



Planning and Transport Research Centre (PATREC)

EXECUTIVE SUMMARY

PATREC Rapid Appraisal Model (P-RAM)

Project No	Project 3
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The project introduces a high level decision support tool to assist the appraisal of TDM policies and projects related to travel plans for new developments and VTBC programs. The **PATREC rapid appraisal model (P-RAM)** supports economic benefit cost assessments of a rough order of magnitude for household information and individualised marketing, workplace and school travel TDM initiatives. In addition, P-RAM may be used to assess the benefits of included TDM measures as a component of capital expenditure on transport infrastructure. The aim is to provide a decision making structure that allows the benefits of TDM projects to be measured in a consistent way and examined on their own or as being a component of capital expenditure.

PATREC Rapid Appraisal Model (P-RAM)

The PATREC Rapid Appraisal Model (P-RAM) is an Excel-based software package that evaluates the economic (and social) costs and benefits of travel behaviour change (TBhC) initiatives. The model was developed using the methodology outlined by the Australian Transport Assessment and Planning (ATAP) guidelines.

P-RAM efficiently conducts this cost benefit analysis by converting an input consisting of the TBhC program type and a few other key parameters, and outputting a benefit cost ratio (BCR) and net present value (NPV).

Economic Analysis Framework

The P-RAM appraisal identifies the economic and social benefits of travel behaviour change programs. Social benefits are benefits to the whole of the target population, not just the individual mode changers, and include: decongestion, less pollution, reduced accidents and increased physical well-being. In accordance to ATAP these social benefits are estimated in monetary terms through unit costs to provide an overall economic benefit.

According to the ATAP, benefits and costs of TBhC initiatives fall into the four following benefits. Generally, TBhC programs aim to encourage users to switch from private transport to public or active transport modes. This assumption is used to describe the four types of benefits/costs below:

- Category A: Benefits to the existing users of public and active transport modes being targeted by the program.
- Category B: Benefits to the new users of public and active transport.
- Category C: Benefits resulting from the avoidance of unperceived costs associated with private transport.
- Category D: Unperceived costs (or benefits) to the new users of public transport.

Figure 1 below describes a scenario where a traveller switches from car use to public transport as a result of a TBhC initiative. It is assumed that the traveller accounts for the perceived costs, out-of-pocket cost and travel time, and chooses the lower cost of the two alternatives. The intent of the TBhC initiative is to make the traveller aware of the unperceived costs. After the initiative, category B benefits are shown by the difference in perceived costs and category C benefits are due to avoiding unperceived costs associated with car travel. However, there remain unperceived externalities associated with public transport and these are accounted for by subtracting category D costs.

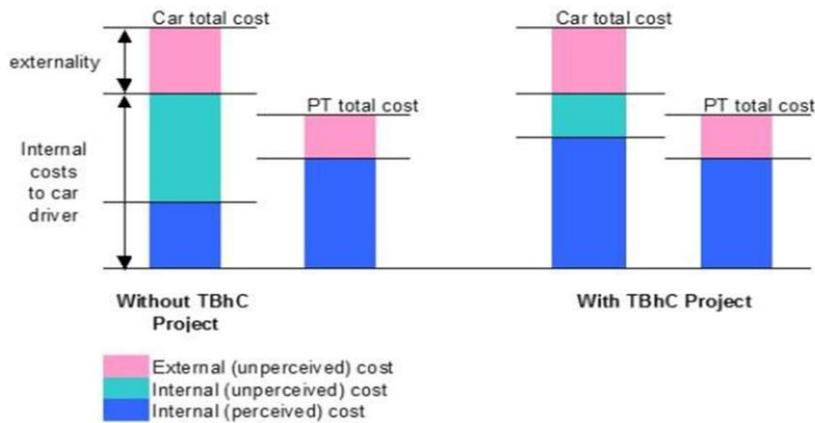


Figure 1: Effect of TBhC initiatives with reference to the benefit/cost categories defined by ATAP

Source: 'Figure 1: Categories of costs associated with a car trip', Australian Transport Assessment and Planning Guidelines: Travel Behaviour Change (Transport and Infrastructure Council 2016)

The net benefit is computed by adding benefits B and C before subtracting unperceived costs D. Category A benefits do not apply as the TBhC project does not include infrastructure or service improvements. The total benefits are attributed to the population through an estimate of the percentage of car users who make the change such that the total benefits for population N with a diversion rate of p is given by:

$$\text{Total Benefits} = N.p. (B+C-D) \quad \text{Equation 1.}$$

Equation 1 has been coded into a user friendly multi-sheet Excel spreadsheet. The input-output page is the main page users will operate when using P-RAM. Users enter program details on the nature of the project, the target population and the estimated cost through the use of drop down menus. The economic benefit indicators are presented on the same page as illustrated in Figure 2

Calculation Inputs	
Population	10000
Trip type	Other trips
City size	pop > 1 million
Travel time	All
Appraisal period	10
Discount rate	7%
Program cost	\$2,500,000.00
Program type	Household/Community based initiative
Assumed effect on transport	Standard
Trips per day	1
Click here	Calculated days per year
	365
Output	
Click here	Benefit cost ratio
	5.47
	Net benefit
	\$10,445,942.88
Click to see calculation steps	

Figure 2: P-RAM Input-Output page

PATREC recognises that this is a broad brushed approach to appraisal and continued effort should be made to refine the parameter estimates applicable to Perth. To this end a detailed developer manual and eleven training videos were created to allow agencies to peer under the hood and make changes that are specific to each project. PATREC included two separate pieces of analysis that required customisation of P-RAM. The first is delivering a TBhC program with an infrastructure construction project (Section 3) and the other is an evaluation of land use and density measures for the Bayswater station precinct (Section 4).

Project Impact Statement

The project is aimed at the following research questions:

RQ1: What is the standardised evidence based method should the transport portfolio use to appraise specific travel plans for new developments and VTBC projects in order to prioritise TDM funding?

Outcomes

Software, reports manuals and support videos officially delivered 19th June 2017. However, software was in use by DOT over the course of 2017:

- P-RAM Software delivered as a spreadsheet.
- A website <https://444987364.wixsite.com/patrec-uwa/pram> was provided to house a definitive version for DOT to share with members of Traffic Demand Management Senior Officer's Working Group (TDM SOWG) - GOAG
- Technical report on methodology (APPENDIX 2.1)
- The Software User's Manual (APPENDIX 2.2)
- Software Developer's Manual APPENDIX 2.3
- Thirteen short training videos addressing the use and the development of the modes were made available at available at <https://444987364.wixsite.com/patrec-uwa/p-ram-training-videos>
- Workshop on method and use of P-RAM delivered to DOT/DOP & PTA July 24 2017

Support to the travel behaviour team at DOT, April-June 2017.

- Spreadsheet used by DOT to develop the business case for your move central Your Move Central, to appraise the benefits of a travel behaviour change program delivered in the Perth CBD and surrounding area.
- Economic evaluations were supplied for an evaluation of over 20 workplace programs. Whilst useful to inform the process the final results were not report to the funders of Healthy Workers Initiative. The results are not provided in this technical report and can be made available on request (David Wake is the current custodian of the summary analysis).

Impact on travel behaviour due to density and land use mix for a railway station precinct

- Economic appraisal of land use density and mix as well as station accessibility Bayswater Station APPENDIX 4.1
- Software developed for DOT and submitted to industry mentor, Clair Thomson.
- Software User Manual APPENDIX 4.2
- Results presented to CEED annual seminar September, 2017
- Paper Accepted CAITR, 2017

Work discussed or proposed but not delivered upon

Extension of PRAM to support travel plans for new commercial developments (other than workplace programs).

- Travel plans for new commercial developments are not defined in a way that an economic appraisal tool could be readily applied. It was decided in March 2017 that a way forward was to identify two policies that could be included in in the documents as any specific tool and it was agreed that the project include:

- a. Active transport facilities at the local level
- b. Parking policy / supply and pricing for centres

Some initial work has been done in the area by a PATREC research assistant. A model has been prepared, but I am not confident that it is ready for release. I have chosen to not report the initial work here.

RQ2: How would a transport agency assess the benefits of travel plans for new developments and TBhC programs when included as a component of supply-side projects including roads, railways and bike paths?

Outcomes

- P-RAM has been used to appraise the benefits for demand management proposals for Forrestfield-Airport Link and Metronet projects Yanchep Rail Extension and Thornlie Line Extension.
- An evaluation of Mandurah Living Smart Program is provided in Section 3 of this report
- Workshop on method and use of P-RAM for appraising infrastructure accompanying TBhC programs was delivered to DOT/DOP & PTA July 24 2017.

RQ3: What is the standardised evidence based method should the transport portfolio use to monitor and evaluate specific travel plans for new developments and VTBC projects in order to account for TDM funding as well as make subsequent funding decisions?

Work discussed or proposed but not delivered upon

During the course of the project PATREC team 3 discussed the possibility of drawing on the Transport Data Hub (PATREC Projects 4.1 and 4.2). Some initial ideas were discussed but as the discussion progressed the application of observing travel behaviour changes through Smart Rider data, traffic monitoring counts and broader economic indicators (such as occupancy rates of commercial properties in the CBD) appeared to be a major project on its own. Work on RQ3 has not been progressed and will be put forth as a research proposal for 2018/2019 as a joint outcome of Projects 3 and 4. In addition the proposal will address the support for Project 1 (Phase 2) on developing business cases for railway precinct development.