wctr'04
4-8 july 2004 / istanbul-turkey

FACILITATING EVIDENCE-BASED DECISION-MAKING - THE DEVELOPMENT AND USE OF AN ON-LINE KNOWLEDGEBASE ON SUSTAINABLE LAND-USE AND TRANSPORT

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Abstract

It is clear from recent policy and research initiatives that city authorities need improved advice on the appropriateness of individual policy instruments, and combinations of such instruments, to their particular circumstances. Reasons for this identified by the ECMT and OECD include, poor policy integration and co-ordination, counter productive institutional roles, unsupportive regulatory frameworks, weaknesses in pricing and poor data quality and quantity. There are now some 80 policy instruments available, but unfortunately, for the majority of these, there is an absence of clear and consistent evidence of their performance in different contexts. For some there are long standing reference sources which are still used, whilst for others, there are more recent reviews. However, for the majority the evidence is widely dispersed in journal articles and consultancy reports. Further to this, assessments are often made against different criteria and are sometimes incomplete as well as being subjective. This paper reports the development of an on-line Knowledgebase on Sustainable Urban Land-use and Transport (KonSULT) which aims to provide comprehensive, consistent and up to date assessments of evidence on the impacts of a wide range of urban transport policy instruments for use by decision-makers in the development and implementation of integrated transport strategies. In addition to reporting on how KonSULT has been developed, the paper reports on how the knowledgebase works, puts forward plans for further development and seeks feedback on its usefulness, and on other potential developments. Further to this, compilation of the material for inclusion in KonSULT has identified areas where further research is needed to fully understand the impacts of policy instruments and the development of effective strategy. This is especially true of newer policy instruments, especially attitudinal and behavioural measures, and small scale projects that operate below the level which is conventionally assessed by transport appraisal methods. The way in which cross-sector impacts are considered is a further challenge at institutional, strategy and appraisal levels. Consideration is given to these areas of further research in drawing conclusions from the work that has gone into the development of KonSULT.

Keywords: Sustainable urban land-use and transport; Knowledgebase
Topic Area: C1 Integrated Planning of Transport Systems

1. Introduction

It is clear from recent policy and research initiatives that city authorities need improved advice on the appropriateness of individual policy instruments to their particular circumstances, and combinations of such instruments. ECMT and OECD have updated their general guidance on Urban Transport and Sustainability (ECMT, 2002), having concluded at their ministerial council meeting in May 2001 that the majority of developed countries have faced difficulties in implementing the recommendations of the 1995 report.

Reasons for this were cited as poor policy integration and co-ordination, counter productive institutional roles, unsupportive regulatory frameworks, weaknesses in pricing and poor data quality and quantity. In Europe the EU PROSPECTS project, provides guidance on land use and transport policy decision-making for European cities (May et al, 2003), as part of a wider programme of research into land use, transport and urban sustainability.

There are now some 60 policy instruments available and we aim to assess all of these in KonSULT – our on-line **K**nowledgebase **on Su**stainable **U**rban **L**and-use and **T**ransport (KonSULT). Unfortunately, for the majority of policy instruments, there is an absence of clear and consistent evidence of their performance in different contexts. For some there are long standing reference sources which are still used, despite the fact that they may now be out of date. For others, there are more recent reviews. However, for the majority the evidence is widely dispersed in journal articles and consultancy reports. Further to this, assessments are often made against different criteria and are frequently incomplete as well as sometimes being subjective.

This paper reports the development of KonSULT, which aims to provide comprehensive, consistent and up to date assessments of evidence on the impacts of a wide range of urban land-use and transport policy instruments for use by decision-makers in the development and implementation of integrated transport strategies. As such, KonSULT is a dissemination tool that seeks to make evidence on the effectiveness of land-use and transport policy instruments available to a wider international audience. In this way, KonSULT is adding significantly to the dissemination activities of organisations such as WCTR, in particular through SIG10, and others referred to below.

Initial development focused on 30 key policy instruments. KonSULT aims to provide a description and consistent assessment of each policy instrument. The process of putting this initial material together has highlighted a number of research issues, particularly the gaps and weaknesses in the currently available evidence relating to some policy instruments. The research issues arising from KonSULT are discussed in more detail later. KonSULT is internet-based, allowing easy access and ready updating. KonSULT has been disseminated through the PROSPECTS project referred to above, and is currently promoted by Elsevier Science who are hosting the website. Links are also being maintained with the work of ECMT, OECD and the World Bank, so that it can be made available as appropriate through these channels.

2. Early development and structure of konSULT

2.1. Initial development and information sources

The prototype for KonSULT was developed with support from the University of Leeds and UK Engineering and Physical Sciences Research Council, as described more fully in a paper to the ninth World Conference (May and Matthews et al, 2001a). Initial proposals, based on the principles of the earlier IHT Guidelines (IHT, 1996), were discussed with potential users and providers in Australia, Europe, Japan, New Zealand and the United States. This led to the design of the website architecture, the preparation of levels one and two (as described below) and the first two, prototype, instruments of light rail and urban road charging. These were used both to clarify the treatment of each instrument and to develop the appraisal method, which is described in more detail in Section 4.

The UK Department for Transport and the Rees Jeffreys Road Foundation were sufficiently impressed by the prototype to award parallel grants to finance the second stage of development, which will have been completed by March 2004. In parallel support was obtained from the Japanese Institute for Transport Policy Studies, who seconded a staff member for six months, and from the European Commission through the PROSPECTS

project. The main focus in this second stage has been to expand the coverage of policy instruments, and it is envisaged that a total of 45 will have been completed by April 2004.

PROSPECTS has produced guidance for cities on the development of sustainable land use and transport strategies. As planned it envisaged three guidebooks: a Decision-Makers' Guidebook (May et al, 2003), a Methodological Guidebook (Minken et al, 2003) and a policy guidebook which would provide detailed information on the range of policy instruments available. The first version of the policy guidebook was developed as a text document, with brief descriptions of each policy instrument and a simple assessment, based on case studies, of their performance (May and Matthews et al, 2001b). In style it largely mirrored earlier UK guidance (IHT, 1996, May and Still, 2000). It was agreed at that stage that it would be appropriate to use KonSULT as the policy guidebook, and some resources from colleagues at the Transport Economics Institute in Oslo and the Polytechnic University of Madrid were used to contribute material on specified instruments.

Material for each instrument has been obtained from a detailed literature search and informal contacts. However, as noted earlier, there is a dearth of literature on case studies of the application of many instruments, and it is hoped that dissemination of KonSULT will stimulate those with unpublished case study material to make it available. Three other European projects have the potential to contribute. Two, PLUME and EXTRAWeb, are collating results from European and national research. PLUME (PLanning and Urban Mobility in Europe) focuses specifically on urban land use and transport policies, and is working with end users to identify their information needs and provide them with relevant results. A central mechanism for achieving this objective is the provision of annual State-of-the-Art Reviews (SoARs). Each SoAR is intended to provide a synthesis of research findings and case studies, with recommendations as to which policies, measures and tools are best able to meet the need for sustainable development, taking account of users' needs and barriers to implementation. Sources for the SoARs are the existing 12 LUTR cluster projects and other national and international research. It is hoped that KonSULT will facilitate this, while at the same time benefiting from the additional research evidence collected. EXTRAWeb is a more all embracing project which covers research results in all areas of transport research, and will provide a series of thematic summaries. Some of these should be of direct relevance to KonSULT, and will be incorporated as they become available. The third project, SPECTRUM, is studying the integration of policy instruments, and the extent to which regulatory instruments offer an alternative to pricing. It is considering both urban and interurban policy instruments, and carrying out a review of them. At an urban level, these reviews will add to the KonSULT database, and thought is being given to extending KonSULT to include material on the interurban instruments. At a later stage, research in SPECTRUM will help in preparing the material in level four of KonSULT on integrated strategies.

Two North American sources are also worthy of mention. The first is the US Transportation Research Board's Traveller Response to Transportation System Changes Handbook, which is being published as TCRP Report 95 (TRB, 2003). This provides an intensive source of largely North American evidence on demand responses, which are a key element of KonSULT's analysis. We intend to incorporate these results, with due acknowledgement, as they become available. The second is the Victoria Transport Policy Institute's Transport Demand Management Encyclopaedia (VPTI, 2003), which is an admirably extensive description of a wide range of policy instruments. We have interacted frequently in the development stages of KonSULT and the TDM Encyclopaedia, and benefited from the resulting exchange of ideas, concepts and results. The two websites are designed to serve rather different needs, and retain somewhat differing structures.

However, we are keeping open the possibility of combining them at a later stage in their development.

2.2. The structure

The Knowledgebase is organised into four levels, as shown in the site map in Figure 1. The first level, 'Getting started', provides introductory material outlining content, mission and sampler information and can capture user registration details if needed.

The second level, 'Decision-making and strategy formulation', includes general material on:

- the approach to urban transport strategy development
- transport policy objectives
- past trends and future scenarios
- a taxonomy of transport policy instruments
- the approach to describing and assessing individual measures
- barriers to implementation
- ways of developing an integrated strategy
- a glossary of terms to encourage consistency of terminology.

Much of this material has been based on the IHT Guidelines (IHT, 1996), but has been updated based on research for the PROSPECTS Decision Makers' Guidebook (May et al, 2003). Several of these elements and in particular the categories of objectives, barriers and approaches to integration, are used to structure material on individual policy instruments in the third level.

The third level, 'Instruments of transport policy', includes specific material for each policy instrument listed in the taxonomy in level two. The taxonomy and definitions of policy instruments being used in KonSULT draw on those developed for the IHT guidelines (IHT, 1996) and as part of surveys of policy instruments (May and Still, 2000; May and Matthews et al, 2001b). The resulting list of potential policy instruments in KonSULT includes a range of instruments listed in six categories:

- land use measures
- infrastructure measures
- management of the infrastructure
- information provision
- behavioural and awareness measures and
- pricing.

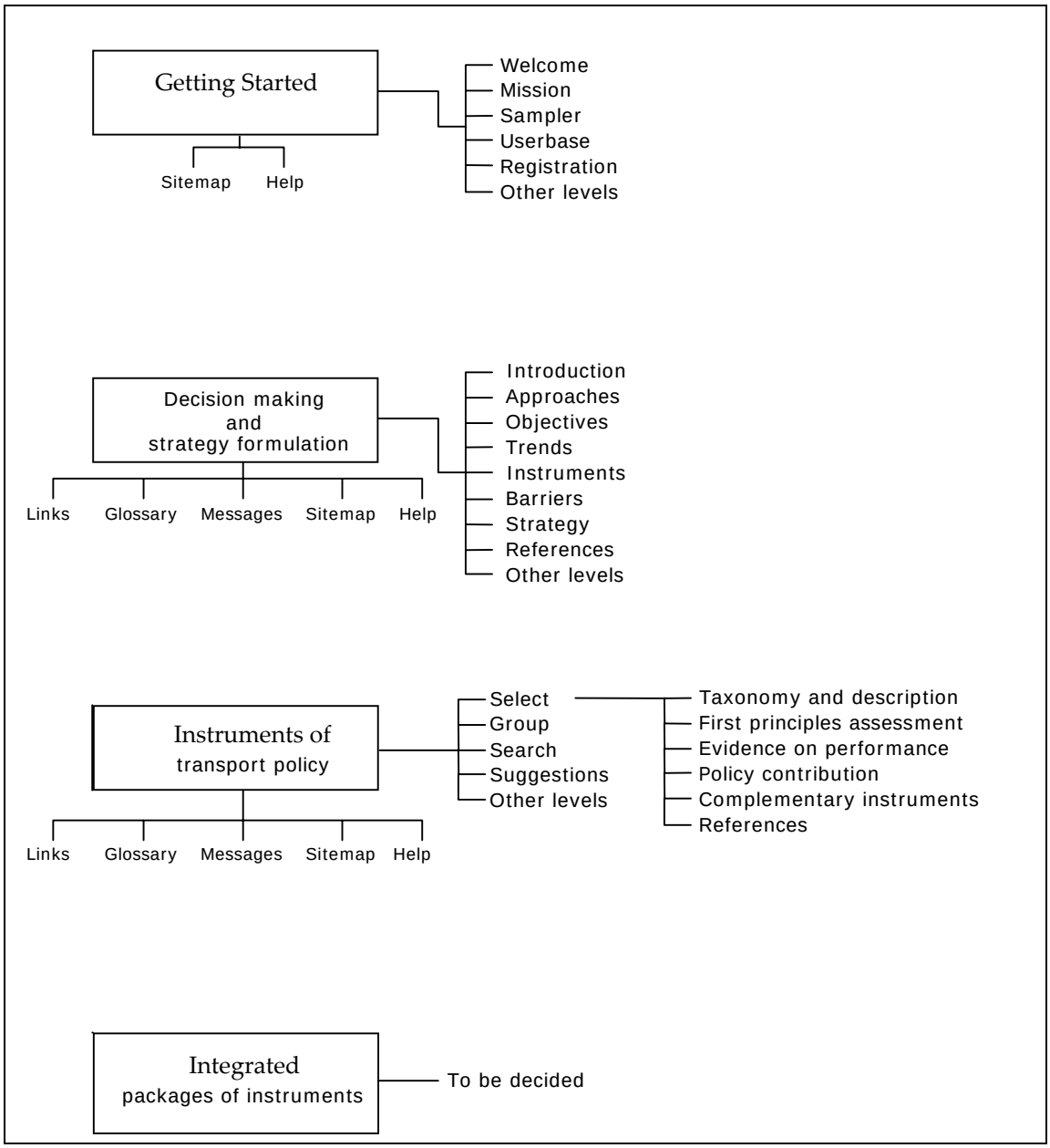


Figure 1 KonSULT Site Map

Where relevant, each is split into instruments affecting car use, public transport, walking and cycling and freight. A taxonomy and description is given for each instrument, followed by information under four headings, the aims of which are outlined here.

2.3. A first principles assessment.

Any instrument can have impacts on the demand for travel, the supply of transport facilities and the cost of implementation and operation. These in turn will influence the way in which it can contribute to transport policy objectives and the alleviation of problems. For example, a measure which encourages transfer from car to other modes should, if effective, contribute to efficiency, environmental and safety objectives. This section assesses the potential impacts in principle following a common structure. On the demand side, it considers the extent to which it can influence overall travel, journey lengths and destinations, choice of mode, time of travel and route. It also suggests the extent to which these are likely to be short, medium or long term responses. On the supply

side, it considers impacts on capacity, the allocation of capacity to different users, permitted speeds, different elements of journey time, reliability and cost, information and quality. The first principles section also comments on the likely costs of implementing and operating the instrument. Based on the demand and supply impacts an indication is given of the expected impact on each of the key policy objectives, and on each of the types of problem, as a context for the next section. Responses, impacts and contributions are all summarised in assessment tables, using a scoring/rating system. The assessment tables are illustrated in Section 4 along with discussion of the scoring/rating systems.

2.4. Evidence on performance.

This section follows the same structure as the first principles assessment. It uses evidence from case studies to assess whether that evidence supports the first principles assessment. For each application it describes the context. It then summarises the evidence, first for impacts on demand and supply, and then on contribution to objectives and problems. It includes a quality assurance evaluation of the strength of the evidence from each case study, and identifies gaps and weaknesses.

2.5. Contribution to objectives and alleviation of problems.

This section is a summary in a standard form. It assesses, across all the case studies presented, the strength of the evidence for the instrument's contribution to objectives and alleviation of problems. In addition it judges the suitability of the instrument for application in a pre-defined set of area types suggests the likely barriers, using the list of barriers from level two, and gives an indication of potential negative side effects on a defined list of impact groups.

2.6. Complementary instruments.

This section takes as a starting point the four approaches to integration identified in level two:

- reinforcement of benefits;
- reduction of financial barriers;
- reduction of political and acceptability barriers; and
- compensation of losers.

The first of these is considered for all instruments. The second and third are considered when these barriers are identified in the section on contribution to objectives, and the fourth is considered in relation to the impact groups which are identified there as being adversely affected. For each relevant approach, the other instruments which might contribute are identified, and hyperlinks are provided to enable the user to consider them.

The fourth level, 'Integrated strategies', will provide information on packages of instruments and case studies of integrated transport strategy applications. It will be developed at a later stage in the project, based on principles which are outlined in a companion paper at this conference (May, Kelly and Shepherd, 2004) and the research currently underway in the SPECTRUM project.

KonSULT's architecture is designed to provide easy navigation between its four levels. For example, within the second level, users can specify the objectives they wish to pursue, the problems they wish to solve, and the contexts in which they wish to do this. This leads them to a graded list of possible instruments which they might consider. Similarly, within level three, the section on complementary instruments leads the user to other supporting instruments which they might consider as part of an overall strategy.

In accessing the range of instruments in the third level, users can employ one of a number of search facilities. The first simply uses the taxonomy from level two, as described above. The second, a search facility, makes use of a glossary which is being developed. By clicking on an instrument name, the user will access both a definition and a list of the other references to it. The third, and most advanced, is a filter facility, which enables users to specify their role, their objectives, the problems which they face, the strategy which they are pursuing and the type of area which they are considering. For each of these, instruments are rated based on the assessments in the 'contribution to objectives' section of level three. An unweighted scoring facility then identifies a ranked list of instruments which the user might consider. No attempt is made to prescribe a preferred approach; the intention is simply to encourage the user to consider a wider range of relevant options.

3. Preparation of material on policy instruments

This section provides a walk through of the material included for each policy instrument within the KonSULT website. Material on policy instruments is presented through a series of assessment tables common to each measure accompanied by text to provide more detail and tackle instrument specific issues. The common assessment tables are illustrated below. The various challenges faced when compiling material and how they were overcome is discussed under the relevant sections.

A mixed graphics and text approach that would allow readers to quickly gain an overview as well as providing essential details was developed. When designing the assessment tables three issues were borne in mind throughout: consistency, comparability and scope of the assessment. Given these concerns it was felt that the more graphical approach made comparability between policy instruments easier. As the material for additional instruments was developed during stage two we continued to fine tune the common assessment frameworks used to present information on the policy instruments. To ensure that all instruments were treated fairly, contrasting measures, for example Intelligent Transport Systems versus Ride Sharing, were periodically reviewed in parallel.

3.1. A Summary

The first page presents an executive summary of the material on each policy instrument. This material is purely text based and is thus not illustrated here. It provides a succinct outline of the nature of the instrument, where, when and how it may be implemented and the key issues that may arise as a result of implementation. This section is particularly useful for politicians and others in need of a briefing note.

3.2. Taxonomy and description

This second section provides a description of the policy instrument, but in greater detail than the initial executive summary. Again, it is largely text based so it is not illustrated here. However, images of infrastructure, vehicles and technology associated with the policy instrument are included where ever possible. This is both useful for readers unfamiliar with a policy instrument and in terms of making the website more visually appealing.

The taxonomy and description includes terminology, as well as technology and theory where relevant. Consequently, this is one of the few sections where sub-headings will vary between policy instruments.

3.3. First principles assessment

The third section is written using a text book approach, so it sets out why one would use a particular policy instrument and what impacts one would expect to see if everything operates as one would expect it to in theory. Consequently, this section employs a common set of sub-headings and assessment tables.

3.3.1. Why introduce the policy instrument?

This section is relatively straightforward, providing an explanation of the context in which a policy instrument might be implemented. An example from the material on Parking Standards is included here:

"Parking standards are set by local authorities to control the amount of new PNR [private non-residential] parking in their jurisdiction. There are a number of approaches to setting parking standards, but they generally seek to either meet all actual (and sometimes anticipated) demand for PNR parking or manage travel demand through PNR parking availability. Additionally, parking spaces take up land, so reducing parking capacity may reduce land take".

3.3.2 Demand impacts and short and long run demand responses

'Demand impacts' and 'short and long run demand responses' are separate sub-sections within the taxonomy and description section. Figure 2 illustrates the assessment of demand impacts via a table that considers responses in particular situations. Figure 3 illustrates that used under short and long run demand responses to present impacts over time.

Fitting assessment of Individualised Marketing to Reduce Car Use into the common assessment framework was particularly challenging. In the first instance, use of individualised marketing campaigns in the transport context does not have a long history, therefore there is a lack of evidence on the impacts over time. Thus, a significant amount of professional judgement based on other behaviour change campaigns (e.g. drink driving) was necessary (and this is acknowledged within the text). There was also considerable debate over the time periods that should be assessed. An attitudinal and behavioural instrument such as that illustrated here will have a cumulative impact over time and will take a long time to reach its maximum impact, whilst a pricing instrument, e.g. Urban Road Charging, can be expected to have instantaneous effects. Whilst there are other instruments that will reach their maximum impact in the medium term and may have a declining impact after that. Thus the discussion was not confined to the time periods to illustrate, but considered whether two ticks against a time period followed by one for the next, for example, conveyed an incremental impact (but with a declining increment), or a declining impact over time. On balance we felt that it conveyed the additional impact experienced in each time period.

A third sub-section, which is purely text based, goes on to consider 'Level of Response' for a number of instruments. Level of response is considered through a discussion of price elasticity of demand. This was particularly challenging with regard to attitudinal and behavioural policy instruments, some land use measures and infrastructure measures. In some cases level of response was omitted entirely. Taking Individualised Marketing to Reduce Car Use, an attitudinal and behavioural measure, as an example there is firstly a lack of evidence as response has not been studied in terms of elasticity. Secondly, it will vary considerably depending on "the success of the programme and the context in which it is implemented. A programme that promotes all alternatives available equally will have different impacts to one which is targeted at increasing cycling rates. Thus, the type of trip, type of traveller, price elasticity of related goods and services and

whether the elasticity accounts for short term or long term demand responses are important influential factors in the calculation and interpretation" (KonSULT).

Supply Impacts and Financing Requirements are further sub-sections that are primarily text based. Both tend to be relatively short sections despite the fact that supply impacts are often quite complex and summarising these has been challenging.

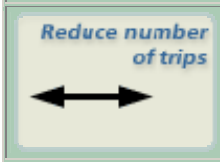
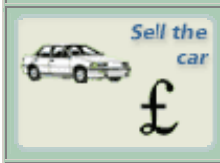
Response	Impact on vehicle kilometres by car	Expected in situations
	XXXXvvvv	Where the system only operates during limited hours or where charges are different at different times of day
	XXXXvvvv	Where the origin or destination is not in the charged area and where alternative routes, which avoid the charged area, are available and attractive
	XXXXvvvv	Where an attractive alternative destination exists and is not subject to charging and where individuals have the flexibility to change. Some such alternative destinations may involve shorter journeys, e.g. to local facilities, where as others may involve longer journeys, e.g. to neighbouring towns
	XXXXvvvv	Where there is potential to link journeys together, to work or shop from home or to otherwise re-arrange activities
	XXXXvvvv	Where public transport is available and attractive, there is potential to car share or potential to walk or cycle. The response to change mode may go hand in hand with other responses, e.g. changing destination to use local facilities and walking to those local facilities
	XXXXvvvv	Where individuals' reduction in car-use over a sustained period is so significant as to make owning a car uneconomic and where individuals believe that charging is part of a longer term transport strategy. In the first instance, this is more likely to apply to a household's second or third car
	XXXXvvvv	Where this assists individuals to make any of the above responses and where it is recognised that charging is part of a long term transport strategy responses

Figure 2. Urban road charging demand response and situations assessment table

	-	1st year	2-4 years	5 years	10+ years
Change departure time 9:30	-	XXXXXXXXX	XXXXXXXXX	XXXXXXXXX	XXXXXXXXX
Change route	-	XXXXXXXXX	XXXXXXXXX	XXXXXXXXX	XXXXXXXXX
Change destination	Change job location	XXXXXXXXX	XXXXX✓XXX	XXXXX✓XXX	XXXXX✓✓XX
-	Shop elsewhere	XXXXX✓XXX	XXXXX✓✓XX	XXXXX✓✓✓X	XXXXX✓✓✓X
Reduce number of trips	Compress working week	XXXXXXXXX	XXXXX✓XXX	XXXXX✓✓XX	XXXXX✓✓XX
-	Trip chain	XXXXX✓XXX	XXXXX✓✓XX	XXXXX✓✓✓X	XXXXX✓✓✓X
-	Work from home	XXXXXXXXX	XXXXX✓XXX	XXXXX✓✓XX	XXXXX✓✓XX
-	Shop from home	XXXXXXXXX	XXXXX✓XXX	XXXXX✓✓XX	XXXXX✓✓XX
Change mode	Ride share	XXXXX✓XXX	XXXXX✓✓XX	XXXXX✓✓✓X	XXXXX✓✓✓X
-	Public transport	XXXXX✓XXX	XXXXX✓✓XX	XXXXX✓✓✓X	XXXXX✓✓✓✓
-	Walk/cycle	XXXXX✓XXX	XXXXX✓✓XX	XXXXX✓✓✓X	XXXXX✓✓✓✓
Sell the car £	-	XXXXXXXXX	XXXXXXXXX	XXXXX✓XXX	XXXXX✓✓XX
Move house For Sale	-	XXXXXXXXX	XXXXXXXXX	XXXXX✓XXX	XXXXX✓✓XX

✓ = Weakest possible response, ✓✓✓✓ = strongest possible positive response

✗ = Weakest possible negative response, XXXXX = strongest possible negative response

XXXXXXXXX = No response

Figure 3. Individualised marketing to reduce car use demand response over time table

3.3.3. Expected impact on key policy objectives

Impacts were also assessed against key transport and land use policy objectives. As with responses and situations an assessment table employing both text and graphics was used, as illustrated in Figure 4 In this case it was felt that a purely graphics based assessment was insufficient for two reasons. Firstly, it was not always immediately obvious how a policy instrument would contribute to meeting an objective. This is

especially true with regard to objectives that may not be familiar to all readers. For example, liveability has only relatively recently been considered explicitly at the European transport policy level. Thus, the concept may have become familiar within long standing member countries, but may be less familiar in accession countries. Secondly, contributions could be positive or negative depending on the nature of response to implementation of the policy instrument, as is the case with regard to Fuel Taxes.

Objective	Scale of contribution	Comment
Efficiency	✓✓	By reducing congestion, efficiency will be increased.
Liveable streets	✓✓	By reducing congestion, severance, pollution, accidents and other negative impacts will be reduced, thus, improving liveability.
Protection of the environment	✓✓	By decreasing car use, negative environmental impacts will be reduced.
Equity and social inclusion	✗✗	As fuel tax is indiscriminate and affects those on low incomes most, it may have negative effects in terms of equity and inclusion. Those for whom car use is essential due to the nature of the journey or lack of alternative will also be unduly penalised. Where tax levels differentiate between types of fuel, cheaper options may be available if those concerned can afford to change the vehicle they drive.
Safety	✓✓	Reductions in car use will improve safety.
Economic growth £ £ £ £ £	✗ / ✓	If increased expenditure on fuel reduces spending in other sectors of the economy, economic growth may be stifled. Although, where individuals change their travel behaviour to avoid increased costs, there will be no negative effect on economic growth. Indeed, where the changes in behaviour result in reduced congestion, growth may occur.
Finance £	✓✓	Increased revenue from taxes will benefit finances.

Figure 4. Fuel tax expected impact on key policy objectives assessment table

3.3.4. Expected Impact on Alleviation of Problems

The approach taken with regard to alleviation of problems was essentially the same as that taken with regard to contribution to objectives. Figure 5 illustrating the table covering New Rail Stations highlights a situation where the policy instrument results in both positive and negative contributions to the alleviation of problems. Thus, alleviation of one problem could exacerbate another. This is a key example of a policy instrument that should be implemented as part of a package containing complementary instruments (discussed below) to mitigate the negative impacts associated with the core measure.

Problem	Scale of contribution	Comment
Congestion-related delay	√√	By transfer of some car journeys to rail, though there may be some attraction of previously suppressed car traffic if congestion falls notably
Congestion-related unreliability	√√	By transfer of some car journeys to rail, though there may be some attraction of previously suppressed car traffic if congestion falls notably
Community severance		-
Visual intrusion		So long as station design and location are sensitive to the surrounding environment
Lack of amenity	XX	By encouraging longer journeys and endangering the viability of local facilities
Global warming	√√	By reducing traffic-related CO2 emissions
Local air pollution	√√	By reducing emissions of NO_x, particulates and other local pollutants from car traffic
Noise	√	By reducing car traffic volumes
Reduction of green space	X	By increasing pressure for city expansion and associated road building
Damage to environmentally sensitive sites	√	By reducing car traffic volumes
Poor accessibility for those without a car and those with mobility impairments	√√	By creating new opportunities to access the rail network and discouraging car-oriented development
Disproportionate disadvantaging of particular social or geographic groups		By creating new opportunities to access the rail network and discouraging car-oriented development, though some may be disadvantaged if bus services along part of the rail route become unviable and are withdrawn
Number, severity and risk of accidents	√	By reducing car traffic volumes
Suppression of the potential for economic activity in the area	√√	By improving an area's accessibility, by freeing up time previously spent in congestion and by improving the efficiency of the local transport network

Figure 5. New rail stations alleviation of problems assessment table

The alleviation of problems assessment table also highlights the issue of scale of impact. In this table and the others discussed in this paper the meaning of one tick compared to two ticks for example, and the range of the scale used has been a continuous issue of debate. Taking noise as an example, the modal shift from road to rail that is expected as a result of easier access to rail services, will result in fewer road journeys and less noise from this source. This is likely to reduce the background noise level throughout the day. However, noise may increase at specific points in time when trains are passing. Where neighbouring land use is residential or employment, this could be a problem if train services are frequent. Thus, it is not entirely clear whether the instrument should be given a positive or negative rating in this instance, or the size of the impact to be reflected, as it is clearly dependent on where the new rail station is located in relation to other land uses. Thus, it should always be borne in mind that the scoring within the assessment tables reflects the most likely response. Key deviations from this are highlighted in the notes.

A further issue was does one tick/cross mean the same across the full range of policy instruments? It was felt that readers would interpret one tick/cross in the same way wherever it was used, i.e. minimum impact that can be expected. It was thus possible to use the tick/cross assessments to facilitate the filter function that has been developed (and outlined above). A five point scale was decided upon as this is commonly considered an easily interpretable range. A longer scale can result in misinterpretation of options between

the midpoint and end points if descriptors are not used, where as a shorter scale does not give sufficient options to differentiate responses.

3.3.5. Expected winners and losers

Given that implementation of a policy instrument can clearly have negative impacts for some people, it is important to consider who the winners and losers will be. Again the expected winners and losers are summarised in an assessment table. The extent to which specific groups will win or lose is assessed using the same five point scale as in other tables. Figure 6 illustrates the winners and losers assessment table for Parking Charges.

The key challenge when designing this table was the choice of groups to assess. The assessment against people with a low income in relation to Parking Charges illustrates this as it was not possible to decide upon a score that conveyed the average situation given that whether a person in this group became a winner or loser very much depended upon their chosen mode of transport. Sub-division into people with a low income travelling by car/public transport was an option. However, the same sub-division would then have been necessary in every alleviation of problems table to maintain consistency. This and other potential sub-divisions would have resulted in an overly long table, so was not pursued since it was less relevant to the majority of policy instruments.

Group	Winners / losers	Comment
Large scale freight and commercial traffic	√√	High value journeys – less time spent in congestion the greater the vehicle utilization – relatively small proportion of journey distance in urban conditions.
Small businesses	-	Some small, local businesses may experience suppressed trade as people avoid the charged area, though they are likely to benefit from any reductions in traffic congestion.
High income car-users	√√	High income associated with high value of time and, hence, highly valued time savings from reductions in parking search time and congestion-related delay, whilst charges are likely to be a relatively small proportion of disposable income
People with a low income		Low income car-users may be inconvenienced by being deterred from driving and parking in the charged area, where as low income public transport users may benefit from improved public transport conditions.
People with poor access to public transport	XX	These people will face an increase in their transport costs but will find it difficult, in the short run at least, to change their travel arrangements and behaviour. However, increased demand for alternatives may result in their increased availability.
All existing public transport users	√√	Any reductions in traffic congestion will result in enhanced reliability and reduced journey times for public transport, whilst increased demand for public transport should result in increased supply, though some possibility of increased over-crowding.
People living adjacent to the area targeted	√√	Any reductions in traffic congestion will result in an improved environment in and immediately around the area in question
People making high value, important journeys	√√	These journeys will have higher values of time so the value of any time savings arising from reduced traffic levels will be significant
The average car user	XX	Average car-users with middle incomes will tend to either be inconvenienced into changing their travel behaviour or into paying the charge which, because of their value of time, may not represent good value to them.

Figure 6. Winners and losers assessment table for parking charges

3.3.6. Scale of barriers

The scale of barriers to implementation of a policy instrument is the final assessment table in the taxonomy and description section. The table used to assess barriers to implementation of vehicle ownership taxes is illustrated if Figure 7. Four key barriers – legal, financial, political and feasibility - were selected for this assessment, although not all are relevant to every policy instrument. In this case the negative scale is most likely to be utilised, although a positive scale has been included since there may be cases where one of the 'barriers' is in fact an enabler.

Barrier	Scale	Comment
Legal	XX	Legislation may be required for a new tax in some countries.
Finance	-	
Political	XXXXX	Significant public opposition is likely from imposition of such a tax.
Feasibility	-	Assuming means of collecting indirect taxes are already in place, there are no obvious practical problems.

Figure 7. Barriers to implementation of vehicle ownership taxes assessment table

3.4. Evidence on performance

Following the taxonomy and description, evidence on performance is presented. As the title suggests this section presents information on real world implementations of a policy instrument. This not only explains where, when, how and why an instrument has been implemented, but also reports on impacts on demand and supply, as well as carrying out an assessment against transport policy objectives. Impacts on demand and supply cannot always utilise the theoretical assessment tables as the data and information needed is not available. However, to facilitate comparison with theory, the contribution to objectives assessment table is used as fully as possible. For some case studies it is not possible to represent the contribution using our scale due to insufficient information, for others there was no evidence available on the contribution to a particular objective.

Assessment of contribution to objectives is taken a step further in the next section – 'Policy Contribution'. Here the common assessment table is used to compare the impacts of the case studies presented under 'Evidence on Performance'. As Figure 8 illustrates, the table is purely graphical in this instance to illustrate the differing effects a single policy instrument can have. Clearly the way in which an instrument is implemented impacts on the contribution it makes to achieving objectives. The Guided Bus example in Figure 8 illustrates the contrasting contributions that a single instrument can have.

The Policy Contribution section also includes sections on 'Appropriate Contexts', 'Appropriate Area Types' and 'Adverse Side Effects'. Apart from 'Appropriate Area Types' this is a purely text based assessment. Figure 9 illustrates the area type assessment table. Since KonSULT is purely concerned with urban areas this constrains the selection of area types to be included in this table. However, the level of sub-division within this was a matter of debate. A concentric rings city model was used to guide our thinking. However, district centres and corridors, as well as small towns and tourist towns have also been included. It was felt that the latter two area types can exhibit urban characteristics and therefore benefit from urban planning practices.

Objective	Adelaide O-Bahn	Leeds Superbus
Efficiency	✓✓✓	✓✓
Liveable streets	✓✓	✗
Protection of the environment		
Equity and social inclusion	✓	✓✓
Safety	✓	✓
Economic growth	✓	✓
Finance	✗	✗

Figure 8. Policy contribution assessment of case studies for guided bus

Area type	Suitability
City centre	✓
Dense inner suburb	✓✓✓
Medium density outer suburb	✓✓
Less dense outer suburb	✓
District centre	✓✓
Corridor	✓✓✓
Small town	✓✓
Tourist town	✓✓

✓ = Least suitable area type ✓✓✓✓ = Most suitable area type

Figure 9. Appropriate area types table for individualised marketing to reduce car use

3.5. Complementary instruments

The final section covers complementary instruments. As Figure 10 highlights, complementary instruments can work by mitigating negative side effects of the core measure or enhancing the benefits, as well as helping to overcome barriers to implementation. For some instruments identifying complementary measures was a challenge, since there were no obvious candidates, whilst for others setting boundaries around what to include was a problem. Where suggested measures are included elsewhere in KonSULT they are highlighted as a hyperlink to the material on that instrument. However, explanation of how to implement instruments as a package is not included here, as that material will make up level four of KonSULT.

Types of instrument	Overcoming financial barriers	Overcoming political barriers	Compensating losers	Reinforcing benefits
Land-use	-	-	-	Development pattern to encourage public transport use
Attitudinal and behavioural	-	-	-	Flexible working hours Individualised marketing campaigns company travel plans
Infrastructure measures	-	-	-	New rail stations Interchanges and termini Bus lanes Light rail Guided bus
Management of the infrastructure	-	-	-	Bus priorities Co-ordinated services
Information provision	-	Information to communicate the benefits of high density developments	-	Information on goods and services available within developments
Charging	Urban road charging	-	-	Reduced bus fares

Figure 10. Development densities and mix complementary instruments assessment table

4. Research issues

The process of putting the material for KonSULT together, as outlined previously, has given rise to a number of research issues. Some of these issues relate to the process of assessing the material, others to the wider land-use and transport research agenda. A particular issue in need of more research that relates to the process of assessing material is how to compare the impacts of different policy instruments when they operate on different scales, temporally and spatially. For example, how do you compare the impact of a walking bus with that of road pricing? Both have the potential to contribute to reducing congestion, but they operate on different scales. The recently funded DISTILLATE project, which was informed by the KonSULT process, will be considering the development of a common evaluation framework.

A further issue is obtaining the right mix of detail versus simplicity when compiling dissemination material. Decision makers often need clear summary information, but also need detail to aid fully informed decisions. To meet both of these needs, and those of other potential users (students, campaign groups, researchers, civil servants, teachers and the general public), KonSULT presents information on a number of levels. Each policy

instrument is introduced with an executive summary, and then moves on to more detailed first principles and case study material. Throughout these later sections, summary tables are used to encapsulate the key points and facilitate easy comparison between responses and situations, and between instruments.

On a wider scale, KonSULT also contributes to the land-use and transport research agenda. The expert discussions involved in the development of KonSULT have led to the formation of the WCTR special interest group on urban transport policy instruments (SIG10). The inaugural meeting of this group took place in Leeds, UK in July 2002. Compiling the material for inclusion in KonSULT highlights the gaps and weaknesses in the available evidence. It is hoped that this will prompt those who have experience and evidence of a policy instrument that is not well documented to disseminate their knowledge more widely. Where the knowledge does not already exist, it is hoped that highlighting the gaps and weaknesses will prompt further research.

Several other issues merit further research. Most evidence is limited to a few case studies; while comparisons can be made across these case studies, it is difficult to assess whether differences result from differences in context or in application. Further research is needed on the principles under pinning the transferability of performance. Most case studies involve a single instrument, but there is a growing interest in packages, in which one instrument complements another. KonSULT includes a section identifying potential complementary instruments, based largely on professional judgement. Further research is needed into the principles of complementarity. Finally, the information contained in KonSULT has the potential to contribute to the generation of policy options, by highlighting instruments that might perform well in a given situation. The filter system built into KonSULT forms the starting point of an option generation tool, which will be further developed by the DISTILLATE project.

5. Summary

There is widespread recognition within policy-making circles of the desirability of ‘evidence-based decision-making in transport policy and within research circles of the need to gather and disseminate existing research relating to transport policy more effectively. An increasing number of research and evidence gathering and disseminating activities now exist aimed at providing better linkages between research, evidence and policy-making. In the past, dissemination has been via printed handbooks or guidance notes, though increasingly use is being made of on-line web-based material which is, in principle, readily updateable and has the potential to draw on international sources and respond to international user needs. In practice however, websites are often resourced through project funding and often are not updated once that project funding ceases and most of the notable projects and web resources in this area have either a European or North American focus, rather than a truly international one. It may be argued that project-based dissemination can work perfectly satisfactorily so long as the current set of projects incorporate the findings of the previous wave of projects, and that dissemination is more effective when targeted towards the needs and interests of a North American or a European audience, rather than at a more diverse international community. KonSULT however, has set out with a clear aim to gather and disseminate evidence on an on-going basis, with regular updates, and with an international focus, drawing on contributors from Europe, Asia, Australasia and North America. In that sense, KonSULT is somewhat different to the other information sources and dissemination activities and serves as an on-going experiment in presenting updateable resources for an international audience.

KonSULT particularly focuses on three aspects of urban transport policy: decision-making processes; the effectiveness of policy instruments; and the usefulness of combining

policy instruments to form integrated strategies. Importantly, it also considers transport together with land-use, in recognition of the key inter-relationship of the two within an urban context. Thus, it seeks to provide a comprehensive information resource for those interested in urban transport policy-making.

KonSULT seeks to appraise the quality of the available evidence and research and assess the effectiveness of the different policy instruments. The approach to these assessments is a systematic one, but one that tries to strike a balance between complexity and simplicity that is appropriate to the needs of a wide range of potential users. The approach is systematic in that all instruments are assessed in a consistent and comparable way, using a common set of criteria and assessment tables. These criteria and assessment tables are relatively straight forward, though more detail is available for the particularly interested user if they wish to investigate further.

Undertaking work for KonSULT has made it clear that there are a significant number of instruments for which there is little or no evidence of their impacts. Instruments for which this is particularly the case include development density, mix and pattern, parking standards and bus management. A second issue is that even where we do have evidence on a particular instrument, it is not always clear how transferable that evidence is, for example in the case of attitudinal and behavioural instruments and some cycling instruments .

These issues present serious challenges to researchers interested in transport policy. Firstly there is the need to continue the task of building up the body of evidence and, in certain cases, to begin this task. Secondly, we need to substantially develop our understanding of context and of potential transferability. This will involve identifying the important factors which define ‘context’ and improving our understanding of how these factors relate to the evidence on impacts. These factors are likely to include city scale, demography and geography, as well as culture, attitudes, behaviour and relationships with other policies.

A further issue which becomes clear when looking individually at a series of policy instruments is that no one instrument on its own is likely to provide a solution to transport problems. Most instruments have at least one positive contribution to make but also have adverse impacts. A package of measures is likely to tackle more problems; one measure can offset the disadvantages of another or avoid the transfer of problems to another area; a second measure can reinforce the impact of the first. Hence, the overall benefits of a package of instruments can be greater than the sum of the parts. The identification of measures which might achieve such synergy is at the core of successful transport planning. However, evidence relating to combinations of policy instruments, or simply relating to how one or other instrument inter-acts with another, is less developed than that for the individual instruments which are reviewed in KonSULT. Gathering and disseminating the available evidence on policy integration, not least that which is emerging from the SPECTRUM project, is one of the key priorities for the next phase of development of KonSULT.

It is likely to be some time before we have full information on the existing array of policy instruments, and new instruments may come on line for which we will then need to begin the evidence-collecting process. We should not let lack of evidence on what might be the ‘best’ policy be a barrier to moving transport policy in the right direction though. The challenge for researchers here is to be effective in disseminating what evidence there is and providing useful guidance where there is little or no evidence. The Challenge for policy-makers is then to make best use of evidence.

6. Conclusions

KonSULT is now fully operational with assessments of approximately 30 policy instruments already in place and more being prepared. Comprehensive guidance on decision-making and strategy development is also in place. The instruments are categorised by type of intervention. This has made it possible to describe all the impacts of a policy instrument in one place. The categories used are land-use policies, infrastructure provision, management and regulation, information provision, attitudinal and behavioural measures and pricing. A sophisticated search facility has also been included. This allows users to search by keyword, or look for information relevant to a particular transport policy objective, problem or strategy, or pick out information relevant to geographical area types or the user types.

Compilation of the material for inclusion in KonSULT has identified areas where further research is needed to fully understand the impacts of policy instruments and the development of effective strategy. This is especially true of newer policy instruments, especially attitudinal and behavioural measures, and small scale projects that operate below the level that is conventionally assessed by transport appraisal methods. The way in which cross-sector impacts are considered is a further challenge at institutional, strategy and appraisal levels.

Thus far during the initial phases, KonSULT has been visited by several hundred users throughout a range of different countries, including several European countries, the US and China; it has also been viewed by delegates at two previous conferences. Feedback has generally been positive and we have sought to respond to it where appropriate. We continue to seek feedback as part of KonSULT's on-going development and invite you to visit the site at http://www.elseviersocialsciences.com/transport/konsult/index.htm

Acknowledgements

The authors would like to express their thanks to colleagues at the Multimedia Environmental Education Group at the University of Leeds, in particular Sally Macgill and James Groves, for developing the KonSULT website. The authors would also like to thank Nick Marler at the Institute for Transport Studies (ITS) who has contributed to the development of KonSULT as well as commenting on an earlier version of this paper. Thanks are also due to Guenter Emberger, also at ITS, who has contributed to this paper and to others who have contributed to and commented on KonSULT.

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