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**KoSULT – developing an international knowledgebase on urban  
transport policy instruments**

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**Abstract**

This paper describes an international collaborative research project aimed at establishing and maintaining a web-based international knowledgebase on urban transport policy instruments (KonSULT). KonSULT will provide an up to date compendium of the understanding of the performance of each of some 70 policy instruments, based on experience gained throughout the developed world. Later developments are intended to incorporate experience in developing countries. The architecture adopted for KonSULT is designed to encourage contributions from those with experience of specific policy instruments internationally, while the management of its development will ensure that the data incorporated maintains high quality. KonSULT will be of benefit to transport professionals in developing urban transport strategies and in selecting, designing and implementing specific instruments. It will assist politicians and other decision-makers, as well as community organisations and other interest groups, in understanding the role and potential of different instruments. It will provide a key source for those involved in transport research and teaching. Through these applications, it should contribute significantly to the achievement of urban transport policy objectives of reduced congestion; an enhanced environment; greater safety; improved public health; better access; fairer opportunities; improved quality of life and increased sustainability.

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## **Introduction**

A new international collaborative research project, led by the University of Leeds with inputs from Australia, Canada, Japan, the USA, the UK and several other EU countries seeks to establish and maintain a web-based international knowledgebase on urban transport policy instruments, known as KonSULT (*Knowledgebase on Sustainable Urban Land use and Transport*). The project forms an integral part of the initial activities of the new Special Interest GROUP SIG-10 ('Transport Policy') established by the World Conference on Transport Research (WCTR) held in Seoul in July 2001.

Eventually KonSULT will provide a compendium on the understanding of the performance of each of some 70 policy instruments already identified, based on objective assessment of experience gained throughout the developed world. Later developments are intended to incorporate experience in developing countries. The structure of the knowledgebase will enable the contribution of a given instrument in different contexts to be assessed, and the opportunities for integration of policy instruments to be identified. The architecture adopted for KonSULT is designed to encourage contributions from those with experience of specific policy instruments internationally, while the management of its development will ensure that the data incorporated maintains high quality.

The first stage of the international research project is to set up the knowledgebase at Levels 0, 1 and 2. Two specific instruments, 'road pricing' and 'light rail' have been fully developed at Level 2, as examples. Level 3 will be developed subsequently. With the collaboration of the well-known international publisher Elsevier Science, the prototype version of KonSULT may be accessed via Elsevier's 'transport connect' website, [www.transportconnect.net](http://www.transportconnect.net).

An international workshop held at Leeds in July 2002 and organised under the WCTR SIG-10 banner planned the future development of the knowledgebase. The paper describes the development of the knowledgebase, the selection of information and case studies for inclusion in it, and the synthesis of instruments and packages of instruments that are possible with it. Needs and plans for further extensions of KonSULT will also be discussed.

## **Aims and objectives**

The broad aim of the KonSULT project is to produce, in electronic form, a knowledgebase on urban transport policy instruments that provide up to date information on the performance of a wide range of urban transport policy instruments. KonSULT should contribute significantly to the achievement internationally of urban transport policy objectives of reduced congestion, enhanced environmental quality, improved safety and security, better accessibility, more equitable distribution of opportunities, improved quality of life and increased sustainability.

The knowledgebase will be of benefit to transport professionals in developing urban transport strategies and in selecting, designing and implementing specific instruments. It will assist politicians and other decision-makers, as well as community organisations and other interest groups, in understanding the role and potential of different instruments. It will also provide a key source for those involved in transport research and teaching.

The specific objectives for KonSULT include:

- the description of each policy measure, including the use of multimedia images of operation where appropriate
- the assessment of each policy measure against a common set of potential objectives of urban transport policy
- the representation of each policy measure by case studies representing good practice in their use.

In addition, wherever possible an assessment will be made of the contexts in which each policy measure performs best.

Links should be provided between the policy instruments so that opportunities can be identified for integrating them to achieve enhanced performance against the objectives.

## **Background**

There are some 80 types of land use and transport policy instrument in use in urban areas (May, Matthews and Jarvi-Nykanen, 2001; May, 2001). All are designed to help meet the objectives of urban transport policy, which can include sustainability, economic efficiency, livable streets, protection of the environment, equity and social inclusion, safety, and contribution to economic growth. These policy instruments can be categorised in several ways, and include land use instruments; attitudinal and behavioural instruments; provision of new infrastructure; better management of that infrastructure, including improved service provision; applications of information technology; and pricing instruments. A list of potential instruments is provided in the Appendix.

The performance of each instrument can be expected to differ depending on the size and density of the urban area, the area covered by the measure, the intensity with which it is applied, and the cultural, political and legislative context within which it is implemented. Performance will also depend on the other instruments with which it is combined in an overall strategy. Past research and practice suggest that integration of policy instruments works best where instruments complement and reinforce one another; and where one measure offsets any adverse impacts of another; increases its acceptability; or generates finance to enable its implementation (May and Roberts, 1995).

There is clear evidence from around the world that city authorities need improved advice on the appropriateness of individual policy instruments, and combinations of such instruments, to their particular circumstances. ECMT and

OECD are currently updating their general guidance on Urban Transport and Sustainability (ECMT, 1995), and the World Bank is updating its Urban Transport Policy (World Bank, 1986; World Bank, 1999). In Europe the EU has commissioned the PROSPECTS project, to provide guidance on land use and transport policy decision-making for European cities (May, Matthews and Jarvi-Nykanen, 2001), as part of a wider program of research into land use, transport and urban sustainability.

Unfortunately, for the majority of policy instruments, there is an absence of clear and consistent evidence of their performance in different contexts. For some, such as fares policy (Webster and Bly, 1980) and bus priorities (NATO, 1976) there are long standing reference sources which are still used. The former is about to be updated and the results will be incorporated into KonSULT when available. For others, such as Intelligent Transport Systems (ITS) (e.g. ERTICO, 1998; Austroads, 1999), awareness campaigns (e.g. Jones et al, 1998; Taylor and Ampt, 2002) and land use instruments (e.g. Taylor, Hamnett, Xu and Page, 2002), there are more recent reviews. But in general the evidence is widely dispersed in journal articles and consultancy reports, and their evaluation is frequently incomplete and occasionally subjective.

There have been some past attempts to provide overviews for part or all of the subject area. In the UK, the Institution of Highways and Transportation produced Guidelines on the Development of Urban Transport Strategies (IHT, 1996) which included a brief description and assessment of policy instruments against a common set of objectives. That summary was subsequently updated (May and Still, 2000), and incorporated into PROSPECTS. Developments in Australia include the consideration of urban transport policy instruments by the Australian Academy of Technological Sciences and Engineering (AATSE) in its review of urban air pollution (AATSE, 1997), and the Austroads 'Cities for Tomorrow' (Westerman, 1999) and 'Travel Demand Management' (Steer Davies Gleave, 2002) projects. Initiatives elsewhere include a Japanese prototype diagnostic and prescription system for environmental instruments in developing cities (Nakamura, 1999) and, in Canada, the online Transport Demand Management Encyclopedia developed by the Victoria Transport Policy Institute (VTPI) (VTPI, 2000). The last apart, all are in text form and thus risk rapidly become outdated.

The KonSULT knowledgebase will incorporate relevant material from all of these sources, and will draw on the best practice in their design. It will be disseminated as part of the output of PROSPECTS, and links are being maintained with the work of ECMT, OECD and the World Bank, so that it can be made available as appropriate through these channels.

## **Format and architecture**

KonSULT is expressly designed to be internet-based. This simplifies updating and external contributions, while still allowing access to be controlled, charged for and monitored. [Access to the current KonSULT website is free in 2002 but will be by subscription in the longer term.] This is important to ensure that the quality of the Knowledgebase is maintained, and that there is an income stream to finance its maintenance. A data entry system will be developed. A secondary alternative of a CD-ROM version was also considered. This would be rather less flexible to update, and more expensive to administer, but would permit higher quality graphics. Ways of incorporating the benefits of a CD-ROM format are being explored.

The design of the KonSULT architecture was a key first step in its development. Several examples of possible architectures have also been offered, including 'Cities for Tomorrow' (Westerman, 1999), the Diagnosis and Prescription System for developing countries currently under development in Japan (Nakamura, 1999), ITS Berkeley's PATH database on Intelligent Transport Systems and VTPI's Transport Demand Management Encyclopedia (VTPI, 2000). The architecture needs to be flexible, to allow linkages between different types of measure, opportunities for complementarity and integration, and contributions to different types of objective to be readily identified. The prototype design is indicated in Figure 1.

## **Structure**

The prototype KonSULT knowledgebase has four levels of information.

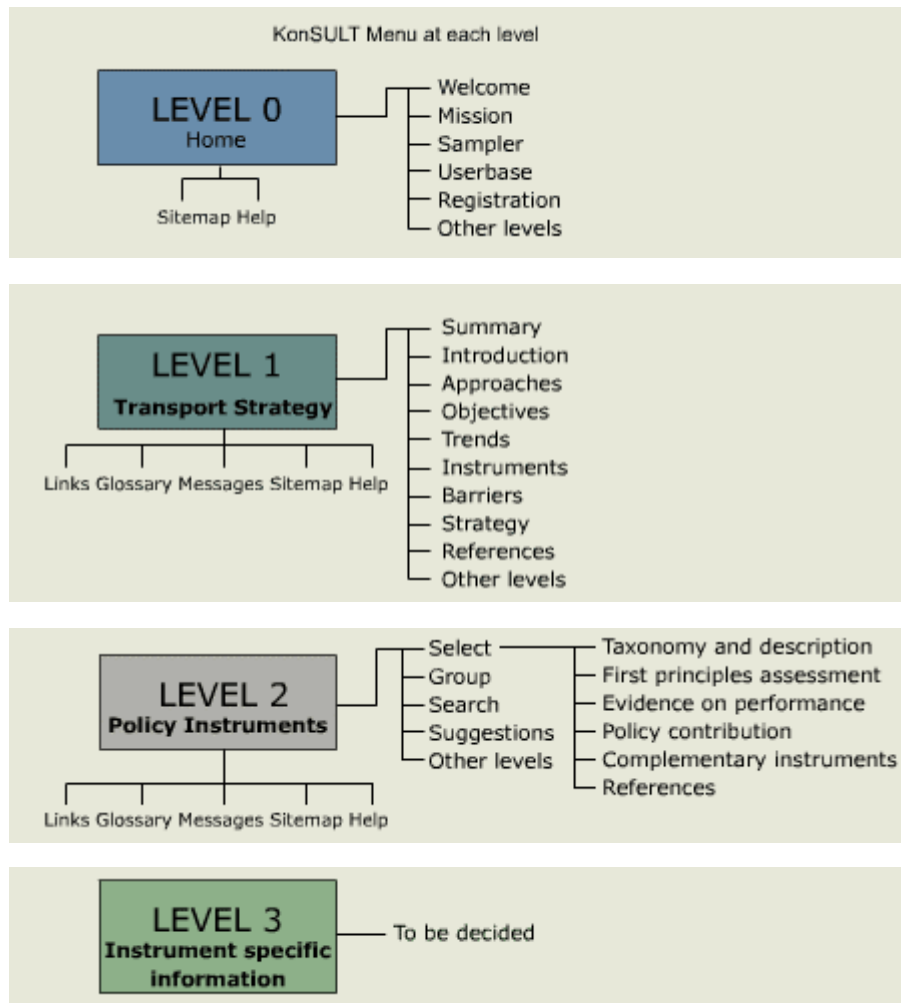
### **Level 0**

This level is dedicated to general introductory material. In addition, it provides access to a comprehensive glossary of terms, designed to encourage consistency of terminology.

### **Level 1**

Level 1 includes material on approaches to urban transport strategy development, related policy objectives and instruments, past trends and future scenarios, approaches to the assessment of individual instruments, barriers to implementation, and ways of developing an integrated strategy.

**Figure 1 KonSULT knowledgebase site map**



## Level 2

Level 2 includes specific material for individual policy instruments, with detailed appraisal of the nature of the measure, a first principles assessment, evidence on its performance, its contribution to objectives and problems, and an identification of complementary instruments. About 70 instruments will be included when KonSULT is fully developed, with 40 measures included by the end of 2002. Currently ten instruments are described at level 2:

1. land use development densities and mix
2. individualised marketing to reduce car use
3. flexible working hours
4. car clubs
5. ride sharing
6. new railway stations
7. light rail systems
8. guided bus systems
9. regulatory restrictions on infrastructure usage
10. urban road charging, including area licensing and road pricing

These provide examples of the intended descriptive form and content of the knowledgebase.

### Level 3

Level 3 will provide similar information on packages of instruments and integrated transport strategy applications. It will be developed at a later stage in the project.

### **Staged development**

The production of such a knowledgebase is a substantial task, and there is a danger that it will take too long to produce something of benefit to users. This is being addressed by proceeding in three stages, as follows.

Stage 1, which was completed in 2001, was the prototype stage. It was supported by the UK Engineering and Physical Sciences Research Council (EPSRC). It involved design of the format, architecture and structure of the Knowledgebase, agreement on the list of policy instruments to be included, and development of two prototypes for the coverage of specific instruments, primarily to enable comments to be provided on the concept and detailed design. These prototype instruments were 'urban road space charging' and 'light rail systems'. Urban road space charging was developed in-house at the University of Leeds, while light rail was developed under contract by Professor Roger Mackett of University College London. This dual development also allows these two alternative development routes to be compared. The material developed for these two prototypes can be found in Level 2 (see Figure 1) of the knowledgebase, at [www.transportconnect.net](http://www.transportconnect.net).

Stage 2 involves the incorporation of as many instruments as can be included within a 12 month period (beginning January 2002), so that a useable, if incomplete, knowledgebase can be disseminated widely and advice sought on its usefulness and on gaps in its coverage.

Stage 3 involves modification of the structure as appropriate in the light of comments; completion of the full KonSULT knowledgebase, using inputs from the users of the second stage version; and incorporation of the case study material.

Once KonSULT has reached this stage, it should be managed so that updates and additional contributions can be provided by users, and incorporated into revised versions that would be disseminated by the editorial team.

## **Quality assurance**

A key concern in many of the discussions leading to the design of KonSULT has been data quality. In some cases, studies of specific instruments have been admirably comprehensive and objectively assessed. In others, data has been limited, and performance has been overstated. It will be important to assess carefully the quality of the information obtained. At the same time care will be needed not to reject any evidence that is incomplete. Rather it should be incorporated with a clear identification of its limitations, so that users can be encouraged to fill gaps in the available knowledge. Even where information is complete, the transferability of results will depend on the context, and it will be important to set this out clearly.

After considering alternative methods for tackling the issue of data quality, an editorial team in Leeds was established. The team receives all of the information, interprets it, summarises it, and checks the information with an international Editorial Advisory Board and with the source. The editorial team is developing a simple but systematic protocol for representing the strength of the available knowledge about the various policy instruments. The results from implementing this protocol will be embedded at Level 2 of the Knowledgebase (quality assurance).

## **Project management**

The project to develop the KonSULT knowledgebase is being managed at the Institute for Transport Studies at the University of Leeds. International inputs are being provided by a network of coordinators, one in each contributing country, and mainly from academic institutions. The role of the coordinator is to provide comments on the design of the Knowledgebase; advice on the potential for its use and the needs of users; and information on suitable innovative applications of the different instruments for their country. Each coordinator is convening a network of experts among academics and practitioners, who are providing input to, and advice on, the project. In larger countries, one particular role of the experts will be to ensure that experience is gleaned from throughout the country and across the range of types of policy instrument. The coordinators are all members of the Editorial Advisory Board, and therefore key to the maintenance of data quality.

The project is associated with the new Special Interest Group (SIG-10) of the World Conference on Transport Research, which focuses on urban transport policy instruments. The role of SIG-10 is to develop an international research agenda in the subject area. Key research issues to be stimulated by the development of the knowledgebase include:

- identification of those policy instruments on which least is known, leading to the formulation of an international empirical research agenda;
- investigation of the contextual attributes which determine the effectiveness of particular instruments;



- development of guidance on good practice in the evaluation of transport policy instruments; and
- enhanced understanding of the design, implementation and performance of such instruments.

The first annual conference of SIG-10 was held in Leeds in July 2002, and developed an initial research agenda. Subsequent meetings of SIG-10 in 2003 will consider progress with this agenda and specific research projects, and a series of papers will be identified for presentation at the Tenth World Conference on Transport Research in Istanbul in 2004.

### **Evaluation and assessment**

Evaluation issues are a major concern in the development of KonSULT, and provide a fertile area for further research. The inclusion of 'sustainable' in the title of the knowledgebase is deliberate. Sustainability is taken as the broad overall goal for KonSULT. The project has adopted the definition of sustainability suggested by Minken (1999), which is based on the work of Chichilinsky (1996) and Heal (1998). According to Minken, one of the two defining characteristics of sustainability as an objective is that it includes both the welfare of present day society and the society of the very distant future. The second defining characteristic is that sustainability implies conservation of natural resources. Thus natural resources should be valued not only as something that may be consumed (in production or consumption) but also as stocks that benefit us even when not being consumed. We depend on some basic qualities of our surrounding ecosystems for our quality of life and indeed for our continued existence. On this basis, a sustainable urban transport and land use system is one which:

- provides access to goods and services in an efficient way for all inhabitants of an urban area
- protects the environment, cultural heritage and ecosystems for the present generation
- does not endanger the opportunities for future generations to reach at least the same welfare level as that of the present generation, including the welfare derived from the natural environment and cultural heritage.

From this definition of sustainability, the KonSULT development team has identified eight objectives of interest in the evaluation of policy instruments:

1. economic efficiency
2. liveable streets
3. environmental protection
4. equity, social inclusion and accessibility
5. safety and security
6. economic growth
7. finance
8. practicability

- While these objectives indicate the directions in which a policy should aim, they do not suggest the amount which it would be appropriate to achieve. Thus it may be difficult to judge the extent of the success or otherwise realised by a given policy instrument. KonSULT has adopted a set of performance indicators, to allow for some level of quantification of objectives. The indicators can be either general or specific, and can also be used to identify problems. An initial set of indicators is shown in Table 1.

**Table 1 Initial set of performance indicators adopted in KonSULT**

Objective	Indicators
Economic efficiency	Delays for vehicles (by type) at intersections Delays for pedestrians at road crossings Time and money costs of journeys actually undertaken Variability in journey time (by type of journey) Costs of operating different transport services
Environmental protection	Noise levels Vibration Levels of different air quality (local) pollutants Visual intrusion Townscape quality (subjective) Fear and intimidation Severance (subjective)
Safety and security	Personal injury accidents by user type per unit exposure (for links, intersections and networks) Insecurity (subjective)
Accessibility	Activities (by type) within a given time and money cost for a specified origin and mode Weighted average time and money cost to all activities of a given type from a specified origin by a specified mode
Sustainability	Environmental, safety and accessibility indicators as above CO2 emissions for the area as a whole Fuel consumption for the area as a whole
Economic regeneration	Environmental and accessibility indicators as above, by area and economic sector
Finance	Operating costs and revenues for different modes Cost and revenues for parking and other facilities Tax revenue from vehicle use
Equity	Indicators as above, considered separately for different impact groups

The indicators shown in Table 1 were chosen based on the following requirements:

1. they must be comprehensive, and fully reflect the objectives to which they relate
2. they must avoid double-counting
3. they should be sensitive to changes in the policy instruments under examination.

## **Dissemination and exploitation**

As noted in the introduction, the beneficiaries of KonSULT are expected to include transport professionals; politicians and other decision-makers; community organisations and interest groups; researchers and those lecturing in and studying transport policy. The knowledgebase will be made widely available to this user community through the internet. The national coordinators and their groups of experts will provide a further network for dissemination throughout the developed world, as well as ensuring that users' requirements are reflected in future developments. The first full version will also be disseminated through the PROSPECTS project, which is providing advice to cities throughout Europe.

While widespread use will be encouraged, access will be controlled to avoid misuse and uncontrolled modifications. KonSULT is not intended to be a profit making venture; rather it is seen by the providers as a contribution to the professional community. However, a small charge will be levied for its use, to ensure that the costs of maintaining it and assuring quality of input are met.

## **Further developments**

In discussion, several suggestions have been made for further development of KonSULT, including:

- coverage of interurban and national instruments
- extension to developing countries
- inclusion of country-specific pages of policy advice
- translation into other languages
- advice on how to conduct objective assessments of innovatory schemes

These and other suggestions are welcome, and will be pursued once the main knowledgebase has been established and is in use. However, where additional finance is available, it may be possible to produce translations as the project develops. This is being actively considered for Japan.

## **Acknowledgments**

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## References

Austrroads (1999) *E-transport: the national strategy for Intelligent Transport Systems* Report AP-62/99 Sydney: Austrroads

Australian Academy of Technological Sciences and Engineering (1997) *Urban air pollution in Australia* Melbourne: AATSE

Chichilinsky, G (1996) An axiomatic approach to sustainable development. *Social Choice and Welfare* 13 (2), 231-257

European Conference of Ministers of Transport (1995) *Urban travel and sustainable development* Paris: ECMT

ERTICO (1998) *Intelligent city transport: a guidebook to intelligent transport systems* Brussels: ERTICO

Heal, G (1998) *Valuing the Future: Economic Theory and Sustainability* New York: Columbia University Press

Institution of Highways and Transportation (1996) *Guidelines on the development of urban transport strategies* London: IHT

Jones, P M et al (1998) *INPHORMM: A review of current practice in Europe* London: University of Westminster

May, A D (2001) Development of an international knowledgebase on urban transport policy instruments *Proc 9th World Conference on Transport Research*, July, Seoul: Korea Transport Institute/Korean Society of Transportation CD-ROM

May, A D and Roberts M (1995) The design of integrated transport strategies *Transport Policy* 2 (2), 97-105

May, A D and Still B J (2000) *The instruments of transport policy* Working paper WP545, Institute for Transport Studies, University of Leeds

May A D, Matthews B and Jarvi-Nykanen T (2001) Decision making requirements for the formulation of sustainable urban land use/transport strategies. *Proc 9th World Conference on Transport Research*, July, Seoul: Korea Transport Institute/Korean Society of Transportation CD-ROM

Minken, H (1999). A sustainability objective function for local transport policy evaluation, pp 269-279 of Meersman, H, Van De Voorde, E and Winkelmanns, W (eds) *World Transport Research. Selected Proceedings from the 8th World Conference on Transport Research. Volume 4: Transport Policy* Oxford: Elsevier-Pergamon

NATO (1976). *Bus priority systems* CCMS Report 45, Crowthorne, TRRL.

Nakamura, H (1999). Computer aided diagnosis and prescription system for traffic related environment in metropolises of developing countries *Journal of the Eastern Asia Society for Transportation Studies* 3 (1), 1-8

Steer Davies Gleave (2002) *Travel demand management: a resource book* Report AP-G67/02, Sydney: Austroads

Taylor, M A P and Ampt, E S (2002) Travelling smarter downunder: the development, implementation and evaluation of travel behaviour change policies for rationalising individuals' use of private motor vehicle transport in Australia *Proc 1st Annual Conf of WCTR Special Interest Group SIG10 'Urban Transport Policy Instruments'*, July, Leeds: Institute for Transport Studies, University of Leeds

Taylor, M A P, Hamnett, S L, Xu, M and Page, A (2002) A microsimulation approach to modelling travel choices: a case study from Adelaide's north-west corridor. *Proc Int Conf on Seamless and Sustainable Transport*, November, Singapore: Nanyang Technological University (in press)

Victoria Transport Policy Institute (2000) *Online transport demand management encyclopedia* [www.vtppi.org/tdm](http://www.vtppi.org/tdm) Victoria, BC: VTPI

Webster, F V and Bly, P H (1980) *The demand for public transport* Report of the International Collaborative Study of the Factors affecting Public Transport Patronage Crowthorne: Transport and Road Research Laboratory

Westerman, H (1999) *Cities for tomorrow: integrating land use, transport and the environment* Sydney: Austroads.

World Bank (1986) *Urban transport* Washington, DC: World Bank.

World Bank (1999) *Urban transport sector strategy review* Concept paper. Washington, DC: World Bank.

## **Appendix: May's list of transport policy instruments (May, 2001)**

The following list of policy instruments was developed on the basis of a taxonomy originally proposed by May and Still (2000) and then extended by May (2001) for inclusion in KonSULT. The taxonomy categorises the instruments into six groups:

1. land use instruments
2. attitudinal and behavioural instruments
3. infrastructure provision
4. management of the infrastructure
5. information provision
6. pricing

### Land use instruments

- Development densities
- Development patterns
- Development mix
- Parking standards for new development
- Commuted payments
- Developer contributions to the financing of infrastructure
- Value capture taxes
- Other land-use taxes, including property taxes

### Attitudinal and behavioural instruments

- Public awareness campaigns
- Flexible working hours
- Telecommunications as an alternative to travel
- Company travel plans

### Infrastructure instruments

These instruments are divided into four subgroups, as follows.

#### *Instruments to influence car use*

- New road construction
- New off-street parking

#### *Instruments to influence public transport use*

- Upgrades to existing fixed infrastructure
- Reopening closed rail lines
- New rail stations
- New rail lines
- New rail services on existing lines
- Light rail systems
- Guided bus systems
- Park and ride
- Terminals and interchanges
- Enhancement of bus and rail vehicles

*Provision for cyclists and pedestrians*

- Cycle routes
- Pedestrian routes
- Pedestrian areas

*Provision for freight*

- Heavy goods vehicle parking facilities
- Transshipment facilities.

Management of the infrastructure

These instruments are divided into the same four subgroups.

*Instruments to influence car use*

- Road maintenance
- Conventional traffic management
- Conventional speed controls and restrictions
- Urban traffic control systems
- Intelligent transport systems
- Road crash remedial instruments
- Traffic calming instruments
- Physical and spatial restrictions
- Regulatory restrictions
- Parking controls
- Car sharing
- Car clubs

*Instruments to influence public transport use*

- Maintenance of existing fixed infrastructure
- New bus services
- Bus priorities
- High occupancy vehicle lanes
- Changes in bus and rail frequencies
- Timetabling strategies
- Bus service management instruments designed to improve reliability

*Provision for cyclists and pedestrians*

- Cycle lanes and priorities
- Cycle parking provision
- Pedestrian crossing facilities
- Safe routes to school

*Provision for freight*

- Truck routes and bans
- Truck parking and load restrictions

## Information provision

These instruments are divided into the same four subgroups.

### *Instruments to influence car use*

- Conventional direction signing
- Variable message signs
- Real time driver information systems and route guidance
- Parking guidance and information systems

### *Instruments to influence public transport use*

- Conventional timetable and other service information
- Real time passenger information
- Trip planning systems
- Operation information systems such as bus fleet management

### *Provisions for cyclists and pedestrians*

- Static direction signs
- Tactile footways

### *Provision for freight*

- Static direction signs
- Fleet management systems

## Pricing

These instruments are divided into two subgroups.

### *Instruments to influence car use*

- Parking charges
- Charges for ownership of private parking space
- Urban road space charging, including area licensing and road pricing
- Vehicle ownership taxes
- Fuel taxes

### *Instruments to influence public transport use*

- Fare levels
- Fares structures, such as flat fares, zonal fares and monthly passes
- Integrated ticketing systems
- Concessionary fares, which are lower for identified groups of users such as elderly people