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1. INTRODUCTION

Transport strategies have changed direction very substantially in the past decade or so, but evaluation methodology has not kept up, often because the linkages between new initiatives and outcomes are not well-enough defined or quantified. Also, evaluation methodologies, in practice if not in theory, often assume that 'more is better' and have difficulty coping with change that includes what we do (activity patterns) as well as how we get there (travel). Consequently, new initiatives often have difficulty getting funding.

Without the unknown, the future is pre-determined. With no concept of different (and unknown) ways of doing things, there will be no change except that which is thrust upon us from elsewhere, forcing us to be reactive rather than promoting the ability to choose our own future.

The fact that we choose to change direction demonstrates a high level of concern about the known future and a desire to create an alternative future, which inevitably contains elements of the unknown - either in terms of the destination or the journey.

Equally important, however, is the need to develop effective packages of interventions, as distinct from a series of individual actions. This paper describes the process and outcomes of assessing a wide range of potential actions proposed for possible inclusion in an action plan for travel demand management (TDM) for Victoria (see Ker, 2003, for full report on the assessments). It is not a conventional benefit-cost or multi-criteria analysis. The disparity of actions and levels of application, not to mention the highly variable state of knowledge with respect to aspects of travel demand management, required the development of a more appropriate appraisal methodology.

This paper describes the approach taken to developing simple yet robust decision-support information from a range of qualitative and quantitative resources. It does not present the detail of actions assessed as these are currently under consideration by the Victorian Government.

2. ISSUES

In the past, project appraisal methods have often been based on benefit-cost analysis (BCA). The results are commonly expressed in terms of a benefit-cost ratio and/or discounted net present value, and used as a basis for infrastructure investment decisions. Various issues have arisen in the application of this technique, such as:

- Identifying which impacts to include in the BCA and whether they can be monetised;
- Defining impacts and estimating their magnitude;
- Determining a set of prices per unit of impact; and
- Defining appropriate time horizons and discount rates (Grant-Muller et al. 2001).

During the 1980s, multi-criteria analysis (MCA) emerged as an alternative method to BCA. It provided the opportunity to include qualitative assessments of impacts based on a rating scale. The overall performance of the project is described as a score, which is the sum of each impact's rating (often multiplied by its weighting relative to the other impacts). However, this technique encounters its own set of issues, including:

- How to measure impacts and assign scores;
- The use of weightings and how they are derived; and
- Variations in how scores and weights are combined to given the total score (Grant-Muller et al. 2001).

Assessment of potential travel demand management actions raises a number of important issues that require consideration when identifying an appropriate appraisal methodology.

In particular, it is intrinsically difficult to consistently assess a diverse range of potential actions that vary not only in their nature and scope, but also in the degree to which they are proven and their definition in terms of understanding, development and rollout. Such assessment requires a methodology that is able to be used effectively to produce robust outcomes from limited information, much of which is qualitative rather than quantitative or, at best, ordinal rather than cardinal.

The assessment of actions, proposed for an action plan for travel demand management in Victoria, needed to address triple bottom line (economic, social, environmental) outcomes, as well as issues of feasibility in delivery (an area often ignored or assumed away in conventional project evaluation, making it difficult to get 'unproven' initiatives on the agenda for funding consideration).

Therefore, an appraisal methodology must be applied that is sensitive to these issues. The resulting appraisal framework includes a style of presentation that provides greater transparency about the various impacts of an initiative. As a result, it facilitates the use of the full range of component assessments in decision-making, rather than simply 'consolidating' them into a small number of values or scores for comparative purposes.

This approach to comparative assessment provides a robust approach to decision-support rather than a technical approach to decision-making. Where outcomes are diverse and uncertain, where the distribution of outcomes differs significantly between candidate projects and where there is no single homogenous set of values that can be said to be 'society's values', this allows the decision-maker to see the full range of outcomes and decide what is relevant – rather than having those decisions made for him/her by technocrats. The decision-maker has a more consistent and transparent method of understanding and weighing up the impacts of each action or project.

Inevitably, the more diverse the range of projects being considered and the wider the range of their potential outcomes, the more difficult this approach becomes. However, this difficulty is equally pronounced in conventional CBA or MCA methods – it is simply less visible.

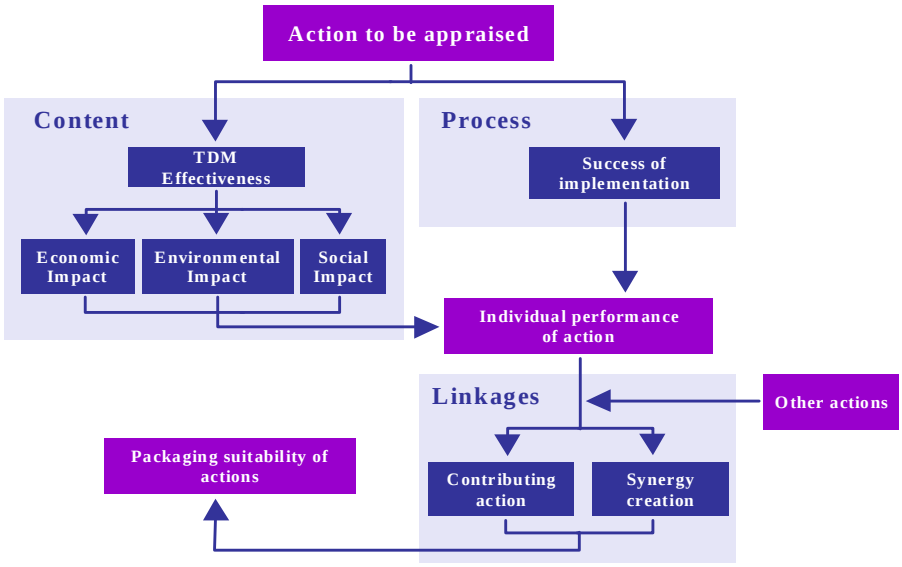
3. THE BASIS FOR APPRAISAL

As part of the development of an action plan for TDM, the Department of Infrastructure, through the project's Consultative Committee and Steering Group, identified a range of criteria against which it considered that proposed actions should be assessed against. These included:

- TDM Effectiveness;
- Economic Impact;
- Environmental Impact;
- Social Impact; and
- Feasibility – technical, social and political.

The framework for appraisal is set out in Figure 1.

Figure 1 Appraisal Framework for Potential Travel Demand Management Actions



In general terms, four different types of actions were assessed:

1. Those that provide the opportunity for people to access information;

2. Those that provide or modify information (including price signals) to people;

3. Those that modify or improve infrastructure and/or service, with or without information; and

4. Those that involve people in identifying existing alternatives and improvements to alternatives to suit their own needs, as employers, employees, students, members of the community.

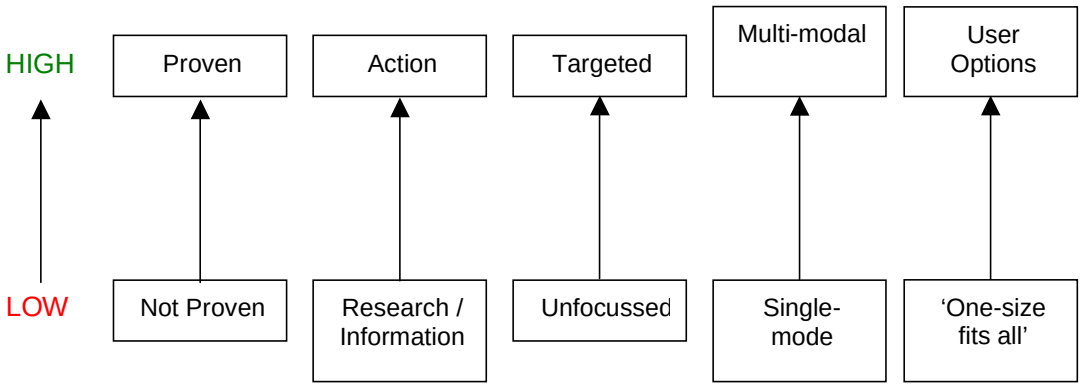
Each action was individually appraised against a set of criteria and given a score between -3 (i.e. high adverse impact) and +3 (i.e. high beneficial impact). Linkages between each action were then identified.

In order to ensure a consistent assessment across a diverse range of potential actions several assumptions were formed. For instance, in terms of the four major categories outlined previously, the action's impact on TDM effectiveness generally increases as one moves down the list. However, many of the initiatives in the earlier parts of the list will be necessary or desirable as part of the lower ones.

Also in this study, the view was taken that the intrinsic effectiveness of a proposed action was being assessed, rather than the action's implementation status or level of intervention,. For instance, some of the actions were described as 'pilot' projects, but included the potential for larger-scale roll-out once their effectiveness has been demonstrated and accepted. In these cases, the appraisal was based on the intrinsic effectiveness of the action rather than 'discounting' for the fact of a 'pilot' scale being small relative to other interventions. Experience with new initiatives, in travel demand management and other areas, demonstrates that pilots are often necessary, partly to test and fine-tune the intervention, but more pragmatically to generate the political and organisational support necessary for funding.

In broad terms, the basis for appraisal followed the form of Figure 2.

Figure 2 Concepts Underlying Assessments for Scoring



3.1 ASSUMPTIONS

Key assumptions were recorded for each appraisal. Over and above these, there are some broad assumptions that underlie any assessment but which might require modification or reconsideration for specific actions. These include:

- The primary target of behaviour change is the single-occupant vehicle. Although this is not the case for school-based actions where the primary 'target' is parents driving their children to and from school, especially where this results in a trip from home and another back, rather than a small deviation (for example on a trip to work).

- The behaviour change from car driver to other modes can be achieved without adversely affecting the travel experience of existing users of those modes.

3.1.1 Induced Demand

A common issue in the assessment of any actions or programs that have the effect of reducing the level of car use is the extent to which there might be a secondary impact of releasing suppressed demand for car travel through reduced congestion. Or it may simply be that actions that cause the car to be left at home and hence available for other household members to use may result in mode change to car for trips currently undertaken by alternatives.

In the case of suppressed demand being released, this would only be likely to be significant where the major impact is on car use in congested areas. However, this may reduce the level of beneficial impact in some aspects (eg reliance on car use, air pollution, greenhouse, safety) but it will not eliminate them as, by definition, the new car users will not tolerate the same level of congestion as previously existed.

In the case of potential car use by other household members, this is less likely in a society with high levels of multiple car ownership. In Perth, WA, for example, only 10% of households have more people with a driver's licence than registered cars. Where the number of cars is at least equal to the number of licensed drivers in a household, leaving the car at home will have no impact on the options available to other household members.

3.1.2 Public Transport Capacity

Where an action has the impact of encouraging car drivers to switch to public transport, it is a pre-requisite for effectiveness that the public transport system has sufficient capacity to be able to accommodate these additional journeys with a reasonable level of comfort and convenience.

Equally, it is essential that existing public transport users do not suffer a reduction in comfort and convenience that will cause them to change to travelling by car.

In some instances, particularly in the case of peak period travel, ensuring this will require additional public transport capacity, through additional services or, in extreme cases, additional infrastructure. It would be counterproductive in the extreme if usage of alternative modes were, in effect, a 'zero sum game' with existing users deserting the alternatives for cars. The planning and implementation for this and its cost must be an integral part of the travel demand management initiative.

3.2 BROAD INTERPRETATION AND ASSESSMENT AGAINST CRITERIA

The broad approach to the interpretation of the assessment criteria adopted for this study is set out in Table 1.

In undertaking the appraisal the following issues were encountered:

- The items under 'TDM Effectiveness', especially the extent of reduction in car reliance, are the key, as they define the primary outcomes through which the remaining impacts are achieved. Since these are not absolute quantifiable measures, there is a degree of relativity between actions rather than precise values. Broad checks were run to see if the implicit scaling held up against other actions.

- Whilst the TDM Effectiveness measures are fundamental, there are good reasons, specific to individual actions, why the assessment against other triple bottom line impact criteria may be higher or lower - the process was primarily to seek justification for such variations, rather than to try to estimate impacts directly, except where there were clear reasons for a particular value.

The negative part of the range of -3 to +3 provides a 'trigger' but was not very useful in practice as the selection of actions for appraisal had already discarded those with potential significant negative impacts. However, there were potential negatives, but not usually as necessary consequences. In these situations, the reasoning for the rating assists in identifying ways of modifying the action to mitigate any adverse impacts.

3.3 DISTRIBUTIONAL IMPACTS

Distributional issues, other than equity of access, were not a core part of the assessment requirements, but a broad identification of winners and losers was undertaken for each action. This check provided the opportunity to identify any significant distributional impacts that could result and therefore ways to mitigate them if possible. Table 2 outlines the common distributional impacts across the TDM actions. Where actions involve voluntary behaviour change, there will be few losers (although taxation changes may be an exception).

Table 1 Broad Interpretation of Assessment Criteria

Criterion	Interpretation/Assessment/Comment
TDM Effectiveness	
♦ Increase Share of Public Transport	♦ Does the action include public transport as an option that is enhanced, promoted or even just available?
♦ Increase Share of Walking and Cycling	♦ Does the action include walking/cycling as an option that is enhanced, promoted or even just available?
♦ Reduce Reliance on Car Travel	♦ Focus primarily on impact on single-occupant car travel?
♦ Optimise use of existing infrastructure	♦ Extent to which impact is on times/areas of peak demand (high score for reduced car use but could be low, even negative where increased demand for public transport if no spare capacity).
Economic Impact	
♦ Positive economic return on investment in transport and land use	♦ Does the action support transport and land use planning strategies?
♦ Reduce costs of travel to the community	♦ To what extent does the action have an impact on critical aspects of the transport system and usage (eg congestion). ♦ Focus on reducing peak-period arterial trips by road will increase rating, but to a smaller extent if change is only to public transport which has no spare capacity.
♦ Improve price signals in the market place	♦ Includes improved perception of existing price signals ♦ Change from fixed to variable costs for pricing will be a benefit.
Environmental Impact	
♦ Improve air quality	♦ Regionally, proportionate to change in car use, with allowance for short journeys (where cold-start conditions comprise a higher proportion of the total journey and the catalytic converter does not become operational until some time after the engine in started) ♦ Locally, lower impact/concentration of pollution in suburban areas ♦ Disproportionate local impact for (mainly peak period) arterial road journeys.
♦ Reduce greenhouse gas emissions	♦ Regionally, proportionate to change in car use, with allowance for short journeys (where cold-starts consume more fuel in starting the engine)
♦ Reduce noise pollution	♦ Generally focussed on times and areas of high car use, so high for peak period commuting on arterial roads and lower for more dispersed (in time and space) impacts
Social Impact	
♦ Improve equity of access to employment opportunities and other activities	♦ Generally proportionate to impact on use of alternatives to car, representing improved perception or reality of using lower cost modes
♦ Increase health and well-being	♦ Generally in line with increase in cycle/walk use (fitness and reduced exposure to air pollution – ICTA, 2000) and impact on air pollution. ♦ Health and fitness benefits from active transport (walking and cycling) depend on existing fitness levels of those who change (people who currently get sufficient exercise in other ways may not benefit) and the quantum and intensity of physical activity undertaken during transport (eg slow walking for short distances may not produce benefits). ♦ Disproportionate local air pollution impact for (mainly peak period) arterial road journeys. There is significantly higher cardio-pulmonary death risk for people living within 100m of a highway or 50m of a major road. Relative risk 1.95 (95% CI 1.09-3.51) (Hoek, et et al (2002).
♦ Increase public safety and security	♦ Related to increased people activity ('eyes on street'), particularly walking and cycling and at public transport stops/stations, and reduction in car use (net road trauma reduction). Children, women and the elderly benefit particularly from safer environment. ♦ Can depend on area of impact. UK research shows children up to four times more likely to be injured in a crash in low socio-economic areas.

Table 2 Broad Distributional Impacts

Criterion	Winners	Losers
TDM Effectiveness		
♦ Increase Share of Public Transport	♦ Public transport operators, especially where spare capacity, including contra-peak-flow use ♦ Existing users if additional capacity (eg service frequency) is provided.	♦ Existing public transport users, where capacity insufficient for increase in use
♦ Increase Share of Walking and Cycling	♦ Existing pedestrians and cyclists through increased numbers and visibility, leading to improved driver behaviour and better facilities. ♦ Individuals who change from car will benefit from improved health and fitness (exceeds increased road trauma risk – Ker & James, 2000)	♦ Individuals who change from car will experience higher road trauma risk yet outweighed by the health and fitness benefits (<u>but</u> they are also winners).
♦ Reduce Reliance on Car Travel	♦ Continuing car users, through improved traffic conditions. ♦ Local communities through reduced traffic volumes (air pollution, noise, safety, severance) ♦ Business and employers where it is possible for them to provide less car parking.	♦ Commercial car park operators ♦ Transport energy suppliers
♦ Optimise use of existing infrastructure	♦ Taxpayer, through reduced demand for additional infrastructure capacity.	♦ Existing users of alternatives may get lower level of service. ♦ Transport infrastructure builders
Economic Impact		
♦ Positive economic return on investment in transport and land use	♦ Owners of property in existing developed areas well-served by alternatives to the car. ♦ Taxpayers benefit from reduced demand for additional road capacity	♦ Owners of property in areas not well served by alternatives to the car.
♦ Reduce costs of travel to the community	♦ Those who continue to use cars will benefit from reduced congestion	♦ No obvious losers unless there is a redistribution of costs, as with pricing changes.
♦ Improve price signals in the market place	♦ Users with alternatives available can make financial and other savings ♦ Existing users of 'low cost' modes will benefit.	♦ Users without alternatives available may have to pay higher prices.
Environmental Impact		
♦ Improve air quality	♦ Local communities and activities close to major traffic concentrations. ♦ Other major emitters – less pressure to reduce emissions. ♦ Those who change from car, through reduced exposure to air pollution (ICTA, 2000). ♦ Federal and State governments (and taxpayers), through lower health system costs (Ker 2002).	♦ No obvious losers
♦ Reduce greenhouse gas emissions	♦ Other major emitters – less pressure to reduce emissions.	♦ No obvious losers
♦ Reduce noise pollution	♦ Local communities and activities close to major traffic concentrations.	♦ Possible impact on residents and activities close to public transport corridors (if not an existing service) – traffic redistributed from road to public transport corridors.

Social Impact		
♦ Improve equity of access to employment opportunities and other activities	♦ People without direct access to a car through age (young or old), disability or financial reasons or through choice.	♦ Possible impact on those whose competitive advantage in the job market is based on access to car.
♦ Increase health and well-being	♦ Those who change from car, through reduced exposure to air pollution (ICTA, 2000). ♦ Those who increase physical activity by the necessary amount. ♦ Federal and State governments (and taxpayers), through lower health system costs (Ker 2002).	♦ No obvious losers
♦ Increase public safety and security	♦ General community through more 'eyes on the street' ♦ All road users, through net improvement in road safety (Ker & James, 2000)	♦ No obvious losers

3.4 SUCCESS FACTORS

The appraisal framework included a number of criteria that relate to the ability of the action to be implemented successfully and easily. These are outlined below:

♦ *Maximise the certainty of an ongoing outcome* – to what extent are the benefits 'guaranteed' versus uncertain? How good is the evidence that the program will achieve the effect and continue to be effective after the initial resources are withdrawn?

This is effectively two distinct criteria, relating to 'certainty' on the one hand and to 'durability' or 'ongoing resourcing requirement' on the other. The latter was shown separately in specific appraisals under the short notations of 'short/long program', with a high rating denoting durable impacts and/or low requirement for ongoing resourcing.

♦ *Realise the benefits in a short amount of time* – How soon will the benefits be realised?

This criterion has been interpreted with the added dimension of the timeframe for cumulative impact. A lower rating has been given where there is a need for development of 'critical mass' or acceptance through pilot projects, which would delay the achievability of full-program benefits.

♦ *Maximise the scale of the impact relative to the cost* – what is the scale of impact related to the cost? What is the degree of the benefit-cost ratio?

This criterion has two elements – impact/benefit and cost. It is quite possible for a low-impact/benefit action to score well on this criterion if the cost is also low.

♦ *Elicit political and social acceptability* – what is the ease with which intervention can be implemented given local political circumstances and the extent to which the intervention will be acceptable to the community?

Surveys in Australia and overseas have demonstrated high levels of community support for reducing reliance on the car and introducing initiatives to favour

alternatives to the car or reduce current favourable treatment of car travel. Political views generally reflect the rhetoric of behaviour change but can stop short of actions, especially where there is likely to be a disadvantage to identifiable interest groups or parts of the community. Voluntary behaviour change should rate well with both groups.

- *Ensure feasibility* – to what degree are the necessary skills, expertise, environments and other resources available?

  Many small initiatives scored well on this criterion, either because they are relatively straightforward, are similar to initiatives already undertaken in other areas or have previously been (or currently are) part of other programs (eg bicycle programs). The more complex actions tend to score less well, although in many instances the skills and expertise are available but need to be packaged in different ways and directed towards different ends.

4. APPRAISING INDIVIDUAL ACTIONS

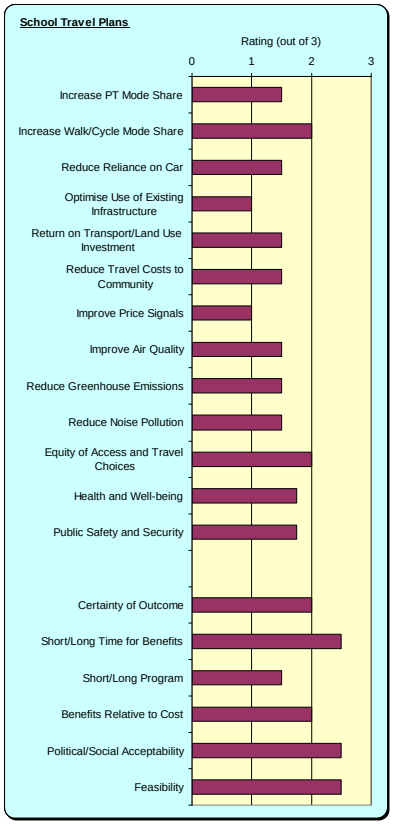
Each proposed action was assessed, using available information and professional judgement against the specified criteria. Simple rating scales were used to minimise the difficulty of achieving broad comparability. At the same time, the number of criteria and the differences between them reduced the risk of systematic under- or over-estimation of the impacts of any initiative.

Each appraisal was presented as a one-page summary (see Figure 3 for an example), including graphical representation, to show each appraisal in as far as possible comparable form with at least an outline of the basis on which the assessment was made. This summary also included a schematic of the extent to which the action would contribute to ('contributing') or are supported by ('synergy') other proposed actions.

Figure 3 Example of Summary Appraisal

School Travel Plans

The creation of green travel plans for schools to encourage both staff and students to adopt sustainable travel. This could relate to establishing facilities within the site (eg bike racks), adjacent to the site (eg bus bays), access routes to the school (eg pedestrian access, walking school bus), school policies about walking and cycling, and parent/student agreements with the school.



Schools, like tertiary institutions, are foci of travel activity, but to a smaller extent. On the other hand, travel is more concentrated (ie largely at two distinct times of day) and the catchment area is usually smaller – although this is not necessarily the case for some private schools.

A school travel plan puts forward a package of measures to improve safety and reduce car use, backed by a partnership involving the school, education and transport officers from the local authority, the police and the health authority. It is based on consultation with teachers, parents, pupils and governors and other local people. The school travel plan concept is still relatively new, but it has generated considerable interest both in this country and on the continent.

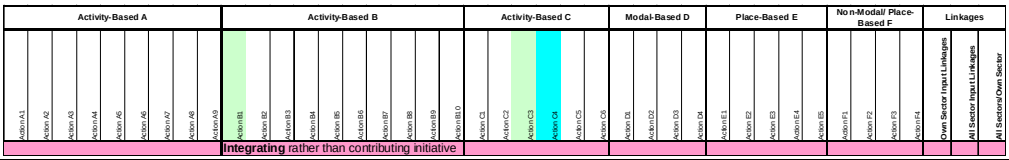
This approach has more impact than initiatives which focus on a single issue or mode of travel, bringing together measures which reinforce each other to create a virtuous circle: improved safety leading to reduced car use and still better safety. (DfT, 2002b).

School Travel Plans are a relatively recent initiative in the United Kingdom. It is, therefore, too early to expect robust evaluation. However, DfT (2002b, Section 3.7) reports some specific examples of achievement and a generally increasing confidence in the value of School Travel Plans.

When asked whether School Travel Plans had actually had an effect on the numbers of children travelling to school by car, over 30 of the 42 authorities undertaking monitoring of STPs said that it was too soon to tell. None of the authorities said that STPs had had no effect, two did not answer and ten thought they already had had an effect on the numbers of children travelling to school by car. Their estimates of the percentage reduction in car escort journeys at participating schools in the last year ranged from 5% (Wiltshire County Council, 13 schools with STPs) to 50% (Vale of Glamorgan Council, unspecified number of schools with STPs). The only other authority which estimated a percentage reduction greater than 30% was Doncaster which had one school with an STP. It seems likely that authorities with only one or two STPs will be able to concentrate efforts on those schools and therefore achieve greater percentage reduction for particular schools. However, authorities which are working with more schools may be having a bigger impact overall.

Thirty-nine of the 64 authorities monitoring STIs said that it was too soon to tell whether they had actually had an effect, two authorities said no, one did not know and 22 said that they had had an effect on the numbers of children travelling to school by car.

In 1998, only five authorities said that SRtoS type projects actually had an effect so it would appear that local authorities are becoming more confident that school travel initiatives can be effective. This could simply be because they have been in place for longer or because they have carried out more monitoring than in the past. Or it could perhaps be that local authorities are becoming more successful at implementing effective initiatives.



5. LINKAGES

While the assessment was based on the performance of an individual initiative, there is recognition that many TDM actions cannot be implemented in isolation and in fact there are opportunities to create synergies between actions. Therefore, potential for actions to support and contribute to the success of others have been identified.

The original intention was to identify 'precursor activities' (i.e. actions that needed to be undertaken in the short term to increase the success of a longer-term action), as well as the linkages between proposed actions.

In practice, this level of detail could not be addressed, as such issues will often relate to the specific circumstances of an action rather than being clear from generic assessment. They are also, often matters of degree: for example, although reform of Fringe Benefits Tax is desirable for the effective development and implementation of workplace travel plans, it is not a necessary precursor, as experience has already shown both in Australia and overseas, where successful travel plans have been achieved.

Instead a more general assessment of linkages was undertaken, according to whether individual actions would contribute to the success of others. A by-product of this assessment was a related assessment of the extent to which each action was supported by others. This approach found that some actions were 'integrating' by their very nature, rather than contributing and that others would benefit by amalgamation across areas, for instance assigned officers, in State or local government, could encourage and facilitate voluntary travel behaviour change across workplace, school and community situations.

This information was tabulated in a way that allowed cumulative measures of the extent to which each proposed action supported others or was supported by others. These simple numerical measures deliberately made no attempt to attribute greater or lesser importance to any of the proposed actions (Table 3 provides an example of the process).

Table 3 An example of linkages between TDM actions

			Supported Actions						
Contributing/Supporting Actions		Journey Planner	Access maps	Green travel plan	Travel/ transport education programs	Events days	Travel information /mobility centre	Awards	Linkages
	Journey Planner			ü	ü	ü	ü		4
	Access maps	ü		ü	ü	ü	ü		5
	Green travel plan		Integrating rather than contributing initiative						
	Travel/ transport education programs			ü		ü			2
	Events days			ü			ü		2
	Travel information/ mobility centre			ü					1
	Awards	Reinforcing rather than contributing initiative							
	Total Precursor/ Linked Actions	1	0	5	2	3	3		

6. SIMPLIFICATION AND PATTERN RECOGNITION

The individual assessments contain a very large amount of information that would be difficult to integrate into a decision-support framework. However, it is important that this information remain accessible rather than becoming hidden in more aggregated measures. This was achieved by maintaining the structure of criteria according to:

- 'effectiveness' and 'impact':
  - impacts on mode choice,
  - economic impact,
  - social impact,
  - environmental impact; and
- 'success factors':
  - certainty of ongoing outcomes,
  - time to realise benefits,
  - durability of impacts,
  - impact relative to cost,
  - social/political acceptability,
  - technical and resource feasibility.

A mean rating was established for each of these two categories by averaging the action's performance scores across each criteria. Figure 4 provides an example of how the initiatives were presented to identify a clear pattern of the overall performance (i.e. effectiveness and success) of each action.

Whilst the ideal program of actions would score highly on the basis of both success of implementation and effectiveness, it is important to distinguish between the two. An intervention that rates highly on the basis of feasibility (ie it can be implemented without difficulty) might not be very effective in achieving the desired outcomes. Conversely, an intervention that scores highly on intrinsic effectiveness might be extremely difficult to implement. In either of these cases, it would be difficult to achieve the desired outcome, but for different reasons.

It was found that initiatives did not need to be overly complex nor infrastructure driven to perform well in changing behaviour (often termed in the UK as 'soft' measures (Halcrow 2002)). Some examples include:

- Assigned officers, in State or local government, to encourage and facilitate all aspects of planning and delivery of voluntary travel behaviour change in tertiary institutions, workplaces, schools and the community, who are also supported by counterparts in the target organisations or communities;
- Development of initiatives to effectively target smaller workplaces and other organisations, possibly on a co-operative basis;
- New programs and materials to target people who are making lifestyle changes, such as new job or new house, and are therefore open to making changes in travel behaviour;
- Changes to taxation and remuneration options to level the playing field between modes, rather than giving preferential treatment to cars; and
- Awards to recognise significant achievements in any area of travel behaviour change and to encourage/reinforce such initiatives.

While the individual performance of an initiative was considered important, there was a need to present the findings that relate to the ways in which the proposed actions contributed to the potential success of other actions or were, themselves, supported.

Table 4 presents the approach used to illustrate the performance of an action in terms of its effectiveness, success as well as its contribution to the success of other actions. The numerical scores for effectiveness and feasibility as well as the extent of contribution to other proposed actions ('contributing') and the extent to which they bring together and add value to other actions ('synergy') have been translated into a star rating (max five stars). In each case, the star rating 'interval' has been established by dividing the effective range (zero to maximum actual value) by five, giving uniform intervals from 1 to 5 stars.

Proposed actions that rate well (at least four stars) on at least two of the criteria groups would be highly valuable components of an action plan.

In practice, many of these can be combined into single, multi-purpose initiatives, with additional benefits of synergy between initiatives, sharing information and learning, and feasibility of resourcing. Others can be extended beyond their original context with similar effect. For example, Green Travel Planning for single sites or organisations, including tertiary institutions, schools and workplaces, could include some key tools, such as:

- journey planners;
- advice about locations that enable easy access by public transport, walking and cycling to the site to assist in finding places to live;
- access maps;
- bulk purchasing of public transport tickets or other schemes, such as the Universal Flexi-pass for students and staff used in the US, which might also have application for large workplaces in particular;
- analysis and audits of site facilities and policy context; and
- infrastructure provision, such as bike storage and other end-of-trip facilities for cyclists and walkers.

7. CONCLUSION

Diversity of actions and limited knowledge of potential impacts are characteristic of new directions in transport and can make it difficult to gain acceptance and funding. In this context, appraisal should be seen as decision-support, not decision-making. The analyst is not the decision-maker, nor should he/she seek to pre-empt that role by over-defining the analysis to produce unique or highly-constrained rankings of projects, especially where the issues relate to policy rather than projects.

This study of proposed travel demand management actions has demonstrated that a broad-based multi-criteria approach to appraisal can deliver robust and supportable outcomes that can be useful in a policy context, even where there is limited information about the impacts of specific actions and the actions themselves are highly diverse.

The absence of a rigid framework, such as weighting of criteria or monetary valuation, coupled with the use of a large number of criteria covering a range of outcome and feasibility issues, makes possible the integration of what information is available into a manageable framework. It provides the decision-maker with a more consistent and transparent method of understanding and weighing up the impacts of a particular action.

In turn, the framework can be enhanced by aggregation that aids simplicity without losing detail and by presentation that focuses on patterns rather than numbers. These patterns, in turn, facilitate the development of synergistic packages of actions as well as identifying individual actions with high potential.

Figure 4 Effectiveness and Success Summary

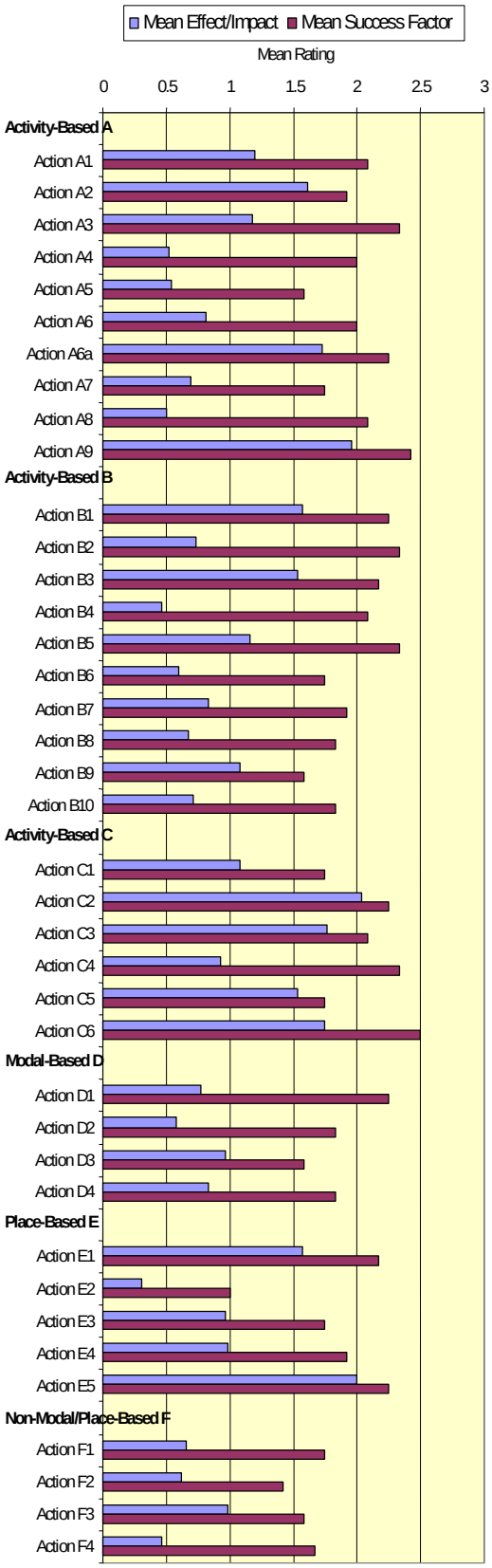


Table 4 Comparative Ratings

	Effectiveness	Success	Contributing	Synergy
Activity-Based A				
Action A1	***	*****	***	**
Action A2	****	****	**	**
Action A3	***	*****	*****	**
Action A4	**	****	***	*
Action A5	**	****	*	*
Action A6	**	****	*	*
Action A6a	****	*****	***	****
Action A7	**	****	**	**
Action A8	**	****	**	****
Action A9	****	*****	(a)	**
Activity-Based B				
Action B1	****	*****	*	*****
Action B2	**	****	**	**
Action B3	****	****	(a)	**
Action B4	*	****	***	*
Action B5	***	****	****	**
Action B6	**	***	*	**
Action B7	**	****	*	*
Action B8	**	***	**	**
Action B9	***	***	*	**
Action B10	**	***	****	**
Activity-Based C				
Action C1	***	***	**	*****
Action C2	*****	****	(a)	***
Action C3	****	****	****	*****
Action C4	**	****	(b)	*****
Action C5	****	***	(a)	***
Action C6	****	*****	**	**
Modal-Based D				
Action D1	**	****	*****	*
Action D2	**	***	*	*
Action D3	**	***	****	**
Action D4	**	***	**	*
Place-Based E				
Action E1	****	****	**	**
Action E2	*	**	*	*
Action E3	**	***	***	**
Action E4	**	****	**	**
Action E5	****	*****	(a)	****
Non-Modal/Place-Based F				
Action F1	**	***	***	*
Action F2	**	***	**	*
Action F3	**	***	***	*
Action F4	*	***	***	***

(a) Integrating rather than contributing actions.
(b) Reinforcing rather than contributing action

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