT

#### 3.1 Policy objectives related to the theme

The implementation of the Single Market places a priority on economic growth. To balance this, policy-makers explicitly included sustainable development as one of the European Union's objectives in the Amsterdam Treaty. As a result, alongside the aim of ensuring that European transport realises its full potential to promote the competitiveness of European business, the Common Transport Policy (CTP) requires a balance to be struck with social and environmental concerns.

Thus, social aspects are taken into account in the transport policy framework of the European Union, even if they are not often stated in a precise way in policy objectives.

Tensions on social issues have arisen several times recently, in part due to the impacts of liberalisation in the transport sector. Liberalisation aims to increase efficiency through greater competition and more transparent institutional arrangements, but could have adverse impacts on jobs and working conditions. This emphasises the need for change to be properly managed by enterprises and public authorities alike, and for appropriate policy responses at Community level on issues such as working time, manning regimes (particularly in the maritime area), and adequate enforcement of Community requirements designed to ensure fair competition.

For example, the Commission has proposed measures on working time in the transport sector. These are designed to include non-mobile workers in the working time Directive, and also to establish specific rules for mobile workers on the basis of the working time Directive principles.

Efficient transport systems are also expected to play a key role in regional development. Structural policies (affecting regional investment) and the CTP are designed to complement each other and thereby promote a more balanced and sustainable development of the Union's territory, particularly by improving accessibility to less developed regions. The Commission has set out how these two policies can achieve maximum synergies in a Communication on Cohesion and Transport.

In the Commission's proposals for a Citizen's Network, one of the main objectives is to reduce social exclusion and improve quality of life. A well-functioning European transport system needs good local and regional passenger transport. This will reduce social exclusion by allowing people without the use of a car to gain access to jobs, schools, shops, medical facilities and leisure activities – recognising that women and young, elderly, unemployed and disabled people are particularly dependent on public transport.

Therefore, two main objectives seem to be the priorities for the European Union in terms of implementing the social aspects of sustainable mobility:

- to improve accessibility for all citizens, whatever their income, physical ability and location;
- to improve working conditions for the workers of the European Union.

Most recently, the Commission has adopted policy guidelines for a new White Paper on the Common Transport Policy, due in 2001. The aim is to provide the European Community with

a programme of actions to gradually decouple growth in traffic from economic growth.

Highlighted actions include:

- ensuring the application of social legislation in the face of commercial pressures (e.g. in the context of increasing competition on the railways);
- developing legislation to recognise the rights and obligations of users – for example extending the concept of the air passenger rights charter to other modes;
- adopting a policy on effective charging for transport;
- focusing the investment in the Trans-European Transport Network into priority actions, partly to improve access to outlying areas of the European Union.

The guidelines also note the need to take consistent measures at national and local level in the context of social and education policy, with better organisation of working patterns and school hours to avoid overcrowding roads at peak periods, when the greatest number of road accidents occur.

### **3.2 Policy issues related to the theme**

Key issues are seen to be:

- Improved safety and security of transport, for instance to encourage the use of cycling and walking.
- Ensuring a user orientation in the provision of transport services, in the face of pressure to increase efficiency.
- The equity and acceptability of pricing policy and other measures such as access restrictions.
- Ensuring the viability of “socially necessary” public transport services through public funding.
- Aligning transport infrastructure investment with regional development, in particular, for peripheral regions.
- Implementation of the Action Programme adopted in 1993 for people with reduced mobility.
- The enforcement of Directives and Regulations concerning working conditions in the transport sector

#### **4. RTD OBJECTIVES**

In general, the goal of research is to enable policy-makers to strike a balance between the growing demand for mobility and its socio-economic benefits on the one hand, and the necessity to limit adverse environmental, social and economic side-effects on the other hand.

Nevertheless, the aims of the RTD Programme have in the past been primarily stated in terms of improving the efficiency of the transport sector. They have rarely been stated in terms of social aspects independent of economic aspects. For example, working conditions are more often analysed from an economic point of view (i.e. in terms of increasing the competitiveness of companies) than in their social context (such as working time or salaries).

However, long-term decisions towards sustainable mobility necessarily call for greater consideration of social aspects. Therefore, methodologies for policy assessment are now placing a greater emphasis on social needs and social acceptability, and these have been included in the objectives of a range of RTD projects.

## 5. SUMMARY OF RESEARCH CLUSTERS

### 5.1 Overview

The RTD projects contributing to an understanding of the social aspects of sustainable mobility can be considered within five topic areas or “clusters”, each relating to one of three policy issues. These clusters are:

<b>Policy issues</b>	<b>Clusters</b>
Social equity	<i>Physical accessibility</i>
	<i>Pricing acceptance and equity</i>
Social cohesion	<i>Support for public transport</i>
	<i>European cohesion</i>
Working conditions in the transport sector	<i>Working conditions</i>

### 5.2 RTD clusters

This Section defines the scope of research in each cluster. More specific objectives are given in Section 6. The titles and objectives of relevant RTD projects are listed in Annex 1, together with a Table identifying the cluster(s) to which each project contributes most strongly.

#### 5.2.1 Social equity

This area of policy is focused on the reduction of social exclusion by allowing people without the use of a car to gain access to jobs, schools, shops, medical facilities and leisure activities. It is recognised that young, elderly, unemployed and disabled people are particularly dependent on public transport.

The research can be considered within two clusters:

##### *Physical accessibility*

Research in this cluster supports the development of strategies aimed at helping the disadvantaged groups in society, particularly by identifying and promoting good practice in the following areas:

- the provision of facilities for people with mobility handicaps;
- support for walking and cycling;
- measures to promote public transport as an alternative to the car;
- the provision of information on mobility options;
- user-friendly design of modal interchanges

##### *Pricing acceptance and equity*

Pricing measures are widely seen as an important means of influencing decisions on trips, making sure that costs to society and not just the individual are taken into account. However,

changing to a more economically efficient system of prices could disadvantage some groups in society. Therefore research aims to determine the equity of policy changes and identify the likely barriers due to public opposition.

### **5.2.2 Social cohesion**

A second area of policy concerns the freedom of mobility for all citizens. An equitable mobility should offer society a wide range of destinations at different spatial scales. The improvement of transport between regions will also bring more cohesion at national and European levels.

The research can be considered within two clusters:

#### *Support for public transport*

At an urban and regional level, a fair and efficient public transport system is needed in order to offer extensive freedom of mobility and a baseline service, as a means of improving social cohesion. Social exclusion is increasingly geographically concentrated and is strongly correlated with low access to cars. Targeted support for public transport can therefore be vital. Research is helping to determine the basis for providing support from public funds, and for improving the viability of public transport services in areas of low demand.

#### *European cohesion*

At a higher spatial level, the European Union aims to stimulate social cohesion through all Member States. The Trans-European Transport Network (TEN-T) is intended to support this policy objective by providing interconnections and interoperability between national transport networks. This should assist the development of regions whose economic performance is substantially below average. Research in this area focuses on determining the size and spatial distribution of the socio-economic impacts of the TEN-T and similar infrastructure investments.

### **5.2.3 Working conditions in the transport sector**

Social policy is also concerned with working conditions of employment in the transport sector. (In turn, this affects policy on training and professional qualifications, which is addressed in the Thematic Paper on Human Factors.) The research can be considered within a single cluster:

#### *Working conditions*

The European Union seeks to balance the quest for increased competitiveness with the improvement of working conditions. This concerns working time, organisational structures and the impact of new technologies on users. Research is needed to identify the likely impacts of transport policies and technological trends, and to determine strategies to protect workers' interests.

## 6. SYNTHESIS OF FINDINGS FROM COMPLETED PROJECTS

This Section provides a synthesis of the research objectives and main findings from completed projects for each of the RTD clusters defined in Section 5. The key results, policy implications and achievements of individual projects are summarised in Annex 2.

Results from the following projects have been included in this Thematic Paper:

<b>Clusters</b>	<b>Relevant RTD projects</b>
<i>Physical accessibility</i>	ADONIS, CAMPARIE, CAPTURE, GUIDE, HANDIAMI, INPHORMM, MIMIC, OPIUM, PIRATE, PRIVILEGE, PROMISING, WALCYNG
<i>Pricing acceptance and equity</i>	AFFORD, CAPRI, CONCERT-P, EUROTOLL, EXTRA/2, PATS, PRIMA, SOFTICE, TRANSPRICE
<i>Support for public transport</i>	ISOTOPE, SONERAIL, VIRGIL
<i>European cohesion</i>	ASTRA, CODE-TEN, EUNET, EUROSIL, TENASSESS
<i>Working conditions</i>	HANDIAMI, HINT, RHEA, WORKFRET

## 6.1 Physical accessibility

### *Research objectives*

One strand of the research on *physical accessibility* looks at the needs of particular disadvantaged groups in society. Specific objectives are:

- to provide guidance on initiatives to promote walking and cycling;
- to identify actions which would assist disabled passengers, particularly in the maritime sector.

A second strand of the research aims to promote good practice in traffic management and infrastructure investment, particularly in support of public transport. Specific objectives are:

- to assess and recommend policy instruments and physical measures in the areas of traffic management and bus priority measures;
- to develop guidelines and standards for the design of interchanges, taking account of stakeholder needs.

The third strand of the research focuses on the improvement of traveller information. The objective is to provide guidelines on how to design and implement various kinds of information and awareness campaigns, aimed at reducing dependence on the car

### *Main findings*

#### ***Guidance has been provided on good practice in promoting walking and cycling***

Extensive research has been conducted into good practice to promote cycling and walking instead of short car trips in cities. This is particularly aimed at improving mobility conditions for people without access to a car. The outputs include catalogues of basic and innovative measures, and practical guidance on their implementation. Recommendations include:

- extending and improving *pedestrian areas*;
- providing *facilities for cyclists*, such as bicycle lanes and secure types of bicycle parking, and raising awareness of these facilities;
- introducing *bicycle registration* programmes and making it possible to insure bicycles against theft;
- using *awareness and incentive campaigns* aimed at behavioural and attitudinal changes towards cars, such as Car Free Days and taxation of workplace parking spaces;
- involving big companies, for instance establishing *mobility management plans* that emphasise non-motorised transport;
- *targeting travellers to/from schools and colleges* in order to influence transport habits at an early stage;
- *enforcing a maximum speed of 30 kph* on streets where walking and cycling are significant;
- developing local and national *policies for walking and cycling*, and appointing local authority staff to promote change in the city.

In addition, an evaluation tool has been produced in the form of interactive software. This is for use by city authorities in assessing the appropriate measures to promote walking and cycling in a certain area.

***Good practice has been compiled on traffic management for pedestrians and cyclists***

One of the main barriers to walking and cycling was identified as the actual and perceived level of safety. To address this issue, a review of good practice in infrastructure design and traffic management has been prepared. For example, the costs and effects on safety and mobility of around 100 measures for pedestrians have been evaluated. It was concluded that *walking and cycling need to be planned as transport modes in their own right* – whereas current urban traffic planning systems in Europe commonly focus on cars, buses and trucks, making provisions for cycling merely as additional features of the traffic system for motor vehicles.

Cost-benefit analysis identified the following measures as the most important in promoting safety for pedestrians and cyclists:

- *a separate network of direct routes for pedestrians and a separate network of direct routes for cyclists*, segregated from motorised traffic and with a fair share of priority at crossings;
- a categorisation of roads to *separate flow traffic* from distribution traffic and access traffic;
- *area-wide speed reduction*, except on roads with a flow function for motorised traffic;
- development and implementation of *design standards* for infrastructure for pedestrians and cyclists;
- *regulations giving priority* to pedestrians and cyclists in urban areas;
- *education and driver training* that focuses on respect for other road users.

***Actions have been recommended to meet the needs of disabled people on ships***

Research into the needs of another minority group, disabled people, focused on the maritime sector. The first overview of the special needs of disabled people in this sector led to a set of recommendations for changes in the design and operation of ships, such as improvements in crew training.

***Measures to promote public transport have been identified***

Much research has considered the promotion of *public transport*, whether through direct investment in infrastructure such as user-friendly interchanges, or by prioritising public transport modes over car use. This is seen as reducing the social exclusion of lower income groups, by ensuring that public transport services remain viable and reliable.

For example, detailed findings have been published on the effectiveness of *physical* transport measures designed to restrict or encourage the use of different modes. These include bus lanes, public transport priority at junctions, improvements to interchanges, area access restrictions, traffic calming, controls on central area parking, and the use of parking management and guidance systems.

The research concluded that, in general, these measures *individually* do not have a major short-term impact on modal split, unless they are large in scale and/or used as part of an integrated strategy. However, they may encourage a change in behaviour when people periodically re-assess their travel decisions – either due to changing circumstances (such as a job or house move) or due to other policy changes (such as pricing measures). Also they can improve the performance and perceived advantages of public transport. This is an essential precursor for a change in travel behaviour, whatever the levers (pricing, green commuter plans etc.) used to induce that change.

***Guidance has been produced on prioritising groups of road users***

One of the most effective ways of favouring public transport was found to be the restriction of road space and parking for private cars. To implement this approach, local authorities have to assign different levels of priority to different user groups (such as public transport). For this purpose, one research output has been a catalogue of measures for network management and their operational implications. Examples have been developed, showing how a package of measures can be tailored to meet local priorities.

***Good practice in designing passenger interchanges is now available on the web***

Another significant area for research has been the development of guidance on good practice in the functional specification and design of passenger interchanges. This is available on the web. The aim has been *to increase the visibility of user needs in the design process*, both to cater for specific needs (for instance, of the disabled) and to improve the attractiveness of public transport more generally.

The outputs include a series of surveying and modelling tools and guidelines aimed at planners, designers and managers of interchanges. They include guidance on consumer research methods and on involving users and non-users in the planning process.

A gap analysis revealed the perceptions of various stakeholder groups towards the importance and performance of the various features of an interchange. The analysis showed general agreement about the *high importance of safety/security, information and car parking*. However, infrastructure design experts emphasised the aspects of layout, location and the quality of connections, while users had more uniform concerns across all characteristics of interchanges, with preference for comfort and safety issues. Certain characteristics – surveillance, toilets, traffic and travel information, cleanliness and security against theft and vandalism – were perceived to perform poorly at a number of sites.

Specific *policy actions* were recommended to reinforce good practice in interchange design:

- Central and regional governments need to oversee the *planning and co-ordination* of interchanges. This will help to synchronise services through the interchanges and guide investment priorities for public transport.
- Authorities should consider setting up *a single body to be responsible for timetable co-ordination, information and through-ticketing*.
- Authorities should extend the *guidance* they give to public transport designers and operators to include good practice for the design of interchanges.
- An independent body should be given the task of developing a *Europe-wide standard for the basic elements of signing schemes* that would cover all public transport modes.

***Lessons have been drawn on information and awareness campaigns***

Finally, work has been done on the use of information measures to improve “accessibility” for different user and social groups. A review of over 120 transport information and publicity campaigns has been compiled, and good practice guidelines developed which target a range of organisations. These include recommendations for local authorities, public transport operators, major institutions and their site managers, and environmental, cycling and walking groups. Three types of campaign are described in detail – public awareness campaigns; campaigns for targeted groups and settings (such as schools and workplaces); and campaigns aimed at individual travellers and households.

In addition, a software tool has been developed that provides information on more than 100 previous campaigns (mainly concerning public transport). It is designed to help practitioners identify experiences relevant to their own situation. The software is complemented by guidelines on the *process* of designing a campaign.

The analysis of previous experiences shows that:

- Communications as part of an integrated transport plan *can* enable changes in travel behaviour. However, many organisations have failed to achieve good practice in the past.
- General awareness campaigns need to be repeated at regular intervals, otherwise they lose their “power” to influence behaviour. *Campaigns targeted on specific groups have stronger and longer-lasting effects.* In particular, there is evidence of success in carefully targeted sectors, such as schools, workplaces and neighbourhoods.
- *Times of change for individuals, organisations and communities are worth targeting.* Examples include people moving house or changing jobs, businesses moving site and new housing developments.

## 6.2 Pricing acceptance and equity

### *Research objectives*

Research relating to the reform of policy on transport pricing includes specific social aspects among a wide range of other considerations. The relevant objectives are:

- to assess the acceptability of pricing reform and identify ways of increasing the acceptance of new pricing schemes;
- to identify the effects of marginal cost pricing on social equity, in terms of the accessibility and affordability of transport to different social groups;
- to determine possible effects of pricing policies on employment within the transport sector.

### *Main findings*

#### *Surveys have shown how to make pricing reform more acceptable*

Acceptability has been identified as a primary obstacle to pricing reform. The reasons behind the opposition are many: the impacts will not be distributed uniformly, the benefits are not obvious to many transport users, and significant changes in daily travel habits might be implied. The Transport RTD Programme has therefore used surveys to look at the acceptability issue in detail and identify policy actions to increase acceptability.

Around 6000 people were surveyed in two major studies. Public acceptance of new pricing measures is low, particularly among motorists, even though pricing is perceived to be an effective tool. The results indicate that for a pricing strategy to be accepted by the public and by businesses, it should include the following elements:

- The objectives of the strategy have to address the major public concerns over transport problems. This must be *evident to those affected* by the strategy, and the prices should be seen to relate to the real costs of transport.
- The proposed strategy must be *perceived as an effective solution* to the problems, for instance based on evidence from pilot applications.
- *The revenues must be hypothecated*. In general, people want the revenues to be used in the transport sector, especially to cross-subsidise public transport. (However, this may not be appropriate from an *economic* viewpoint, with a reduction in local taxation being preferable.)
- People must have *confidence* in the use of the revenues and the protection of privacy.

Therefore *new* types of measures should be preceded by *campaigns* to raise awareness of the targeted problems and the effectiveness of the proposed measures. Pricing measures should be introduced in a *stepwise* way, avoiding price shocks, and *compensation measures* should be considered for disadvantaged groups. Acceptance requires adequate *investment in alternative modes of transport*, as well as *public consultation* on the proposed scheme. Travellers have to be given sufficient *information* about the pricing scheme and alternative travel possibilities if behaviour is to change.

Experiences from several cities show that acceptance tends to increase after the implementation, but this is quite sensitive to the level of charges. In general, people are against congestion charging, as they see themselves as victims of a non-functioning transport system, whereas pricing to curb environmental damage is accepted as a general principle. On

the other hand, there is considerable support for road pricing as a means of financing investment in public transport and infrastructure. Therefore road tolls could be a stepping stone to raising acceptance for congestion charging.

### ***Evidence has been collected on the effects of pricing measures***

Given the social resistance to pricing schemes and the *perceived* effects on equity, some work has been done to estimate the *actual* effects on different groups of people. It is clear that impacts will not be uniformly distributed – *some will pay more and some will pay less*, depending on the context. Studies found that the existing range of pricing policies in EU Member States is so varied that the impacts have to be assessed on a case-by-case basis. The extent and direction of any price changes will depend strongly on current levels of taxation and charging. Nevertheless, *as a broad conclusion*, pricing reform would involve:

- a decrease in prices for inter-urban road and rail passenger transport and an increase in the price of urban road travel (particularly for the private car and during periods of peak congestion);
- an increase in prices for both road and rail freight.

For example, charges for using cars in congested cities during peak periods could increase by 100-250%. Fares for public transport may reduce or increase, depending on the city context and the current level of subsidies. Nevertheless, the aim of pricing reform is not to deter trips that offer a net benefit to society, but rather to discourage trips where the benefit to the individual user is less than the cost to society as a whole

### ***Effects of pricing reform on equity and accessibility have been estimated***

Modelling results for major cities indicated that pricing measures could benefit the local population by 100 to 400 Euro per capita, particularly if the revenues are returned to people in a lump-sum way or by reducing taxes on labour. The effects of pricing will vary across different income groups – however, the impact is estimated to be relatively small, depending on the way the revenue is recycled into the economy.

With respect to equity of access, reductions in trips by private car in these cities were calculated to lie between 5 and 30%. Overall, accessibility would be reduced, particularly for car users. However, if revenues were used to subsidise public transport services, then accessibility could even be increased for most of the population.

### ***Studies show a scarcity of data on the social consequences of pricing measures***

In a complementary approach to modelling, data from previous travel surveys have been analysed to find evidence for the likely effects of pricing policies. These data covered a variety of cities and countries. The research showed that there is only limited information on the sensitivity to transport prices of different socio-economic segments. In general, car use seems to be less sensitive to changes in travel costs than the use of public transport. The price sensitivity varies by country (presumably reflecting differences in culture and transport infrastructure) and also depends on the competitiveness of the different transport modes.

### ***Variations in freight costs between countries could have social implications***

In the road freight sector, survey results showed that total tax costs vary between countries, ranging from 10% to 25% of the total operating cost of long haulage trucks. For 100km distance, EU prices are between 3 and 8 times higher than in Eastern European countries, but

prices are closer for long distance freight. Studies also suggested that systematic violation of traffic rules could reduce costs per tonne-kilometre by up to 30-40% in some countries.

Therefore, *uniform* changes in taxation across the EU would penalise those countries where the tax burden is already relatively high, affecting employment and increasing the pressure on working conditions. As a result, *harmonising the enforcement of regulations* such as driving hours, speed limits and maximum loads would be important in ensuring fair competition. On average, a 10% increase in total taxation would increase the operating cost of long distance hauliers in the EU by 1.7%. However, the diversity and adaptability of road freight operations generally makes it difficult to produce quantitative estimates of reactions to policy and their social consequences.

### 6.3 Support for public transport

#### *Research objectives*

The aims in this area were to provide strategic and practical recommendations concerning:

- the legal and organisational structures for public transport operations;
- decision-making on the provision of socially necessary rail services;
- the organisation of transport in rural areas.

#### *Main findings*

##### ***Preserving the social benefits of public transport requires competition to be controlled***

Member States have been interested in moving away from public ownership of transport services towards competition, but the question arises whether this could reduce the social benefits of collective transport. Research into the legal and organisational frameworks for urban public transport (UPT) concluded that:

- the initiative for creating and specifying the UPT network should rest with local authorities – a fully deregulated system was found not to address collective goals and system integration in an adequate way;
- a regime of "limited competition" (where authorities define the transport service to be delivered and invite tenders for its execution by candidate operators) is to be preferred over full regulation (monopoly supply) or full deregulation;
- partnerships between operators and authorities should be established that include clear definitions of standards of service and responsibilities.

These findings have been influential in the development of Commission proposals to revise Regulation 1191/69 on the organisation of public transport. It was concluded that reductions in unit operating costs of around 15% are feasible over fully regulated operations, even with no redundancies or wage reductions.

##### ***The social justification for subsidies to public transport can now be quantified***

One advantage of controlled competition is that subsidies can be provided in a transparent way, allowing services that are not fully commercial to be supported in recognition of their social benefits. However, a sound basis is needed for selecting the candidates for support. Research has provided a methodology for this purpose, targeted on the rail sector.

A socially necessary rail service was defined as one with a positive net social value, taking into account the social benefits and costs for users and non-users of the service. This includes aspects such as changes in congestion, environmental impacts and travel time. The evaluation methodology was tested on case studies of rail services across Europe, identifying annual net benefits in the range from –4 to +5 million Euro.

##### ***Experience in maintaining marginal transport services in rural areas has been collated***

A similar social problem arises for public transport in rural areas. Low population density often means that conventional approaches to passenger transport, which are based on significant numbers of passengers travelling together, lose their viability. Therefore, to assist transport planners, a database with over 100 case studies of European experiences in arranging rural transport services has been compiled on the web. In addition, a good practice guide proposes twelve schemes for providing innovative services, such as integrated passenger and

freight services. Information technologies are highlighted as offering major potential in assisting rural transport, for instance by improving flexibility.

## 6.4 European cohesion

### *Research objectives*

The specific objectives of research in this area are:

- to develop methodologies to support policy decisions on TEN-T investments;
- to provide methods and tools for assessing the socio-economic impacts of infrastructure investments.

### *Main findings*

#### ***New tools have been developed to evaluate the social impacts of transport policies and investments***

In the past, most transport investments have taken place at a national level, and historically the evaluation has focused on the local and direct benefits of individual projects, usually in economic terms and without any explicit treatment of social issues. However, the development of the Single European Market and the promotion of the Trans-European Transport Network (TEN-T) as a means of economic growth and regional cohesion are now requiring evaluation to be done on a broader geographic scale. Sustainable mobility objectives require an explicit assessment of social implications. And in the context of *network-wide* development, a more strategic assessment method is needed, taking account of *long-term and system-wide effects* including socio-economic outcomes. Therefore substantial research has been directed towards developing and testing appropriate evaluation tools.

#### ***Methodology for assessing the strategic impacts of investments in transport corridors***

One of the resulting tools assesses the strategic impacts of pan-European multi-modal corridors. A scenario approach was used to elaborate consistent images of the future through to the year 2015, featuring high or low rates of economic growth and fast or slow integration of neighbouring countries into the EU. Using these images, alternatives for corridor development can be subjected to impact assessment while taking account of uncertainties in the external context.

The methodology has been used to support in-depth corridor studies for the TEN-T. Combinations of road and rail projects were generally found to offer the greatest benefits. The method could also be applied more generally to other infrastructure programmes.

The methodology is also supported by guidelines for evaluating the impacts of multi-modal links on regional development. A review of current evaluation methods in Member States revealed significant deficiencies in this area.

#### ***Methodology for quantifying the impacts of investments in transport corridors***

To complement the corridor-level methodology, a tool has been developed to *quantify* the impacts of corridor investments. The modelling system includes:

- methods for valuing socio-economic effects;
- a tool for estimating spatially-resolved indicators of regional accessibility and social cohesion, including effects on national output and employment;
- a new approach to regional economic modelling, where the sources of potential travel growth are identified separately as a function of specific social and economic activities.

The methodology has been demonstrated for the Trans-Pennine corridor in the UK and for long-distance freight movements in Finland.

### ***Modelling the Europe-wide impacts of policies and investments***

Another development took a more global view of the impacts across Europe of large transport investments, such as the entire TEN-T strategy. The resulting model covers the whole EU, sub-divided into 201 regions, and provides forecasts to the year 2016. Innovative attributes include:

- the prediction of regional unemployment;
- the estimation of the spatial redistribution effects of the TEN-T;
- the calculation of accessibility taking account of proximity to nodes of the transport network;
- the calculation of indicators of cohesion for the European Union.

The model was used to assess some scenarios for extension of the TEN-T. The development trajectories of the European regions were similar in all scenarios, showing that *macro-economic and social trends (such as ageing of the population) have a much stronger impact on cohesion than different transport infrastructure strategies*. In all scenarios, most regions improve their accessibility and economic performance in absolute terms, but with some changes in their *relative* position. The maximum TEN-T investment leads to a slightly less polarised distribution of accessibility and economic output among the regions, but this slight cohesion effect would not, however, be able to reverse the general trend towards economic polarisation in the EU (with its associated social effects).

### ***Methodology for evaluating policy from multiple perspectives***

Of course, it is not sufficient just to *calculate* impacts, since indicators can be *interpreted* in different ways. Research has shown that many of the problems in developing pan-European transport relate to the variation in policy processes between Member States. This leads particularly to conflicts over the relative role of European, national, regional and local levels, *the trade-off between social, economic and environmental objectives*, and the rate of deregulation and restructuring of the transport market. Such conflicts damage the prospects for strengthening regional links through better cross-border transport.

To help to overcome some of these conflicts, a tool has been developed for assessing the effectiveness of different measures and investments against policy objectives. The model helps different stakeholders to make explicit how they rate specific policy objectives and project impacts.

It was concluded that a clearer distinction is needed between policy plans and infrastructure plans. Policy plans should be enhanced to include measurable objectives and performance indicators, e.g. for social impacts. Infrastructure plans should show a closer consideration of strategic policy goals (such as regional linkage and social cohesion), e.g. through the process of Strategic Environmental Assessment.

### ***Modelling the interactions between the transport sector and the wider economy***

One requirement for an *integrated* evaluation is to be able to model the long-term interactions between the transport sector and other branches of the economy, in order to identify wider socio-economic outcomes. Some research has therefore been directed towards providing a suitable approach. This uses a “system dynamics” methodology to assess the wider socio-

economic and environmental impacts of transport policy packages over a 25-year time horizon. This is achieved by linking sub-models covering macro-economic activity, regional economics and land-use, transport demand and environmental impacts, and using feedback loops to capture the inter-relations between variables. Outputs include economic, social and employment indicators.

## 6.5 Working conditions

### *Research objectives*

The objectives of research in this area have been:

- to develop a European strategy for managing the human and organisational impacts of the new technologies likely to be implemented over the next 10-20 years – in terms of worker preparation and technology acceptance;
- to assess the impacts on work organisation, management and training resulting from innovations in specific sectors – notably maritime, aviation and intermodal activities.

### *Main findings*

#### ***Actions have been recommended to manage the social impacts of new technologies***

A tactical approach has been developed to manage the human and organisational impacts of new technologies. This involves:

- introducing *guidelines* at international and EU level addressing the responsibilities of stakeholders for upcoming new technologies;
- encouraging and enforcing the *certification* of products and services on a national level;
- ensuring compliance with *best practice* at regional and local level by imposing tender conditions on suppliers;
- prompting suppliers and system integrators to *self-certify* and subsequently test their products to outlined standards.

In addition, recommendations have been made concerning:

- the appropriate *distribution of responsibilities* among equipment manufacturers, after-market suppliers, purchasing agencies, contractors, installers and users;
- *data collection and failure investigation* in order to identify safety problems of new technologies.

The research highlighted the need for a co-ordinated approach at the EU level, aimed at harmonising the pace of technology innovation in the transport sector with the associated regulatory process.

#### ***Strategies have been devised for automating air traffic control***

In the aviation sector, research has provided strategies to systematically guide the decision process for automating functions in an air traffic management (ATM) system, while maintaining (or even enhancing) safety and efficiency levels and giving the air traffic controllers a satisfying job. Good practice in the field has been compiled, identifying evaluation methods that can help in allocating work between humans and machines, according to criteria such as safety, workload and complexity.

#### ***Work opportunities for disabled seafarers have been assessed***

In the maritime sector, an assessment was made of re-employment opportunities for disabled seafarers. This led to the conclusion that a switch to shore-based jobs – whether in the maritime or related sectors – is highly likely due to inevitable safety constraints. However, the anticipated shortfall in the supply of seafarers may offer some opportunities for re-employment of crew members with impaired fitness if safety, operational and organisational regulations are slightly adapted.

***Workplace effects of new technologies in intermodal freight have been highlighted***

Concerning intermodal freight transport, research investigated the impacts of new technologies on the number of employed workers, their working conditions, the quality of jobs (e.g. a shift to more high skill jobs), the time pressure dictated by efficiency considerations and the membership to trade unions. New logistics and production systems were highlighted as having particular significance.

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## ANNEX 1 RTD PROJECTS CONTRIBUTING TO THE THEME

This Annex lists (in alphabetic order) the titles and objectives of RTD projects relevant to the social aspects of sustainable mobility. The following Table identifies the RTD cluster(s) to which each project contributes most strongly.

<b>Clusters</b>	<b>Relevant RTD projects</b>
<i>Physical accessibility</i>	ADONIS, CAMPARIE, CAPTURE, EU-SPIRIT, GUIDE, HANDIAMI, INPHORMM, INTERCEPT, MIMIC, OPIUM, PIRATE, PRIVILEGE, PROMISING, WALCYNG
<i>Pricing acceptance and equity</i>	AFFORD, ATENCO, CAPRI, CONCERT-P, EUROTOLL, EXTRA/2, PATS, PRIMA, SOFTICE, TRANSPRICE
<i>Support for public transport</i>	ISOTOPE, SONERAIL, VIRGIL
<i>European cohesion</i>	ASTRA, CODE-TEN, EUNET, EUROSIL, TENASSESS
<i>Working conditions</i>	HANDIAMI, HINT, MASIS II, RHEA, THALASSES, WORKFRET, WORKPORT

Acronym	Title	Objective(s)
ADONIS	Analysis and development of new insight into substitution of short car trips by cycling and walking	The project aims to provide recommendations and guidelines for initiatives to promote walking and cycling instead of short car trips. Best practice examples of cycle-friendly and pedestrian-friendly infrastructure elements and other measures will be reviewed. Behavioural factors affecting modal choice and car-cyclist and car-pedestrian accidents will be identified.
AFFORD	Acceptability of fiscal and financial measures and organisational requirements for demand management	The project aims to show that marginal cost-based pricing measures are both efficient and feasible. The pricing methods to be considered include road user charges, parking fees, fuel taxes, vehicle taxes, and public transport fares and subsidies. In particular, it is intended to show that marginal cost pricing, in combination with other fiscal and financial measures, can effectively internalise transport externalities such as congestion and environmental impacts, and can regulate demand in a way that is socially efficient and equitable. An equally important aim is to identify the institutional and political barriers to the implementation and acceptance of such pricing measures in Europe, and to show how they can be overcome.
ASTRA	Assessment of transport strategies	The aim of the project is to develop a common methodology and tools for strategic policy impact assessment related to CTP targets and the TEN-T.
ATENCO	Analysis of the cost structures of the main TEN ports.	The aim is to assess the positive and negative impacts resulting from the introduction of new charging and financing principles, both in the European port system as a whole and for different types of port.
CAMPARIE	Campaigns for awareness using media and publicity to assess the responses of individuals	The aim is to recommend strategies for information management and awareness campaigns aimed at influencing travel behaviour in favour of sustainable transport modes. This will include the provision of guidelines on campaign design and implementation, and the production of a computer-based tool for strategy optimisation and impact evaluation.
CAPRI	Concerted action for transport pricing research integration	The aim is to facilitate dissemination to Member States of the results of projects dealing with the pricing of transport and to attempt to build up a consensus on the policy implications.
CAPTURE	Cars to public transport in the urban environment	The aim of the project is to assess and recommend policy instruments and strategies using physical measures designed to encourage travellers to use public transport, cycling and walking as opposed to public motoring in EU urban areas. Information on the most appropriate strategies and decision support will be provided to decision-makers; policy strategies will be tested in demonstration sites, singly or in combinations; and tools and databases will be developed to ascertain the transferability of results to other urban areas.

Acronym	Title	Objective(s)
CODE-TEN	Strategic assessment of corridor developments, TEN improvements and extensions to the CEEC/CIS	The project will provide a comprehensive strategic assessment methodology that can be applied to transport corridors, and will identify major policy-related issues as an aid to decision-makers. A tool for assessing interactions between policy instruments and corridor/network developments will be produced.
CONCERT-P	Co-operation for novel city electronic regulating tools	The general aim of the project is the assessment of demand management policy instruments such as pricing/restraint measures. The potential of the different measures will be assessed, the impact of integrated pricing/restraint measures on urban travel behaviour evaluated, the public acceptability of different forms of pricing/restraint tested, and the obstacles to their implementation examined.
EUNET/SASI	Socio-economic and spatial impacts of transport infrastructure investments and transport system improvements	The main objectives are to develop innovative methods for studying the socio-economic and spatial impacts of European transport system improvements, supported by software models and decision tools.
EUROSIL	European strategic intermodal links	This project will provide a set of guidelines, criteria, modelling and evaluation tools for analysing modal split, intermodality and interoperability in European transport networks.
EUROTOLL	European project for toll effects and pricing strategies	The objective is to assess the potential of tolls to achieve sustainable mobility, increase the efficiency of the transport system, and manage demand and modal split. Case studies, tools and policy analyses will be provided for decision-makers.
EU-SPIRIT	European system for passenger services with intermodal reservation, information and ticketing	The project aims to establish conditions for a significant shift in long distance travel from individual motorised transport to intermodal transport. EU-SPIRIT will identify technical and non-technical obstacles to intermodal transport, and afterwards establish solutions – validated in a number of pilot trials – to reduce those barriers.
EXTRA/2	Euromethodologies X travel assessment	The aim is to assess the consequences of increased charges for road transport for groups that face some disadvantages in terms of mobility.
GUIDE	Group for urban interchanges' development and evaluation	The project aims to assess and disseminate best practice in the functional specification and design aspects of the interchange between passengers and urban public transport systems. A best practice guide will be developed, and a research network established.

Acronym	Title	Objective(s)
HANDIAMI	Investigation of the employment of disabled persons in the maritime industry, e.g. new shore-based jobs, and into the problems of disabled passengers in access and emergency situations	<p>The main objectives of the project are:</p> <ul style="list-style-type: none"> <li>• to undertake a detailed comparative analysis of the level of existing provisions for disabled passengers in the maritime and other transport sectors;</li> <li>• to develop introductory training material for managers and staff in the maritime industry;</li> <li>• to promote the employment and retention of disabled maritime workers;</li> <li>• to highlight any safety-specific issues that impact on ship design, operation and training.</li> </ul>
HINT	Human implications of new technologies	<p>This project aims to develop a European strategy for managing the human and organisational impacts of the new technologies likely to be implemented over the next 10-20 years. The project will identify the relevant technologies, investigate the human factors and the organisational and safety implications of these technologies, and develop a strategy for managing those impacts.</p>
INPHORMM	Information and publicity helping the objective of reducing motorised mobility	<p>The project aims to produce guidelines showing how to use various kinds of information and publicity campaigns in order to reduce dependence on the car and levels of motorised mobility. A comprehensive review of different kinds of information and publicity campaigns will be provided, with illustrations of good and bad practice. A general model setting out relationships between objectives, information and publicity strategies, use of specific tools and likely behavioural outcomes will be developed; and a number of "concept campaigns" will be produced.</p>
INTERCEPT	Intermodal concepts in European passenger transport	<p>The project will build on the experience gained in the use of telematics applications and novel transport solutions in the previous EU R&amp;D demonstrations GAUDI, CONCERT-P, CENTAUR, ANTARES and ZEUS. The technologies and measures developed and implemented in these projects will be drawn together into a toolbox for promoting intermodal transport concepts. This toolbox of measures will then be demonstrated in cities across Europe.</p>
ISOTOPE	Improved structure and organisation for transport operations of passengers in Europe	<p>The project aims to identify how organisational structures for urban public transport may be improved, in order to increase the role of public transport in European urban areas. The existing legal status and organisational structures for public transport operations in the European countries will be compared. The pros and cons of various organisational forms in terms of effectiveness and efficiency will be analysed; and a strategic approach to the development of public transport operations will be provided to political decision makers, transport planning authorities, public transport authorities and operators.</p>

Acronym	Title	Objective(s)
MASIS II	Human element in man/machine interface and interaction to improve the safety and effectiveness of transport for the European fleet	The main objective is the improvement of human behaviour and performance onboard ships, particularly in an emergency. Practical tools and procedures will be developed for effective man/machine interfaces so as to reduce the impact of the human element in marine accidents.
MIMIC	Mobility, intermodality and interchanges	The project aims to identify and evaluate from different actors' perspectives (users, operators, developers) key issues in planning, design, implementation and management of passenger interchanges with the public transport system. Barriers to intermodality and to transfers at interchanges will be assessed. The effect of the institutional context on infrastructure financing and operations will be studied. Guidelines for planning, design and management of interchanges will be provided.
OPIUM	Operational project for integrated urban management	The project aims to develop physical traffic management measures in the areas of parking management and guidance, traffic calming and bus priority measures. The impact of the measures on transport efficiency, safety and modal split in urban areas will be evaluated, with particular reference to the impact on vulnerable road users. Recommendations will be made for the future development of urban transport policies.
PATS	Pricing acceptability in the transport sector	The aims of this project are to identify the reasons behind the acceptance/non-acceptance of transport pricing; find the means and measures to increase its acceptability; find ways to harmonise pricing and fairness principles; identify the legal and political barriers to the implementation of pricing schemes; and design acceptable pricing schemes and policy packages.
PIRATE	Promoting interchange, rationale, accessibility and transfer efficiency	The project aims to develop recommendations, guidelines and standards for the design of transport interchanges based upon the stated requirements of users and non-users. The outputs will be aimed at those involved in financing or developing new or extended interchanges.
PRIMA	Pricing measures acceptance	The objectives for PRIMA are to identify the reasons behind the acceptance or non-acceptance of road pricing and to produce recommendations for the implementation of urban road pricing in Europe.
PRIVILEGE	Priority for vehicles of essential user groups in urban environments	The aim of the project is to put various categories of private and public transport in order of priority, in terms of guaranteeing their mobility in overcrowded road networks.

Acronym	Title	Objective(s)
PROMISING	Development and promotion of measures for vulnerable road users with regard to mobility integrated with safety, taking into account the inexperience of the different groups	The objective of the project is to show the potential for reduction in casualties of vulnerable road users (such as pedestrians, cyclists, motorised two-wheelers and young drivers) by technical measures that do not restrict mobility or directness of travel - in contrast to previous restrictive safety measures.
RHEA	Role of the human in the evolution of ATM systems	The main objective of the project is to provide automation strategies to guide the decision process for automating functions in an Air Traffic Management system of the future. In addition, the future functional requirements of human operators and automation assistance tools will be addressed.
SOFTICE	Survey on freight transport including a cost comparison for Europe	The aim of the project is to identify the main parameters affecting freight cost structure in EU Member States plus Switzerland and some CEE countries, and to identify the factors affecting freight transport demand. The effects of different policies for taxation and internalisation of costs on the spatial organisation of production will be identified, and an optimal country-related time path for the implementation of harmonisation policies defined.
SONERAIL	Socially necessary railways	The goal of SONERAIL is to improve the decision-making basis regarding the provision of socially necessary rail services, by providing a practical evaluation methodology.
TENASSESS	Policy assessment of Trans-European Networks and Common Transport Policy	The aim of the project is to develop a methodology that could be used in the assessment of policies and options related to decisions on transport infrastructure investments (especially TEN-T), and to provide a comprehensive assessment of the CTP.
THALASSES	Evaluation of the impacts of new technologies in maritime transport on the human element through the creation of a constructive technology assessment network	The project will assess the impacts of new technologies on the human element in maritime transport. It includes: <ul style="list-style-type: none"> <li>• a 'working cultures' approach to allow an evaluation of the changes induced in terms of work content, workload, safety, job security and job satisfaction;</li> <li>• socio-economic cost-benefit analysis;</li> <li>• identification of trends in technology.</li> </ul>
TRANSPRICE	Trans modal integrated urban transport pricing for optimum modal split	The project aims to evaluate the technical/financial options for integrated pricing/payment measures across modes of transport. Political acceptability will be evaluated; an analytical framework establishing the effects on modal split will be set up; a comprehensive impact assessment of integrated pricing/payment scenarios will be provided; and integrated pricing/payment demonstrations in selected European cities will be evaluated.

<b>Acronym</b>	<b>Title</b>	<b>Objective(s)</b>
VIRGIL	Access to transport services in rural areas	The aim of the project is to improve the access to transport and services in rural areas by identifying and analysing good practices and experiences, disseminating the results and identifying needs for further research after a broad consultation with stakeholders.
WALCYNG	How to enhance walking and cycling instead of shorter car trips and make these modes safer	The aim of the project is to develop a conceptual marketing model for enhancing walking and cycling in order to replace shorter car trips and to make the walking and cycling modes safer. Existing 'products' for pedestrians will be evaluated and new products developed. Supporting soft policy measures (advertising, lobbying) will be defined in the guidelines.
WORKFRET	Working cultures in the face of intermodal freight transport systems	The aim is to contribute to the development of an efficient freight transport system in Europe, taking into account the interests and requirements of the people who operate them.
WORKPORT	Work organisation in ports	The project aims to assess the impact of new technology on the port work environment and to consider the application of new organisational and management concepts to meet new demands on ports.

## ANNEX 2 MAIN FINDINGS FROM COMPLETED RTD PROJECTS

This Annex summarises the findings from completed projects for which the Final Report has been approved or made available. Project web page references are provided where known. Summaries of all projects are available from the two web sites given in Section 1 of this paper.

### Index of RTD project results:

<b>Project acronym</b>	<b>Page no.</b>	<b>Project acronym</b>	<b>Page no.</b>
ADONIS	41	ISOTOPE	57
AFFORD	42	MASIS II	57
ASTRA	43	MIMIC	57
ATENCO	44	OPIUM	58
CAMPARIE	44	PATS	59
CAPRI	45	PIRATE	61
CAPTURE	46	PRIMA	62
CODE-TEN	47	PRIVILEGE	63
CONCERT-P	48	PROMISING	63
EUNET/SASI	49	RHEA	64
EUROSIL	51	SOFTICE	65
EUROTOLL	51	SONERAIL	66
EU-SPIRIT	52	TENASSESS	67
EXTRA/2	52	THALASSES	68
GUIDE	53	TRANSPRICE	68
HANDIAMI	54	VIRGIL	69
HINT	55	WALCYNG	70
INPHORMM	55	WORKFRET	70
INTERCEPT	56	WORKPORT	71

**Project acronym and title****ADONIS:****Analysis and development of new insight into substitution of short car trips by cycling and walking****Key results and policy implications****KEY RESULTS**

ADONIS has provided general recommendations and guidelines regarding good practice to promote cycling and walking instead of short car trips in cities. It has produced a report and CD-ROM which include:

- the first comprehensive European catalogue of (42) measures concerning walking;
- a compilation of (60) innovative measures to promote cycling, as a complement to existing catalogues of basic measures.

These measures include both technical solutions (such as infrastructure changes) and non-technical actions (such as education and planning). The relevance of measures is mapped onto specific situations by considering:

- the extent to which a city already has certain measures in place;
- the extent to which cycling and walking are already used;
- the need to address two distinct groups – those who are, and those who are not, accustomed to cycling and walking.

Recommendations for all cities include:

- improving home delivery services;
- introducing secure types of bicycle parking;
- introducing bicycle registration programmes;
- making it possible to insure bicycles against theft;
- increasing the number of parking places for bicycles and reducing the number for cars;
- using awareness campaigns aimed at behavioural and attitudinal changes towards cars;
- stimulating the creation and participation rates of cyclist and pedestrian organisations;
- targeting travellers to/from schools and educational centres, in order to influence transport habits at an early stage.

Surveys of people's behaviour and attitudes to mode choice in Amsterdam, Barcelona and Copenhagen showed that:

- walking is mainly considered for trips under 1 km, while cycling competes with cars for trips up to 5 km;
- the main factor which appeared to encourage the use of the car was comfort;
- safety and bicycle security are major concerns, while non-cyclists also fear an increase in travel time if they switch to cycling.

**POLICY IMPLICATIONS**

The project concluded that walking and cycling require clear recognition within local and national transport policies and plans. This particularly requires changes with regard to walking, which enjoys little public advocacy (e.g. by lobbying groups).

The choice of measures is largely dependent on the local situation. However, certain recommendations can be made regardless of situation:

- for Government:
  - develop specific policies for walking and cycling, especially in terms of urban traffic priority and support for complementary public transport;
  - activate employers, factories and shops to provide sufficient and safe bicycle parking;
  - activate shops to provide (free) delivery of goods;
- for transport planners:

**Project acronym and title****Key results and policy implications**

- use catalogues such as ADONIS to understand what package of measures would be most appropriate in a particular local situation, and in what order of introduction.

Measures specifically highlighted were:

- to appoint a pedestrian and cyclist officer to advocate and promote change in the city;
- to promote incentives that make drivers experience the benefits of cycling and walking (e.g. Car Free Days);
- to control car speeds by appropriate restrictions and/or enforcement.

**AFFORD:****KEY RESULTS****Acceptability of fiscal and financial measures and organisational requirements for demand management**

The aims of AFFORD were to define practical measures to implement marginal cost pricing for transport in cities, to assess the potential problems and to provide policy guidelines for introducing such measures.

The project evaluated “first-best” and “second-best” policy packages based on marginal cost pricing, rather than assessing individual pricing measures. Results from modelling in four European cities (Athens, Edinburgh, Helsinki and Oslo) suggested that such packages give rise to substantial welfare benefits for the urban population. Annual gains typically vary between 100 and 400 Euros per capita, depending on the city context and measures applied. A major part of this gain may result from the effective use of the revenues, for instance allowing a reduction in labour taxes. (The benefits are therefore quite sensitive to the value or “shadow price” attributed to helping a government meet budget constraints without the need for distortionary taxation elsewhere in the economy.)

The equity effects of pricing were estimated to be moderate (negative or positive). Environmental benefits constitute a significant part of the welfare gain, ranging between 15 and 95% depending on the city. Reductions in trips by private car range between 5 and 30%. Overall, accessibility is reduced, particularly for car users. However, if revenues are used to subsidise public transport services, then accessibility may even be increased for most of the population.

Case studies and surveys in five cities indicated that the legal and institutional frameworks required to implement marginal cost-based pricing for urban transport have, so far, not been put in place. For example, these are different to the frameworks needed for road pricing on inter-urban motorways.

Surveys of public, political and business acceptability of pricing were carried out in several cities. These showed a high awareness of the underlying pollution, congestion and parking problems, but relatively little knowledge of pricing instruments. In general, pricing was perceived to be effective, but likely to lead to disadvantages to stakeholders. A majority of motorists did not accept the proposed packages of pricing measures.

**POLICY IMPLICATIONS**

The dependence of the welfare benefits of pricing on how the revenue is used implies that urban transport pricing is a general policy issue that goes beyond the local policy level and also beyond the transport sector. AFFORD concluded that the introduction of marginal cost-based pricing will require the creation of supporting institutions and laws, and the removal of inconsistencies in national-level policies. For example, strong institutions are needed with the powers to control multi-modal transport pricing

**Project acronym and title****Key results and policy implications**

across urban regions, rather than trying to construct complex relationships across multiple local authorities.

Successful pricing will also need effective communication to overcome public opposition. Marginal cost pricing, especially prior to implementation, will be regarded with a lot of scepticism and even hostility. It may be politically vital to redistribute a significant majority of revenues to the local or regional population that pays, whether or not the funds are used for transport.

**PROJECT WEB PAGE:** <http://www.vatt.fi/afford/>

**ASTRA:****KEY RESULTS****Assessment of transport strategies**

The aim of the ASTRA project was to develop a system dynamics tool capable of analysing the long-term effects of the EU's Common Transport Policy, not only for the transport system but also for the most important connected systems. The tool was also intended to support the comparison of developments *over time*, not just the static comparison of outcomes in some horizon year (which has been common practice in transport assessments).

ASTRA developed a system dynamics modelling platform integrating four sub-models (covering macro-economic activity, regional economics and land-use, transport demand and environmental impacts). The interfaces between the sub-models allow feedback loops to be established, thereby capturing the inter-relations between variables. Output indicators include traffic volumes, vehicle numbers, environmental impacts, and economic, social and employment indicators. Forecasts are produced from a base year of 1996 to a time horizon of 2026. Important attributes include short run-times for some types of policy test, and the ability to simulate the gradual introduction of a policy measure.

The ASTRA model was demonstrated by simulating the effects of five policy packages (each consisting of sets of policy measures) and also a more comprehensive set of measures. The scenarios addressed policy decisions in the fields of taxation, construction of the Trans-European Transport Network, mitigation of air pollution and safety improvement. As an example of the system dynamics approach, the simulations considered different ways of spending the revenue from increased taxation – either for a reduction in labour costs or for construction of new transport infrastructure.

Overall, the fully integrated set of measures produced the best results across the range of economic, environmental and employment indicators. Other significant points from the policy analysis were as follows:

- None of the tested packages was able to meet the Kyoto requirements for abatement of greenhouse gas emissions.
- No further significant improvement could be identified for road accidents.
- Air transport growth would be significant in all scenarios, and in some cases would counterbalance most of the environmental benefits of policies giving a reduction in road transport.
- The effects of the policy packages on the economy change the average annual GDP growth rate by 0.2% at most between the “best” and “worst” policy options.

**POLICY IMPLICATIONS**

ASTRA has shown that the system dynamics methodology allows for a long-term assessment of the wider socio-economic and environmental impacts of transport policy packages, and provides inherently consistent indicators to enable a direct assessment

**Project acronym and title****Key results and policy implications**

by the policy-maker. Moreover, the methodology is available in an operational software model for policy assessment on a European scale. This can be used to forecast the “what-if” consequences of planned policies, or be run in a “backcasting” mode to identify measures that will achieve a desired end-state.

**PROJECT WEB PAGE:** <http://www.iww.uni-karlsruhe.de/ASTRA>

**ATENCO:**

*The final results of this project were not available when this Thematic Paper was prepared.*

**Analysis of the cost structures of the main TEN ports****CAMPARIE:****KEY RESULTS****Campaigns for awareness using media and publicity to assess responses of individuals in Europe**

CAMPARIE aimed to collate and disseminate strategies for information and awareness campaigns in the transport sector, based on real-life experiences, in order to provide decision support for future initiatives.

The project developed a software-based tool that provides information on more than 100 previous campaigns (mainly concerning public transport). It is designed to help practitioners identify experiences relevant to their own situation. The software is complemented by guidelines on the process of designing a campaign.

A survey confirmed that local authorities usually use transport planners and engineers rather than communications experts for designing and running campaigns. Conversely, the professional agencies that are sometimes employed to support such campaigns often have little or no experience of transport-related issues. The CAMPARIE outputs aim to bridge this gap by broadening the knowledge base on both sides.

General public awareness campaigns tend to be undertaken by regional and national authorities. Impacts cannot readily be assessed, and a long time period is necessary to obtain reliable results. In contrast, local authorities and operators seem to prefer targeted campaigns and more individualised marketing. This requires some knowledge of user needs, and much could be learnt from the latest developments in market segmentation techniques, computer applications and the targeted use of incentives.

Detailed evaluation of six campaigns generated the following insights:

- The success of a campaign is maximised when combined with one or more specific policy measures (such as traffic restrictions or a new public transport service).
- Mixes of measures and mixes of campaigns seem to have an increased effect relative to isolated efforts.
- General awareness campaigns need to be repeated at regular intervals, otherwise they lose their “power” to influence behaviour. Campaigns targeted on specific groups have stronger and longer-lasting effects.
- Most of the campaigns studied by CAMPARIE can be transferred to other locations, with appropriate adaptation.

**POLICY IMPLICATIONS**

CAMPARIE concluded that marketing is not being used to its full potential in the

**Project acronym and title****Key results and policy implications**

transport sector to support policy-induced changes in behaviour. This may be due to decision-makers not being comfortable with how to design and evaluate campaigns. The consequence is that they are missing a low-cost approach to increasing the impact of high-cost measures.

CAMPARIE found that there is a need to distinguish a campaign coming from a local authority to that of a private enterprise aimed at promoting a particular product or service. Target audiences often discard material that they consider pure advertising, and therefore need to be warned about “public service” information.

Children need to be addressed by campaigns. It is likely that someone will develop less car-centred travel behaviour and attitudes if their awareness of the issues has been raised from an early age.

For the future, the issue remains as to how to make tools such as the CAMPARIE software available to users and up-to-date. This suggests that future applications of this sort need to be Web-based.

**CAPRI:****KEY RESULTS****Concerted Action on transport pricing research integration**

The purpose of CAPRI was to facilitate the transfer of information from research projects dealing with the pricing of transport. Key objectives were:

- to aid dissemination of results to Member States and other stakeholders;
- to develop a synthesis of research findings;
- to help to build a consensus on the implications for policy.

CAPRI drew conclusions in six areas (pricing principles, valuation of externalities, road pricing, rail and other public transport, air transport, and the likely impacts of pricing policy). These were based on EC-funded research as well as other evidence from inside and outside the EU.

**Pricing principles:** Pricing policy should be based on an understanding of marginal social costs, where the user pays the costs that they cause through additional infrastructure use. This will not deter trips that offer a net benefit to society, but it will discourage trips where the benefit to the individual user is less than the cost to society as a whole. Marginal social costs should be used as the starting point for price determination, with other important considerations such as financial needs incorporated in a way that does least damage to society’s welfare. One of the main implications of pricing based on social costs is that prices should vary to a greater extent according to location and travel time.

**Valuation of externalities:** All of the main externalities (air pollution, global warming, congestion, accidents etc.) can be taken into account in pricing structures, even though some uncertainty exists in their estimation. CAPRI recommended specific evaluation methods for particular impacts.

**Road pricing:** Greater differentiation in road charges by time period and area is necessary to cope with congestion resulting from heavy peaks in travel demand. The main impact is likely to be travel at different times or by different routes, rather than a change in mode. To increase acceptability, the introduction of pricing should be staged, starting with simple systems with low charge levels, and the revenue should be earmarked for specific spending programmes such as public transport.

**Rail and other public transport:** Efficient pricing is likely to require greater peak/off-peak differentials, and also an element of government funding (particularly for

**Project acronym and title****Key results and policy implications**

short-distance urban services). Improving the service quality and investment in infrastructure may be the most important measures for improving modal shares, as opposed to internalisation of externalities for all modes via the pricing mechanism – this is particularly the case for freight transport.

**Air transport:** Environmental pricing can be based on kerosene consumption and/or landing and take-off operations, but policy development in this area requires further research.

**Likely impacts of implementing efficient pricing:** Pricing based on marginal costs may result in price reductions for some modes as well as price rises for some others. For example, inter-urban passenger travel in uncongested conditions, by road or rail, is typically *over-priced* at present. For inter-urban freight transport, evidence suggests that there is often significant *under-charging* for both road and rail. Finally, urban transport by means of road-based modes is typically *dramatically under-charged*, particularly in congested conditions.

**POLICY IMPLICATIONS**

The existing range of pricing policies in EU Member States is so varied that the impacts of marginal cost pricing have to be assessed on a case-by-case basis. The extent and direction of any price changes will depend strongly on current levels of taxation and charging, and will not necessarily imply lower travel demand. Nevertheless, as a broad conclusion, pricing reform to reflect social marginal cost would involve:

- a decrease in prices for inter-urban road and rail passenger transport and an increase in the price of urban road travel (particularly for the private car);
- an increase in prices for both road and rail freight.

Regulatory policy may often be more powerful than pricing policy in the control or reduction of some categories of environmental emission, such as noise. For emissions of greenhouse gases, CAPRI recommended that pricing should be based on political decisions about target emission levels, given the lack of consensus about the values to be placed on each tonne of pollutant.

**PROJECT WEB PAGE:** <http://www.its.leeds.ac.uk/projects/capri>

**CAPTURE:****KEY RESULTS****Cars to public transport in the urban environment**

The aim of CAPTURE was to collate and evaluate data on the effectiveness of *physical* transport measures designed to restrict or encourage the use of different modes (such as parking management, bus priority schemes and restriction of road space for private cars).

Based on the evidence of demonstrations of packages of measures in 11 cities, the project has published detailed findings on the performance and impacts of different measures. Major elements of these packages included bus lanes, public transport prioritisation, improvements to junctions and interchanges, area access restrictions and controls on central area parking.

The project found that physical measures do not *in themselves* generally have a major short-term impact on modal split, unless they are large in scale. Nevertheless, CAPTURE identified positive effects on the performance of public transport (such as lower journey times and better timekeeping). This means that the smaller schemes may encourage a change in behaviour when people periodically re-assess their travel

**Project acronym  
and title****Key results and policy implications**

decisions – either due to changing circumstances (such as a job or house move) or due to other policy changes (such as pricing measures).

Physical measures are not easy to introduce. In the CAPTURE cities, the most common barriers were conflicts of interest between the institutions involved, a lack of funds, diversion of attention to alternative schemes, and opposition from affected stakeholders. Small-scale, low-visibility cheap solutions were found to be the most readily implemented. However, these run the risk of failing to achieve large-scale change, unless introduced as part of an overall vision and strategy.

Measures that reduce traffic levels in *areas* of cities are difficult to implement, but are effective when carried through. However, there are no “off-the-shelf” solutions for cities to apply. For example, bus lanes have had good success in some cities and little in others. Changes must be planned individually, taking into account local conditions, the ease of implementation and user reactions. City size is not a major factor in determining the most appropriate measures, but city type (historic versus modern) may be significant.

***POLICY IMPLICATIONS***

CAPTURE concluded that modal change requires a package of measures in a well thought-out strategy. Physical measures are important because they affect the capacity and efficiency of public transport. This is an essential precursor for a change in travel behaviour, whatever the levers (pricing, green commuter plans etc.) used to induce that change.

Experience suggests that only two or three institutions need to be involved in the implementation process for serious conflict to arise. This worrying conclusion highlights the importance of building consensus and commitment throughout the process.

If area-wide changes are targeted, the following recommendations can be made:

- Carry out public consultation and, preferably, public participation in the scheme design.
- Note that physical restrictive measures are probably more acceptable than road pricing measures.
- In cities where such changes have not previously been attempted, start small or experimentally in order to build up public support.

For the national and European levels, CAPTURE concluded that:

- A national or regional body needs to assess local plans with respect to their overall impact on longer-term policy goals (including broader issues such as reducing social exclusion).
- Good practice examples need widespread dissemination, particularly to counter popular perceptions about the effects of access restrictions and pedestrianisation on city centre trade.
- Telematics measures can generally be implemented without delay, but the benefits are often greater to private motorists than to public transport passengers.

**CODE-TEN:*****KEY RESULTS*****Strategic  
assessment of  
corridor  
developments**

Multi-modal corridors across Europe represent costly infrastructure investments that require phasing. Classically, economic evaluations are critical in decisions on prioritising projects. However, in the context of *network* development, a more strategic assessment method is needed.

**Project acronym  
and title****Key results and policy implications**

Therefore CODE-TEN has developed a strategic policy assessment tool for assessing the impacts of the development of pan-European corridors. The tool applies a scenario approach to elaborate consistent images of the future that combine information on three aspects: socio-economic development, policy development and infrastructure planning. Using these images, the alternatives for corridor development are subjected to impact assessment to help in decision-making.

The images build on 4 scenarios of socio-economic and political developments through to the year 2015, named:

- Renaissance – high economic growth and fast integration of neighbouring countries into the EU;
- Dilution – high growth and slow integration;
- Solidarity – low growth and fast integration;
- Fragmentation – low growth and slow or no integration.

A comprehensive information system was produced on a CD-ROM covering 30 European countries. This provides information on politics, regional socio-economic data, regional road information, foreign trade, transport costs, resource costs, networks and maps. It has supported in-depth corridor studies on: Via Baltica, Berlin-Warsaw-Moscow, Dresden - Budapest - Istanbul, Venice – Kiev, The Danube Waterway, Copenhagen - Stockholm - Helsinki - Moscow, Salzburg - Belgrade - Thessaloniki, the Mediterranean short sea shipping and the Lisbon-Madrid-Paris Trans-European link.

Descriptions of infrastructure strategies and traffic flow estimations (based on the development of the various scenarios and corridors until the year 2015) have led to the impact assessment of the various alternatives for corridor development, focusing on accessibility, environment and socio-economic factors. Combinations of road and rail projects were generally found to offer the greatest benefits.

***POLICY IMPLICATIONS***

CODE-TEN gives guidelines for assessing transport investments to support the policy of expanding the European Union to Baltic and Central European countries. The method could also be applied more generally to other infrastructure programmes.

CODE-TEN recommended that, in addition to project-specific assessment, the whole set of related projects should be subject to strategic assessment. The DECODE method elaborated in CODE-TEN is one method for carrying out this analysis.

**PROJECT WEB PAGE:** <http://www.iccr-international.org/code-ten/>

**CONCERT-P:****Co-operation for  
novel city  
electronic  
regulating tools*****KEY RESULTS***

Demonstrations of road pricing measures to change modal split in urban areas were conducted at three sites:

- In Trondheim, car drivers incurred peak period charges that varied over short time intervals to reflect different levels of congestion.
- In Bristol, charges applied throughout the day, with additional incentives for using public transport and higher charges during days of poor air quality.
- In Barcelona, zone access control was implemented.

Key findings were:

- Trondheim: reductions in peak period traffic exceeded 10% (mainly due to drivers changing their time of travel), with a smaller decrease in the total number of trips

**Project acronym  
and title****Key results and policy implications**

– indicating some trip suppression or modal shift.

- Bristol: 15-20% reductions in daily car travel could be largely attributed to drivers switching to public transport.
- Barcelona: the viability of technical implementation was shown to be acceptable to enforcement authorities.

It was clear that drivers tended to re-schedule trips before considering switching to public transport, and that individual drivers responded very differently to the charges. This has to be borne in mind when tariff structures are being designed.

Public acceptance of road pricing was found to be higher if revenue hypothecation (e.g. to improve public transport) is introduced.

**POLICY IMPLICATIONS**

The project made a series of recommendations:

*Pan-European level*

Urban demonstrations of multi-modal charging regimes with integrated payment systems should be intensified. Projects should:

- combine road pricing with public transport alternatives;
- use technology to collect evaluation data and provide a feedback loop to drivers on the financial implications of their daily decisions;
- demonstrate the benefits of revenue hypothecation.

*National level*

Governments and relevant authorities should:

- introduce enabling legislation so that revenues from road user charging can be re-invested locally to improve the travel alternatives where road charges are introduced;
- encourage local authorities to integrate public transport services in their pricing schemes;
- co-ordinate initiatives to develop multi-modal payment systems.

**EUNET/SASI:****KEY RESULTS****Socio-economic  
and spatial  
impacts of  
transport**

EUNET/SASI involved two sub-projects with the following main aims:

- *EUNET*: To develop a comprehensive methodology and model for assessing the impacts of transport initiatives (including infrastructure investments, regulatory and fiscal policies).
- *SASI*: To develop a specialised methodology and model for forecasting the socio-economic and spatial impacts of large transport investments in Europe, particularly to support the assessment of options for the TEN-T.

By comparison, EUNET took a regional/corridor view and focused on the demonstration of methodology, while SASI took a more global view of impacts across Europe.

**EUNET**

A broad-based modelling system was developed in the form of prototype software to support policy decisions. This included:

- methods for valuing socio-economic effects;
- a tool for estimating spatially-resolved indicators of regional accessibility and social cohesion, including effects on national output and employment;
- a new approach to regional economic modelling, where the sources of potential

**Project acronym and title****Key results and policy implications**

travel growth are identified separately as a function of specific social and economic activities;

- a database for estimating the costs of vehicle and infrastructure operation, by country, through to 2020;
- an assessment framework combining both cost-benefit and multi-criteria analysis methods.

The model was demonstrated for the Trans-Pennine corridor in the UK and for long-distance freight movements in Finland. In addition, the application of the methodology in areas with limited data availability was assessed in a desktop study for an area of Greece.

EUNET also provided an overview of current practice across Member States in appraising major transport projects and deriving monetary values for impacts.

**SASI**

In this sub-project, software was devised for predicting the impacts of transport infrastructure investments and transport system improvements on socio-economic activities and development, including the spatial distribution of impacts. The model covers the whole EU at the NUTS-2 level of geographic disaggregation (dividing the Member States into 201 regions), and provides forecasts to the year 2016. Innovative attributes include:

- the prediction of regional unemployment;
- the estimation of the spatial redistribution effects of the TEN-T;
- the calculation of accessibility taking account of proximity to nodes of the transport network;
- the calculation of indicators of cohesion for the European Union;
- *dynamic* modelling of the development of the transport network and socio-economic impacts over time.

The model was used to assess some scenarios for extension of the TEN-T. The development trajectories of the European regions were similar in all scenarios, showing that macro-economic trends (such as ageing of the population) have a much stronger impact on cohesion than different transport infrastructure strategies. In all scenarios, most regions will improve their accessibility and economic performance in absolute terms, but with some changes in their *relative* position. The maximum TEN-T investment leads to a slightly less polarised distribution of accessibility and economic output among the regions, but this slight cohesion effect would not, however, be able to reverse the general trend towards economic polarisation in the EU.

A case study on the Oresund crossing in Sweden showed that the model is sufficiently sensitive to assess individual infrastructure projects with regard to their impact on accessibility and regional economic development.

**POLICY IMPLICATIONS**

EUNET/SASI has provided new methods for assessing the complex relationship between transport infrastructure and regional development and the effects of policy initiatives such as infrastructure investment.

The project recommended that transport statistical data should be collected and published in a more standardised way, to make their use in modelling and policy support more cost-effective.

**PROJECT WEB-PAGE:** <http://fpiv.meap.co.uk/fpiv/EUNET.htm>

**Project acronym and title****Key results and policy implications****EUROSIL:****KEY RESULTS****European strategic intermodal links**

EUROSIL aimed to develop robust guidelines to support decision-making on TEN-T and other transport investments, which would take into account the impacts of multi-modal links on regional development.

Through a series of 12 case studies, EUROSIL identified examples of good practice in appraising the benefits of multi-modal transport investments. However, it was clear that few of the current modelling approaches deal explicitly with regional development effects, and there are further deficiencies in the evaluation of those impacts.

Therefore EUROSIL developed an evaluation framework and software tool to support a structured approach to the assessment of regional development effects. This covers the selection of criteria for the evaluation, the estimation of impacts, and the definition of weighting factors for combining different impacts according to the selected criteria. Guidance is provided on the choice of traffic modelling methods.

For those cases where the decision-maker requires a quick low-cost evaluation of alternatives rather than a sophisticated evaluation, EUROSIL has constructed a simplified set of guidelines.

**POLICY IMPLICATIONS**

The case studies highlighted a number of barriers to intermodality:

- inadequate information flows between the variety of actors;
- problems with slow procedures at border crossings;
- differences in technical standards and regulations between Member States, e.g. for vehicle size and weight;
- a lack of co-ordination at interchanges (such as different companies working different hours);
- a lack of interoperability between modes, for instance concerning ticketing and information systems.

The EUROSIL evaluation framework is now available for use in real-life decisions on the TEN-T and other major long-distance transport projects. Its incorporation into new developments of user-friendly investment appraisal tools is recommended.

**EUROTOLL:****KEY RESULTS****European research project for toll effects and pricing strategies**

EUROTOLL aimed at providing transport policy-makers with information on the potential effects of different types of road pricing and tolling strategy. The main findings relating to road user behaviour were:

- if tariffs vary throughout the day according to demand, car drivers will reschedule departure times, which leads to less traffic congestion;
- if tariff systems reward rerouting, a significant number of car drivers will do so, which again reduces congestion;
- road pricing has not been observed to lead to significant modal shift;
- it takes time for users to change their behaviour in response to price signals - car drivers are more sensitive than occasional drivers and truck drivers.

In addition, EUROTOLL has demonstrated that strategies to integrate pricing measures and transport information applications are able to reinforce the positive effects of both.

**Project acronym  
and title****Key results and policy implications*****POLICY IMPLICATIONS***

For future pricing strategies, the following recommendations should be considered:

- the reason why a pricing measure is introduced has to be clearly explained to users and the general public;
- during a trip, more frequent road users of an area or route need less information to react to changed conditions than occasional users;
- users who make the same trip frequently will change their behaviour more quickly;
- information strategies have to be designed as a combination of pre- and on-trip information;
- travellers have to be given sufficient information about the pricing scheme and alternative travel possibilities if behaviour is to change;
- alternatives (e.g. routes) and the advantages of alternatives have to be demonstrated and promoted.

EUROTOLL concluded that the principles recommended by the EC White Paper on transport pricing could be implemented through a combination of practical pricing methods.

**EU-SPIRIT:**

*The final results of this project were not available when this Thematic Paper was prepared.*

**European system  
for passenger  
services with  
intermodal  
reservation,  
information and  
ticketing**

**PROJECT WEB-PAGE:** <http://eu-spirit.jrc.es/>

**EXTRA/2:*****KEY RESULTS*****European  
methodologies X  
travel assessment**

The objective of EXTRA/2 was to assess the consequences of increased charges for road transport for groups that face some disadvantages in terms of mobility, such as the young, the elderly, women and the poor.

Data from previous travel surveys were analysed to find evidence for the likely effects of pricing policies. The data covered a range of cities (Helsinki, Tampere, Oulu and Turku in Finland, London, Oslo, and Turin, Milan, Genoa, Rome, Naples and Palermo in Italy) as well as national data for The Netherlands and Norway.

Overall, the statistics show that women are less mobile than men. They tend to make fewer, shorter trips, and they more often walk, cycle or take the bus, while men make more trips as car drivers. Similarly, people over 55 tend to make fewer trips per day, and both young and old people are less likely to drive a car when making a trip. People in paid work tend to make more, longer trips in a day than those without paid work, and these trips are more likely to be made by car. Car driving is generally the mode of choice for those who can afford it, with people from higher income households tending to use their cars the most.

EXTRA/2 looked at data on the elasticity of demand for transport, i.e. the sensitivity of travellers in changing how much they travel when the price changes. The main finding was that there is little information on elasticity values for different socio-economic segments, the results vary substantially between countries, and depend significantly on the source of the data (surveys versus simulation modelling, the former

**Project acronym and title****Key results and policy implications**

being the more reliable method). In general, car use seems to be less sensitive to changes in travel costs than the use of public transport. Further analysis indicated that the strongest influences on elasticity values are the country (presumably reflecting differences in culture and transport infrastructure) and the competitiveness of the different transport modes.

**POLICY IMPLICATIONS**

The project drew the following conclusions:

- Cost-internalisation for road use, if applied without complementary measures, will reduce the mobility of those who already face disadvantage, or further increase the burden of transport costs in their income.
- However, road pricing could be introduced so that its revenues are used to improve the mobility of disadvantaged groups, e.g. by making public transport safer.
- In addition, regulation could be used to target the most damaging trends in road use (such as driving to out-of-town shopping centres).
- The public transport alternatives have to be put in place before the pricing measures that lead to a modal shift from cars.

EXTRA/2 also identified a need for greater standardisation in the methodologies for collecting data on travel behaviour, and made recommendations for surveying the mobility of different socio-economic groups.

**GUIDE:****KEY RESULTS****Group for urban interchanges development and evaluation**

GUIDE developed and disseminated guidance on good practice in the functional specification and design aspects of passenger interchanges, based on case study evidence.

GUIDE concluded that improving interchanges at a network-wide level requires:

- a definition of the strategic public transport network, which identifies the demand for interchanges;
- an overall information strategy for the network, covering pre-trip and real-time information;
- a system of quality standards to monitor the performance of interchanges;
- fare and ticketing policies that minimise the barriers to interchange between services;
- organisation and management structures that can take an integrated view of the interchange within the network as a whole;
- the promotion of co-ordination arrangements at the location-specific level.

By comparison, improving interchanges at individual locations requires:

- matching the design and layout to user needs;
- developing the interchange to promote access to the public transport network, which is often a more important role than transfer between services;
- improving accessibility for those with special needs;
- commercial exploitation to finance the infrastructure and provide facilities and an attractive image;
- good signs and other information services within the interchange area;
- design features and staffing to combat crime and the fear of crime.

GUIDE has presented these and other recommendations in a guide to good practice, available on the web. Case studies are also reported, concerning London, Birmingham and Manchester (UK), Utrecht and Amsterdam (NL), Paris (FR), Athens (GR) and

**Project acronym and title****Key results and policy implications**

Stockholm (SE).

***POLICY IMPLICATIONS***

The GUIDE handbook identifies public-private partnerships as an increasingly important factor in the development of interchanges, in line with the increasing interest in such partnerships in other areas of urban public transport.

GUIDE recommended the development of a European standard for signing schemes that would cover all public transport modes. The standard might provide a moderate number of pictograms, colour schemes, font designs and sizes. Individual operators would then incorporate these basic principles when developing their individual signage schemes.

**PROJECT WEB PAGE:** <http://www.interchanges.co.uk/>

**HANDIAMI:*****KEY RESULTS***

**An investigation into the problems of disabled passengers in access and emergency situations when using marine transport and the employment of disabled persons in the maritime industry**

HANDIAMI produced:

- the first scientific overview of special needs of disabled people, with a blunt set of pragmatic and cheap-to-implement suggestions for changes in the design and operation of vessels;
- an outline of demographic findings underlining the growing relevance of addressing the needs of disabled passengers as a major target group, e.g. in cruise travel, thereby highlighting the sound economic basis of desired modifications;
- recommendations for improved crew training focused on better awareness of elderly or disabled passengers onboard vessels with reference to existing Standards of Training, Certification and Watchkeeping for Seafarers (STCW 95);
- an overview of obstacles preventing quick and efficient evacuation of disabled passengers, recommendations on how to overcome those barriers, and a qualitative appraisal of associated costs if considered from the initial stage in the design process of ships;
- an assessment of re-employment opportunities for disabled seafarers, leading to the conclusion that a switch to shore-based jobs – whether in the maritime or related sectors – is highly likely due to inevitable safety constraints; only a dramatic shortfall in the supply of seafarers might create the possibility of re-employing disabled crew members;

A comparison with equal opportunities in employment in land-based jobs showed that this issue is widely neglected in the maritime industry.

***POLICY IMPLICATIONS***

Three aspects discussed by HANDIAMI may benefit from actions to be initiated by the EU. The proper exchange of information and experience between, for example, disability organisations and technical experts (ship designers, naval architects, and lawyers) should be facilitated. Secondly, existing and effective IMO recommendations on addressing the needs of elderly and disabled people should be enhanced and promoted. Finally, the anticipated shortfall in the supply of seafarers may offer some opportunities for re-employment of crew members with impaired fitness if safety, operational and organisational regulations are slightly adapted.

**Project acronym and title****Key results and policy implications****HINT:****KEY RESULTS****Human implications of new technologies**

HINT aimed to develop a European strategy for managing the human and organisational impacts of the new technologies, mainly in passenger transport, likely to be implemented over the next 10-20 years.

HINT has produced:

- a strategic approach towards effective technology watch related to feeding into standards development, information provision to the legislative process, and influencing of research;
- a tactical approach at the application level to cover human and organisational issues by:
  - introducing guidelines at international and EU level addressing obligations and responsibilities of involved stakeholders for upcoming new technologies,
  - encouraging and enforcing the recommended procedures – involving system suppliers and integrators to certificate their products and services – on a national (legislative) level,
  - ensuring compliance with best practice experience at regional and local level through tendering procedures where suppliers have to prove their qualification and their compliance with current standards, regulations and procedures,
  - prompting suppliers and system integrators to self-certificate and subsequently test their products to outlined standards;
- recommendations on the appropriate distribution of responsibilities among equipment manufacturers, vehicle manufacturers, after-market suppliers, purchasing agencies, contractors, installers and users, articulated in a formal statement of responsibility by the EU;
- recommendations on stimulating actions, triggered by the EU, for data collection and failure investigation in order to identify, in particular, safety problems of new technologies.

**POLICY IMPLICATIONS**

The study's findings highlight the need to further encourage public/private partnerships on regional and local levels to promote the implementation of new technologies in transport services. The related organisational changes have to be backed and enforced by policy actions. More important, a co-ordinated approach at EU level is needed to harmonise the pace of technology innovation in the transport sector and the connected regulatory process.

**PROJECT WEB-PAGE:** <http://www.its.leeds.ac.uk/projects/hint/>

**INPHORMM:****KEY RESULTS****Priority for vehicles of essential user groups in urban environments**

INPHORMM aimed to bring together existing knowledge on the use of communication tools to influence travel behaviour, evaluate the effectiveness of previous actions, and provide a general model for developing campaigns in the future.

The project compiled a review of over 120 transport information and publicity campaigns, mainly European in origin. Good practice guidelines were developed for such campaigns, targeting a range of organisations. These include recommendations for local authorities, public transport operators, major institutions and their site managers, and environmental, cycling and walking groups. Three types of campaign are described in detail – public awareness campaigns; campaigns for targeted groups and settings (such as schools and workplaces); and campaigns aimed at individual

**Project acronym  
and title****Key results and policy implications**

travellers and households.

The analysis of previous experiences showed that:

- Communications as part of an integrated transport plan can enable changes in travel behaviour.
- Practical advice and ongoing support are essential to maintain such changes. Complementary measures to restrain traffic may also be required.
- Among the most effective campaigns are those co-ordinated by partnerships (such as between operators, site owners and local authorities).
- There is evidence of success in carefully targeted sectors, such as schools, workplaces and neighbourhoods. Mass media campaigns targeting the general public are receiving less emphasis.
- Times of change for individuals, organisations and communities are worth targeting. Examples include people moving house or changing jobs, businesses moving site and new housing developments.
- Many organisations do not adequately assess the effects of campaigns.

Critical success factors for campaigns and programmes include:

- building support for the campaign itself;
- co-ordination between stakeholders and linking to other measures;
- providing evidence of success, both to sustain political and financial support and to fine-tune the campaign process.

The INPHORMM guidelines were tested in a pilot study in Chisinau, Moldova. This resulted in a new public transport information strategy and publications, implemented by a new unit created within the public transport authority.

***POLICY IMPLICATIONS***

The project found that co-ordination of national and local campaigns and their messages leads to greater media coverage and contributes to building a climate for change.

Information, marketing and community education programmes need to become an integral part of transport policy and planning, to raise public acceptance of other (restraint) policies and increase knowledge of travel alternatives. This includes writing campaign budgets into the broader strategy to which they relate, such as the traffic reduction or city regeneration budgets.

Good practice in the formulation of campaigns needs to be disseminated. Many organisations have failed to research the needs of their target audiences, and messages are often communicated without pre-testing. Evaluation of campaigns is often lacking.

**PROJECT WEB-PAGE:** <http://www.wmin.ac.uk/INPHORMM>

**INTERCEPT:**

*The final results of this project were not available when this Thematic Paper was prepared.*

**Intermodal  
concepts in  
European  
passenger transport**

**Project acronym and title****Key results and policy implications****ISOTOPE:****KEY RESULTS**

**Improved structure and organization for urban transport operations of passengers in Europe**

ISOTOPE concluded that:

- the initiative for creating and specifying the urban public transport (UPT) network should rest with local authorities – a fully deregulated system was found not to address collective goals and system integration in an adequate way;
- network design should be under the control of the administrative authority, although the design work may be contracted out;
- a UPT authority must include representation from the communities directly affected by the UPT system;
- traffic management and parking should be controlled by the same authority as UPT, in order to integrate the management of urban mobility;
- a regime of "limited competition" (where authorities define the transport product to be delivered and invite tenders for its execution by candidate operators) is to be preferred over full regulation (monopoly supply) or full deregulation;
- in order to tackle urban mobility problems, partnerships between operators and authorities should be established that include clear definitions of standards of service and responsibilities.

Overall, the project found support for the Citizens' Network (EC Green Paper) preference for some form of limited competition. Various forms of contract appropriate to this regime were identified, with special consideration to the case of rail-based systems. ISOTOPE concluded that reductions in unit operating costs of around 15% are feasible over fully regulated operations, even with no redundancies or wage reductions.

**POLICY IMPLICATIONS**

The project presents limited competition as a preferred regime. However, it is acknowledged that transition costs are significant.

Policy goals like fare integration, concessionary fares and employment of minorities can be accommodated within the tender conditions of limited competition. Improved access to development areas, congestion and pollution issues can be handled by retaining public control of network design.

Any move to comprehensive competitive tendering would require improved data collection, to enable value for money to be assessed in the use of taxpayers' money.

**MASIS II:**

*The final results of this project were not available when this Thematic Paper was completed.*

**Human element in man/machine interface and interaction to improve the safety and effectiveness of transport for the European fleet**

**PROJECT WEB-PAGE:** <http://www.cetena.it/MASIS.html>

**MIMIC:****KEY RESULTS**

**Mobility, intermodality and interchanges**

MIMIC developed and tested a series of surveying and modelling tools that can help planners, designers and managers to systematically analyse passenger interchanges, taking into account the various kinds of barriers to their use by passengers. The tools

**Project acronym and title****Key results and policy implications**

will have their main application in the design stage of interchanges.

The key factors influencing the effectiveness of interchanges are:

- *logistical and operational* factors, such as the failure to synchronise services between different modes;
- *psychological* factors, notably the fear of crime in the area around the interchange;
- *institutional and organisational* factors, particularly due to poor co-ordination between the many stakeholders;
- the functional quality of the *physical design* and layout;
- the *ease of access* to the interchange and the availability of parking;
- *economic and social* factors, such as cost of travel and the development of commercial services at the interchange;
- the availability of pre-trip and real-time *information*.

Recommendations and good practice guidelines were developed in each of these seven areas. For example:

- co-ordination between operators is vital to provide through-ticketing, synchronised services and information;
- commercial development of the site should be encouraged to generate income and reduce the fear of crime;
- integrated management of interchanges is needed, rather than multiple stakeholders taking decisions independently.

***POLICY IMPLICATIONS***

MIMIC highlighted significant gaps in knowledge about improving intermodality by optimising interchanges. The project made a series of recommendations for policy actions to reinforce good practice in interchange design:

- Central and regional governments need to oversee the planning and co-ordination of interchanges. This will help to synchronise services through the interchanges and guide investment priorities for public transport.
- Authorities should consider setting up a single body to be responsible for timetable co-ordination, information and through-ticketing.
- Authorities should extend the guidance to public transport designers and operators to include good practice for the design of interchanges, especially focusing on the barriers facing people with special needs.
- An independent body should be given the task of developing a Europe-wide standard for interchange signing and information.

MIMIC has shown that travellers attach great importance to the interchange when they choose whether to make intermodal trips. However, there are circumstances where the land-use and transport network characteristics of a city can substantially influence passengers' choices, much more than barriers at the interchange. So good design is a necessary condition for a successful interchange, but not a sufficient one.

**PROJECT WEB PAGE:** <http://www.interchanges.co.uk/>

**OPIUM:*****KEY RESULTS*****Operational project for integrated urban management**

OPIUM evaluated a range of physical measures for traffic management through their practical implementation in a number of cities (Gent, Heidelberg, Liverpool, Nantes, Patra and Utrecht).

Schemes to restrict road space and parking space for private cars proved very

**Project acronym  
and title****Key results and policy implications**

successful in terms of their impact on travel behaviour and consequent environmental benefits. The main difficulty lay in opposition from shopkeepers, although residents and visitors were generally supportive.

Traffic calming reduced overall traffic speeds and noise at a local level. This was perceived to benefit vulnerable users and could reinforce measures to promote modal shift. However, there may be negative effects on vehicle emissions unless overall car use is restricted.

Parking management and guidance appeared successful in reducing circulating traffic at a local level, and could influence modal split if implemented widely across a city. Parking measures were generally self-financing.

Public transport priority did not have a strong influence on modal split, but improved the speed and reliability of bus services. Greater modal shift might have been achieved if priority measures were implemented more extensively or integrated with traffic restrictions and improvements to bus services.

Measures to favour cyclists and pedestrians had only limited effect on modal shift when used in isolation, but were perceived by users to improve safety.

The greatest environmental benefits were achieved where road space was closed to private cars or where traffic volumes were reduced. Park-and-ride and parking schemes were successful in this respect. However, measures that led to slower speeds and increased journey times, such as traffic calming and bus priority, resulted in an increase in pollutant emissions.

All the schemes within OPIUM had a positive cost-benefit ratio, with payback periods of ten years or less.

***POLICY IMPLICATIONS***

OPIUM concluded that public consultation needs to play an increasingly important role in the development of traffic management measures. It is needed to gauge public opinion during scheme design and implementation, to educate the public about the likely benefits, and to take account of the needs and concerns of specific stakeholder groups such as shopkeepers. Stakeholder opposition proved to be the main hurdle to the schemes tested by OPIUM.

Individual measures can yield benefits in their own right, even if used only locally, but their deployment as part of an integrated strategy has the potential to yield significantly greater benefits. In particular, public transport priority and bicycle measures are increasingly effective at larger scale.

OPIUM recommended a number of areas for further research, particularly in relation to public consultation and the evaluation of user needs.

**PATS:*****KEY RESULTS*****Pricing  
acceptability in the  
transport sector**

The goal of PATS was to identify the reasons for acceptance/non-acceptance of new forms of transport pricing, to find ways of increasing their acceptability, and to identify the legal and political barriers to the implementation of new pricing schemes.

A variety of survey techniques were used to study the perspectives of around 1500 people across six Member States, covering policy-makers, citizens, transport operators and other stakeholders. Important conclusions from these surveys were as follows:

**Project acronym  
and title****Key results and policy implications**

- The objectives behind pricing measures must be clear and reasonable to those affected by the measures. For this reason, *new* types of measures should be preceded by awareness raising campaigns on the targeted problem and the effectiveness of the proposed measures.
- In order to make new or higher charges acceptable, the price should be seen to relate to the real (e.g. environmental) costs of transport. For example, users favour differentiating charges with respect to time and pollution. (However, it is not *universally* true that this will benefit collective modes of transport.)
- Pricing measures need to be perceived as effective in solving transport-related problems – for instance based on evidence from pilot applications.
- The transparent use of revenues raised by pricing measures is essential in securing acceptability. In general, the paying users want to see that revenues are used in the transport sector, especially to cross-subsidise public transport (although this may not be appropriate from an *economic* viewpoint). There is strong opposition to using the revenues outside transport.
- Protection of privacy is a necessary precondition for an acceptable pricing scheme.
- Pricing measures should be introduced in a stepwise way, avoiding price shocks. Compensation measures should be considered for disadvantaged groups.
- There are widespread suspicions of governments' motives for increasing prices, and a widespread belief that transport is already too heavily taxed.
- The authority chosen to run a pricing scheme should be seen as capable, trustworthy and accountable, with the power to integrate pricing with other policies to tackle transport problems.

**POLICY IMPLICATIONS**

PATS made a series of policy recommendations:

- Ideally, the introduction of new or higher prices should be preceded by or done in parallel with measures that will provide a better service, ideally with some *guarantee* of the higher levels of service.
- Even with an increase in quality, the introduction of pricing may be perceived as contributing to the exclusion of less affluent members of society. A possible non-distorting method of compensation is the allocation of a free ration of consumption (although this requires a more complex system of control).
- If there is no *direct* added value to users from higher prices, acceptability is harder, but may be improved by a transfer from fixed to variable components of price.
- Pricing should discriminate between vehicles according to the costs they impose, with the same principles being applied to all regions but taking account of variations in e.g. traffic and population density.
- Stakeholder involvement is needed in the policy decision-making process, varying according to the local political and cultural context.
- Transparency in handling the revenues is vital for public acceptability.

The variations between Member States in methods for evaluating costs and prices were noted as raising problems for acceptability, owing to the effects on market competition – harmonisation of methods across Europe would be valuable in this respect.

Sophisticated technical systems are expected to play an important role in the application of new pricing principles, for instance in road pricing. However, concerns over privacy are often raised in opposition. The evidence from PATS suggests that, provided conditions are set to guarantee privacy, this issue does not appear to be a show-stopping obstacle for users.

**PROJECT WEB-PAGE:** <http://www.tis.pt/proj/pats/pats.html>

**Project acronym  
and title****Key results and policy implications****PIRATE:****KEY RESULTS****Promoting  
interchange  
rationale  
accessibility and  
transfer efficiency**

PIRATE analysed a sample of European interchanges to assess the extent and efficiency with which the needs of the various stakeholders are actually being met, and then developed and tested an innovative approach to defining and providing for those needs. This approach would directly involve stakeholders in the improvement or redevelopment of interchanges.

A gap analysis revealed the perceptions of various stakeholder groups towards the importance and performance of all aspects and features of an interchange. The views of four groups were considered:

- people involved in the planning and construction of interchanges;
- people who work in an interchange (including managers, vehicle drivers and subcontractor service staff);
- people who use an interchange for travel, shopping or social purposes, categorised as
  - walk and ride users
  - park and ride / kiss and ride users
  - bike and ride users
  - ride and ride between the same or different public transport modes;
- people who are non users or potential users.

The analysis showed general agreement at all sites and across all stakeholder groups about the high importance of safety/security, information and car parking. However, infrastructure design experts emphasised the aspects of layout, location and the quality of connections, while users had more uniform concerns across all characteristics of interchanges, with preference for comfort and safety issues. Certain characteristics - surveillance, toilets, traffic and travel information, cleanliness and security against theft and vandalism - were perceived to perform poorly at a number of sites.

PIRATE then developed an innovative "planning approach", in which the users and non-users are involved in the process of planning new or improved facilities.

Application of the "planning approach" again showed significant differences between the priorities of infrastructure designers and users. The divergences are greater on matters of design, location and internal layout of the interchange than on security and operational matters. However, effective solutions to these design issues should be achievable through consultation processes.

PIRATE has produced a handbook in hard copy and CD-ROM format detailing the planning methods and the case study results.

**POLICY IMPLICATIONS**

PIRATE has demonstrated the potential for more efficient and successful development of public transport interchanges by involving various stakeholder groups in the design processes, and has developed a cost-effective method of user research to assist the providers of interchanges in improving their services.

**PROJECT WEB PAGE:** <http://www.interchanges.co.uk/>

**Project acronym and title****PRIMA:****Pricing measures acceptance****Key results and policy implications****KEY RESULTS**

The objectives for PRIMA were to identify the reasons behind the acceptance or non-acceptance of road pricing and to produce recommendations for the implementation of urban road pricing in Europe.

PRIMA provided a databank of results from public surveys and interviews with stakeholders, leading local politicians and experts. Data were collected from 500 citizens and 30 interviews in each of eight urban regions in autumn 1999. From this stock of information, a three-stage decision process was developed. This process can be adapted to local situations to support any city that considers introducing road-pricing schemes. It not only concerns the schemes themselves, but also the design of the public decision-making process in the run-up to their introduction.

The interviews and public surveys identified the following key results:

- Acceptance depends on stakeholders perceiving that there are severe and urgent traffic problems and that pricing is an effective part of the solution.
- Acceptance requires alternative modes of transport to be available. For example, investment in public transport should accompany the introduction of pricing.
- Charges should start low, and compensating measures should be considered for social groups that are disadvantaged by the pricing scheme.
- The introduction of road pricing should be done in a stepwise manner to allow gradual adjustment. For example, a financing toll system may form the starting point, as this is more readily accepted than congestion charging.
- The initiative to introduce road pricing should (be seen to) come from the urban area. In addition, national legislation will have to be changed in many countries, and financial support from the national government may be needed to ease the change in costs for car users.
- Acceptance requires public participation in the decision making process. The starting point must be open discussion of traffic problems and the objectives for urban transport policy.
- The success of earlier road pricing schemes influences acceptance. Therefore the dissemination of results between cities is important.
- The increased use of information technologies and electronic payment systems in other applications is expected to improve acceptance of the technologies needed for efficient road pricing. The privacy issues linked to road pricing do not seem to have an important negative influence.
- Acceptance from a majority of citizens cannot be expected from the outset. Experiences from several cities show that acceptance tends to increase after the implementation, but this is quite sensitive to the level of charges.

**POLICY IMPLICATIONS**

PRIMA found that, in general, public opinion is against congestion charging, although the polluter pays principle is broadly accepted as a general guideline for policy making. On the other hand, there is considerable support for road pricing as a way to finance investment in transport. This includes the funding of public transport and the construction of road bypasses, with some preference for the former. Therefore implementation of road tolls can be a stepping stone to raising acceptance for congestion charging.

At the time of the project, the law in some Member States did not provide for the implementation of road pricing. It was legal in other countries as long as the pricing scheme was related to the financing of new roads. However, congestion charging would need changes in legislation.

**Project acronym and title****Key results and policy implications**

**PROJECT WEB PAGE:** <http://www.certu.fr/internat/peuro/prima/prima.htm>

**PRIVILEGE:****KEY RESULTS****Priority for vehicles of essential user groups in urban environments**

PRIVILEGE has defined 'default' levels of priority to be accorded to different road user groups when they are competing for road space in congested urban areas. It is recognized, however, that cities will need to adjust these weights according to local conditions. Public transport commonly receives the highest priority in the cities studied.

A catalogue has been provided covering 31 individual measures for urban road traffic priority management. This includes implications for fleet management, information management, enforcement and integration into the existing system. Skeleton plans for the introduction of various packages of measures have been devised. Specific city case studies have been developed, showing how a package of measures can be tailored to a given situation.

The potential impacts of the various measures have been characterised, and implementation issues described. Critical local conditions and obstacles were identified. All of this information is provided in a structured format as a guide to local authorities considering prioritising certain user groups.

**POLICY IMPLICATIONS**

In order to prioritise the use of the existing road network, regulations have to be considered which result in restrictions in general road use. Thus, this is essentially a political issue, depending in part on social acceptance.

For a number of measures, the legal framework has not yet been put in place. This situation varies from country to country. Certain measures may, therefore, require legislative amendments (to remove barriers) or new local regulations before they can be implemented effectively.

As a result of interviews with local transport policy-makers and practitioners, PRIVILEGE also found wide variations in the political and social acceptability of the various measures, including differences between countries. In all cases, public awareness campaigns to inform drivers and residents about the benefits of such schemes were found to be essential.

**PROMISING:****KEY RESULTS****Promotion of mobility and safety of vulnerable road users**

PROMISING has:

- presented an overview of current legislation regarding walking, cycling and the use of powered two-wheelers with respect to traffic regulations, infrastructure design standards and legal limitations to vehicle use for young drivers and riders;
- highlighted best practice examples of innovative traffic concepts from Sweden and the Netherlands that aim to increase the safety of vulnerable road users;
- summarised design criteria for roads and traffic management schemes based on a knowledge of the specific mobility needs of pedestrians and cyclists;
- performed cost-benefit analyses for a set of twenty infrastructure (design) and organisational measures, ranging from roundabout design, upgrading of pedestrian crossings, design of dedicated bicycle lanes to e.g. the daytime use of lights on vehicles;
- outlined an implementation strategy that aims at a better balance between the

**Project acronym and title****Key results and policy implications**

interests of different road users, improved co-operation between local and national traffic authorities, and direct involvement of road users in planning and design processes.

***POLICY IMPLICATIONS***

A future, more mode-specific transport policy, addressing the particular requirements of pedestrians and cyclists, will have to come up with a set of practical criteria for traffic flow management, right of way regulations and other safety improvements for vulnerable road users. Cost-benefit analyses, evaluating improvements from the perspective of walkers and cyclists, are needed to avoid further bias towards the dominating motorised traffic.

**RHEA:*****KEY RESULTS*****Role of the human in the evolution of ATM systems**

RHEA aimed to provide automation strategies to systematically guide the decision process for automating functions in an ATM system that can accommodate growth in air traffic, while at the same time maintaining (or even enhancing) safety and efficiency levels and giving the air traffic controllers a satisfying job.

RHEA has produced:

- a review of 20 ATM studies, relevant to the project context, accompanied by a literature survey to identify information sources about automation in ATM, leading to a list of 14 key references;
- an overview of conclusions from literature surveys, such as the operational success of Human Machine Interface (HMI) enhancements and machine aided evaluation, the current testing of co-operative tools and dynamic allocation, and the finding that complete automation happens to fail before complete simulation does;
- a classified list of evaluation methods and techniques, targeting the work allocation between humans and machines, with outlined criteria such as safety, workload, usability, performance, situational awareness, knowledge use and complexity;
- a presentation of 17 ATM scenarios and test situations considering cognitive activities like communication, monitoring, planning, decision-making and negotiation;
- an evaluation of 7 selected automation concepts that address the man/machine interface in Air Traffic Control (ATC): controller as supervisor, machine proposal strategy, machine-aided evaluation, dynamic allocation with human delegation, dynamic allocation with machine delegation, dynamic aircraft delegation and cognitive (assistance) tools, which have been found most promising for several ATC environments;
- requirements for automation of ATM, reflecting automation related issues and basic controller functions.

***POLICY IMPLICATIONS***

The project's results have provided a framework on ATM automation allowing for predictions about the achievable success when implementing particular automation concepts. Further validation of the RHEA framework on the evaluation of automation concepts is necessary. A real time simulation of the four most promising automation concepts – cognitive tools, dynamic allocation with human delegation, machine-aided evaluation, and machine proposal – is recommended. Fast time simulations could be carried out as well in order to gain more accurate information about the most promising ATM automation concepts.

**Project acronym  
and title****Key results and policy implications****SOFTICE:****KEY RESULTS****Survey on freight  
transport  
including cost  
comparison for  
Europe**

SOFTICE had two main goals:

- to identify the factors affecting road freight costs and their interaction with production costs and demand;
- to identify the consequences of different policies for taxation on the freight market.

Survey results showed that drivers' wages are the largest single cost factor (especially for collection/distribution operations), and fuel is the next largest factor (especially in long distance haulage). These factors vary substantially between countries. Total tax costs also vary between countries, ranging from 10% to 25% of the total operating cost of long haulage trucks. For 100km distance, EU prices are between 3 and 8 times higher than in Eastern European countries, but prices are closer for long distance freight. Typically, transport costs account for around 3% of the total costs of industrial production, but with significant variations by industry sector.

Shippers were asked about the expected effects of a reduction in the allowable number of working hours. Less than 10% suggested lower demand and/or modal shift, while around 60% foresaw only cost increases. Case studies suggested that systematic violation of traffic rules could reduce costs per tonne-kilometre by up to 30-40% in some countries.

Feedback from shippers indicated, when faced with policy changes or traffic problems, they are more willing to consider measures like increasing transport prices or changing shipping times than anything to do with modal transfer. The unwillingness to change mode is largely attributed to bad experience with other transport modes, no matter whether that experience has been directly suffered or just reported by other companies.

**POLICY IMPLICATIONS**

The analysis of cost factors shows different levels of cost-competitiveness between Member States – but the underlying reasons for this require further study. Uniform changes in taxation across the EU would penalise those countries where the tax burden is already relatively high.

Harmonising the enforcement of regulations such as driving hours, speed limits and maximum loads is important in ensuring fair competition in the EU internal market. In addition, safety and CO<sub>2</sub> improvements would arise.

On average, a 10% increase in total taxation would increase the operating cost of long distance hauliers in the EU by 1.7%. However, the diversity and adaptability of road freight operations generally makes it difficult to produce quantitative estimates of reactions to policy.

SOFTICE found that internalisation of external costs of road transport (environmental damage, infrastructure costs) is increasingly considered as a fair principle and an effective means of fighting congestion. However, the expected magnitude of price increases in inter-urban transport is not such that it will cause major modal transfers – and there is a lack of non-road alternatives for urban freight.

More generally, the project concluded that the application of intensive policy measures to “push” freight off the roads, for example through higher taxation, is insufficient to achieve significant changes in modal split. A strong improvement in efficiency and

**Project acronym and title****Key results and policy implications**

quality from other modes is necessary in parallel for shippers to consider the scale of modal transfers thought desirable to meet policy goals. This implies changes such as liberalisation of access to the railways. SME's are particularly reluctant to change mode.

**SONERAIL:****KEY RESULTS****Socially necessary railways**

SONERAIL defined a socially necessary rail service as one with a positive net social value, taking into account the social benefits and costs for users and non-users of the service. This includes aspects such as changes in congestion, environmental impacts and travel time. The definition is independent of whether the service is financially loss making or not, although only loss-making services would be considered as candidates for subsidy.

The project devised a two-stage method (in the form of a prototype software tool) for evaluating services that have (previously) been identified as financially unprofitable:

- First a cost-benefit analysis is used to calculate the net social benefit. This covers only those impacts that can be quantified in monetary terms. The output is a list of services deemed socially necessary.
- A multi-criteria analysis is then used to prioritise the candidate services within the overall budget for subsidies (assumed to be fixed). This analysis takes into account further impacts that cannot be expressed in monetary terms, such as stress levels, vibration and economic regeneration.

The evaluation methodology was tested on case studies of 25 rail services across Europe (in the UK, The Netherlands, Germany, Greece, Italy and the Czech Republic). Annual net benefits ranged from -4 to +5 million Euros, with 15 of the services appearing to be socially profitable. For each of the services, action plans were devised aimed at increasing patronage, decreasing costs and encouraging a shift from car travel.

SONERAIL also considered the likely impact of current railway policy initiatives designed to increase efficiency and competition. Although costs may decrease overall, this may not improve significantly the position of socially necessary services. For example, the approach adopted in charging for infrastructure could be critical to the financial viability of marginal services.

**POLICY IMPLICATIONS**

The evaluation methodology is designed for use by national funding authorities, rail operators and the European Commission. The case study work showed that the methodology is suitable to assess the social benefits and costs associated with rail service closure or retention. The required input data generally exist, although confidentiality issues may create problems with access. Further work would be needed to develop the methodology into a full-scale application tool. More broadly, further research is needed on the valuation of noise and non-monetary impacts.

The methodology is well suited to *screening* the candidates for subsidy. A more detailed analysis of net social benefit may be required subsequently, taking account of additional factors such as the possible infrastructure cost savings from rail service closure, and the results of site-specific modelling and surveys of consequences for road traffic (such as changes in congestion).

**Project acronym and title**

TENASSESS:

**Policy assessment of TEN and Common Transport Policy****Key results and policy implications****KEY RESULTS**

TENASSESS had two main objectives:

- to characterise policy processes and identify implications for decision-making on the Trans-European Transport Networks (TEN-T) and the Common Transport Policy (CTP);
- to develop and test decision support tools.

TENASSESS found that many of the problems with CTP development relate to the variation in policy processes between Member States. The following aspects have specific importance:

- the distribution of responsibility between national and lower levels;
- the extent of master planning and evaluation frameworks for transport;
- the degree of stakeholder (including public) involvement in decision processes.

This leads particularly to conflicts over the relative role of European, national, regional and local levels, the trade-off between economic and environmental objectives, and the rate of deregulation and restructuring of the transport market.

A policy assessment model has been developed for assessing the effectiveness of different policy measures and projects against CTP objectives. The model helps users to make explicit the extent to which an option fulfils stated objectives, and the influence of wider socio-political considerations on an otherwise “objective” decision. The critical feature is a transparent weighting system that shows how different decision-makers rate specific policy objectives and project impacts. The model has been tested and refined on a series of case studies.

Another software tool has been developed to help anticipate barriers in the *implementation* of transport infrastructure projects and policy initiatives. Through interactive gaming, the user is able to understand where to concentrate efforts to deal with likely problems. The analytical model was based on case study evidence and then tested on further case studies to show that it is robust.

**POLICY IMPLICATIONS**

TENASSESS concluded that the goal of sustainable mobility requires a more integrated approach to transport policy. This can only be realised by organisational reforms – the responsibilities of different political levels need to be clarified, and stronger procedures introduced for strategic co-ordination.

A clearer distinction is needed between policy plans and infrastructure plans. Policy plans should be enhanced to include measurable objectives and performance indicators. Infrastructure plans should show a closer consideration of strategic policy goals, e.g. through the process of Strategic Environmental Assessment. The links between national and European policy plans should be made explicit, so that variations in national strategies can be understood and co-ordinated where appropriate.

Mechanisms should be established to make effective the participation of citizens in decision processes on transport policy. Information dissemination and project-specific public enquiries are insufficient to build trust in radical changes. Communication with the public should be entrusted to an organisation that is not involved in the decision process.

Many of the barriers in TEN-T and CTP implementation have emerged in the area of financing. TENASSESS recommended that the evaluation of costs and benefits of different options should be separated from the question of how to arrange the funding.

**Project acronym and title****Key results and policy implications**

Nevertheless the expert appraisal of projects should address these issues in parallel, with input from potential financiers. Where partnerships emerge to share the financial burden, the sharing of risk should be specified alongside the sharing of costs.

**THALASSES:**

*The final results of this project were not available when this Thematic Paper was prepared.*

**Evaluation of the impacts of new technologies in maritime transport on the human element****TRANSPRICE:****KEY RESULTS****Trans modal integrated urban transport pricing for optimum modal split**

TRANSPRICE assessed pricing strategies that are co-ordinated across the modes, identifying effects on modal split and public acceptance.

User surveys in eight cities showed that public acceptability of *isolated* pricing measures is low. This can increase substantially when pricing is presented as the cornerstone of a package of measures that include revenue allocation to public transport investments and non-motorised modes. Hypothecation of road use pricing revenues is also becoming more acceptable to politicians.

Demonstrations and modelling work in five cities showed that road use pricing is an effective way of changing modal split from private car to public transport and Park & Ride, giving city centre traffic reductions of 5-25% (for charge levels of 1-3 EUR). Cordon pricing is particularly effective when applied to congested central areas and over peak periods (reducing car trips by up to 25%). Pricing of parking is also effective in restraining car trips, provided enforcement can be maximised. It works best as an accompanying measure rather than in isolation.

Integrated ticketing and smartcard integrated payment systems have a small impact on modal split on their own (especially for Park & Ride), but more importantly support trans-modal pricing measures. Pricing of High Occupancy Vehicle lanes has a marginal impact on modal split, and seems applicable in special cases only (such as severe congestion).

Various forms of road use pricing were assessed to be the most promising approach, followed by cordon pricing, in a multi-criteria evaluation across a range of policy objectives.

**POLICY IMPLICATIONS**

Transport pricing has potential for yielding significant changes in urban modal split towards public transport, Park & Ride and non-motorised modes, as well as providing substantial revenues.

TRANSPRICE concluded that road use pricing should be considered when parking pricing measures alone have been found to have exhausted their effectiveness. Road use pricing should be promoted as part of a package of demand management measures, with hypothecation of revenues towards local transport and environmental improvements. This would substantially increase the potential public acceptability, as well as helping to overcome the resource problems that face demand management investments.

**Project acronym and title****Key results and policy implications****VIRGIL:****KEY RESULTS****Verifying and strengthening rural access to transport services**

The project objectives were to inventory and assess existing and past experiences on rural access to transport in several European countries.

A database containing past and present experiences on rural access to transport has been developed and can be consulted on the project's web site. The database includes a total of 134 books and articles and over 100 case studies, providing an extensive overview of rural transport systems in Europe.

Twenty-eight case studies (both passenger and freight transport) were analysed in depth with regard to: i) resource inputs and service delivery outputs, ii) legal base and preconditions for operation, iii) use of telematics, iv) experience with integrated passenger and freight transport. A Good Practice Guide targeted at rural communities presents 12 different transport schemes providing innovative rural services across Europe.

A report on future research needs has been prepared, based on extensive consultation with key stakeholders and validated during an international seminar. The report addresses several topics, including the integration of local services, the licensing environment for demand responsive services, the institutional and legal barriers, and the role of telematics.

**POLICY IMPLICATIONS**

Improving rural transport services is part of a development and wealth redistribution policy. On the development side, the policy gives traditionally isolated areas potential mobility not dependent on the private vehicle. With respect to wealth redistribution, the policy favours public transport "captives" and "poor" demand segments, such as elderly people and young people. VIRGIL has highlighted problems of rural transport and ideas to improve it, providing a Europe-wide overview. The project's results are of immediate interest both for the local/regional/national authorities promoting rural transport and for the operators providing such services.

The project specifically highlights the tremendous possibilities that ICTs offer in improving rural transport. The need for telematics is largely dependent on the need for flexibility of rural transport. The deployment of telematics in rural transport is still relatively new and most countries have little experience. Comprehensive research is needed into the viability and operational characteristics of using ICTs in integrated ticketing (e.g. multi-purpose contactless smart cards), pre-booking, real-time passenger information and route-planning systems. The research should not focus on developing new, high-technology tools, but should concentrate on the adaptation of already existing telematic tools. Experience from the VIRGIL project has shown that, compared to urban transport, simpler and lighter software systems could be in place for the needs of rural transport.

Rural services carrying both goods and passengers can provide environmental benefits due to better capacity utilisation, economical benefits for providers and users, and an image gain for the region by focusing on environmentally sensitive tourism. There is only a limited experience with such services in most European countries, but VIRGIL proposed that such a possibility should be researched. The main issues in preventing the integration of freight and passenger transport are the legislative barriers (e.g. in Italy).

**PROJECT WEB PAGE:** <http://www.bealtaine.ie/virgil>

**Project acronym  
and title****Key results and policy implications****WALCYNG:****KEY RESULTS**

**How to enhance walking and cycling instead of shorter car trips and make these modes safer**

WALCYNG has produced an evaluation tool to show how walking and cycling can be promoted as an alternative to short car trips. This interactive software is intended for use by city authorities in assessing the preconditions for walking and cycling in a certain area, and as a support when developing measures. It provides:

- an inventory of solutions;
- a structured checklist of all relevant aspects to be considered;
- practical guidance on implementation, with examples of successful initiatives;
- advice on how to motivate change.

The project has provided practical support for stakeholders seeking change, such as:

- incentive and communication strategies;
- briefings and counter-arguments to assist proponents of walking and cycling in meeting the anticipated barriers/opposition;
- advice on lobbying – which is particularly important given that pedestrians currently lack an organised lobbying movement.

In a survey of European cities, the most common measures were found to be the extension and improvement of pedestrian areas and bicycle lanes.

**POLICY IMPLICATIONS**

The promotion of walking and cycling primarily requires policy action. Parking restrictions in inner city areas and improvements in public transport are commonly seen as important. Infrastructure measures to improve facilities for walking and cycling are also emphasised by city planners, together with public relations measures such as providing maps of the bicycle network and communicating the availability of new facilities.

Three incentive strategies are proposed by WALCYNG:

- incentives such as tax reductions for employers to establish mobility management plans for their employees;
- incentives for the general public, such as Car Free Days and reduced entry fees;
- direct incentives to employees, such as taxation of parking spaces.

A particular policy concern would be the increase in accidents if walking and cycling were promoted without corresponding action to enhance safety levels for walkers and cyclists. One of the most important measures recommended is to ensure a maximum speed of 30 kph on streets where walkers and cyclists are present.

The project recommended public support for pilot and demonstration projects, particularly to assess integrated packages of measures. Co-operation with big companies and institutions would be important here.

**WORKFRET:****KEY RESULTS**

**Working cultures in the face of intermodal freight transport systems**

WORKFRET has:

- reviewed working cultures and organisational and management structures in current European (intermodal) freight transport;
- assessed the impacts of new technologies in freight transport on the number of employed workers, their working conditions, the quality of jobs (e.g. a shift to more high skill jobs), the time pressure dictated by efficiency considerations and

**Project acronym  
and title****Key results and policy implications**

- the membership to trade unions;
- highlighted new logistics and production systems – with respect to reliability, integration, flexibility and cost reduction – and their impacts on working cultures;
  - produced a ranking of ten key issues in the development of freight transport systems;
  - analysed five national case studies for the implementation of specific technological and/or organisational developments;
  - identified twelve policy areas addressing the barriers faced by intermodal developments, namely: the size of the freight sector work force, labour regulations, payment; social security, education and training, health and work safety, recruiting, organisational structures, behavioural codes, bargaining, employee and trade union involvement, and the general promotion of intermodal transport;
  - derived a set of ten policy suggestions based on the identified problem areas and policy fields.

***POLICY IMPLICATIONS***

Based on the outlined topics for policy action and the suggestions derived, the implementation of measures needs to be specified in further research studies, in particular focusing on the social impacts of organisational and operational changes in the freight transport sector.

**WORKPORT:**

*The final results of this project were not available when this Thematic Paper was prepared.*

**Work organisation  
in ports**