MONASH University

Land Transport Authority – Sharing Session
Policy and Planning
Thursday 14th February 2020

Sharing Session

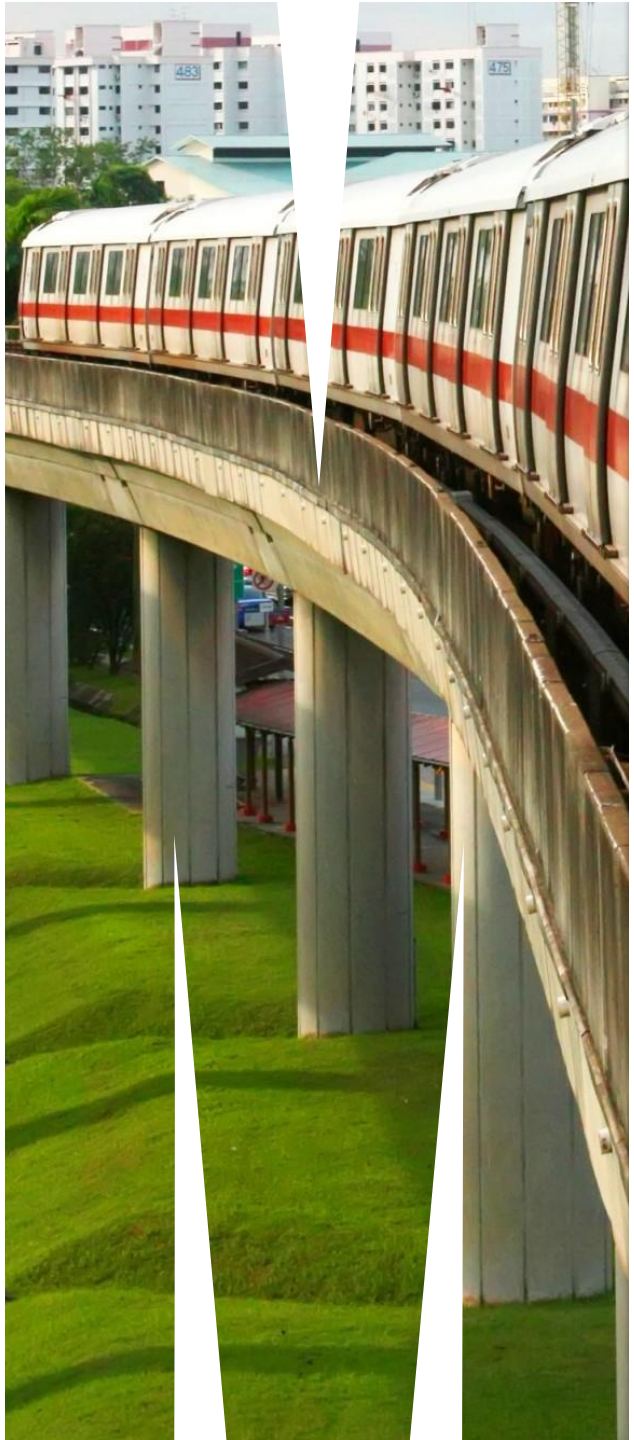
Monash Research Discoveries in Transport Policy and Planning

Prof Graham Currie FTSE
SMRT Engineering Excellence Visiting Endowed Professor, NTU
Director
Public Transport Research Group
Monash Institute of Transport Studies
Monash University, Australia

PTRG PUBLIC TRANSPORT RESEARCH GROUP

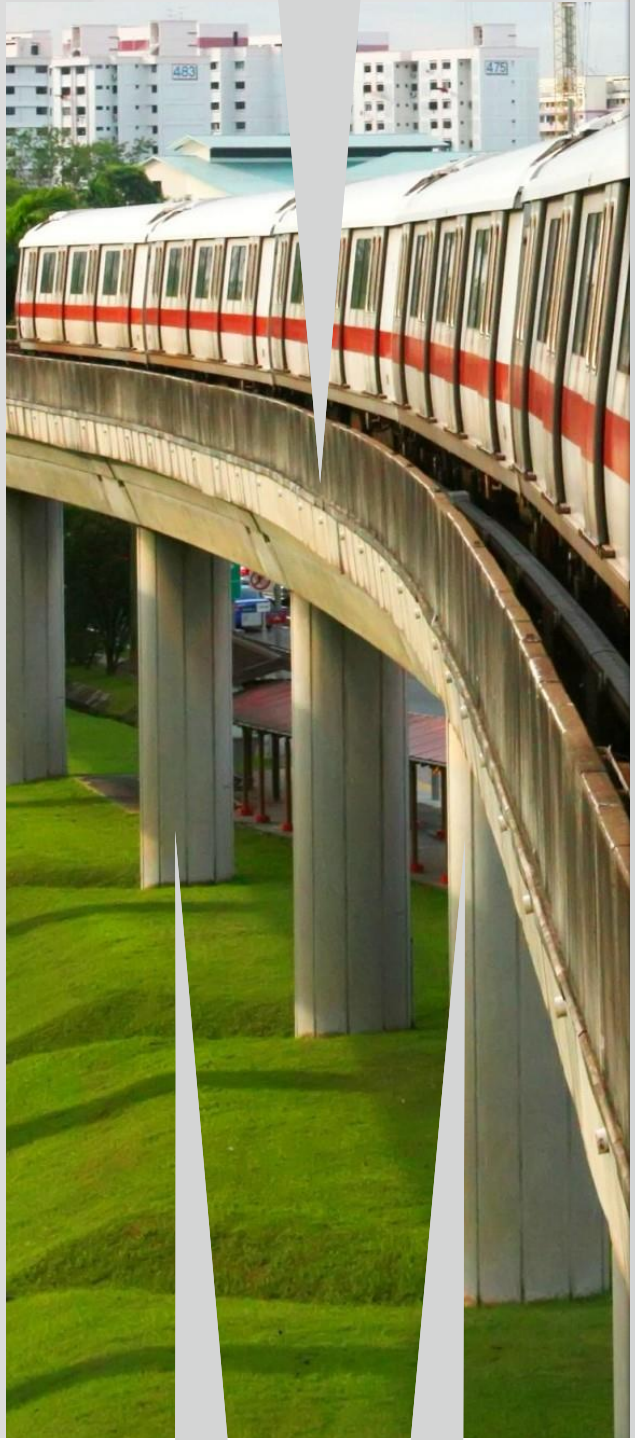
GROUP OF EIGHT AUSTRALIA

MONASH INSTITUTE OF TRANSPORT STUDIES

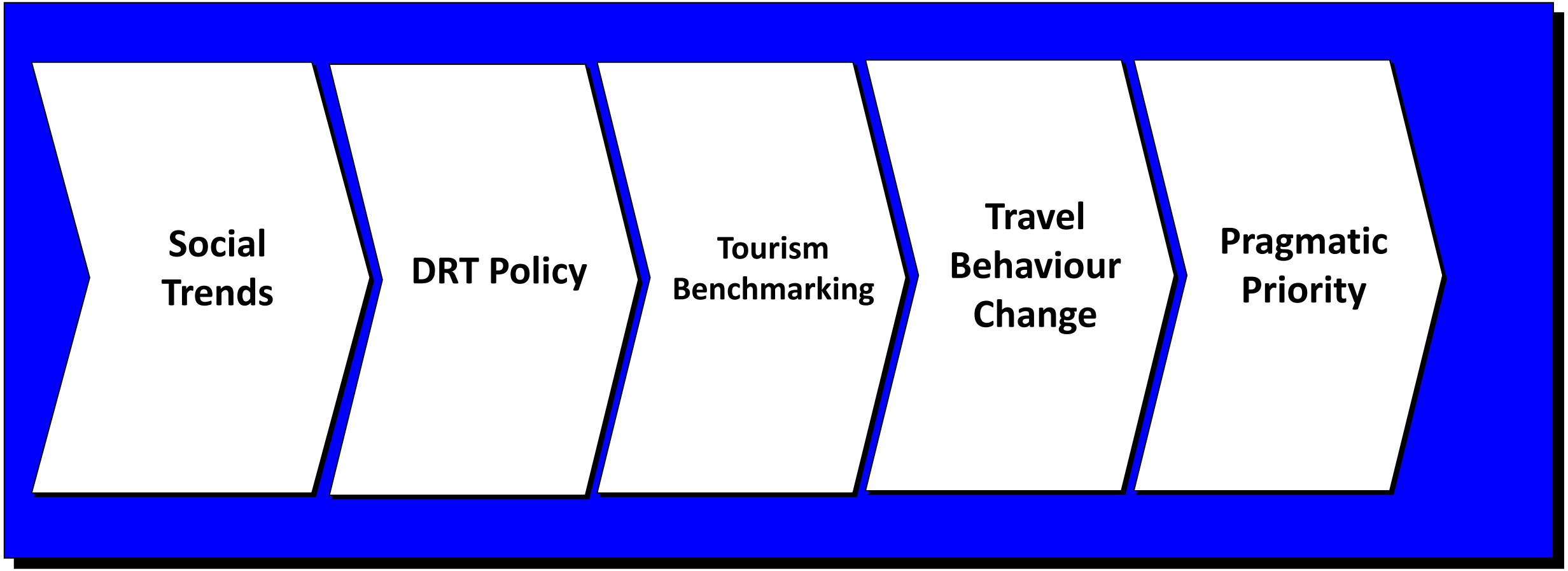


MONASH University

- Introduction
- Social Trends
- DRT and Policy
- Tourism Benchmarking
- Travel Behavior Change
- Pragmatic Priority



This sharing session is an open discussion of Monash Research focused around 5 themes



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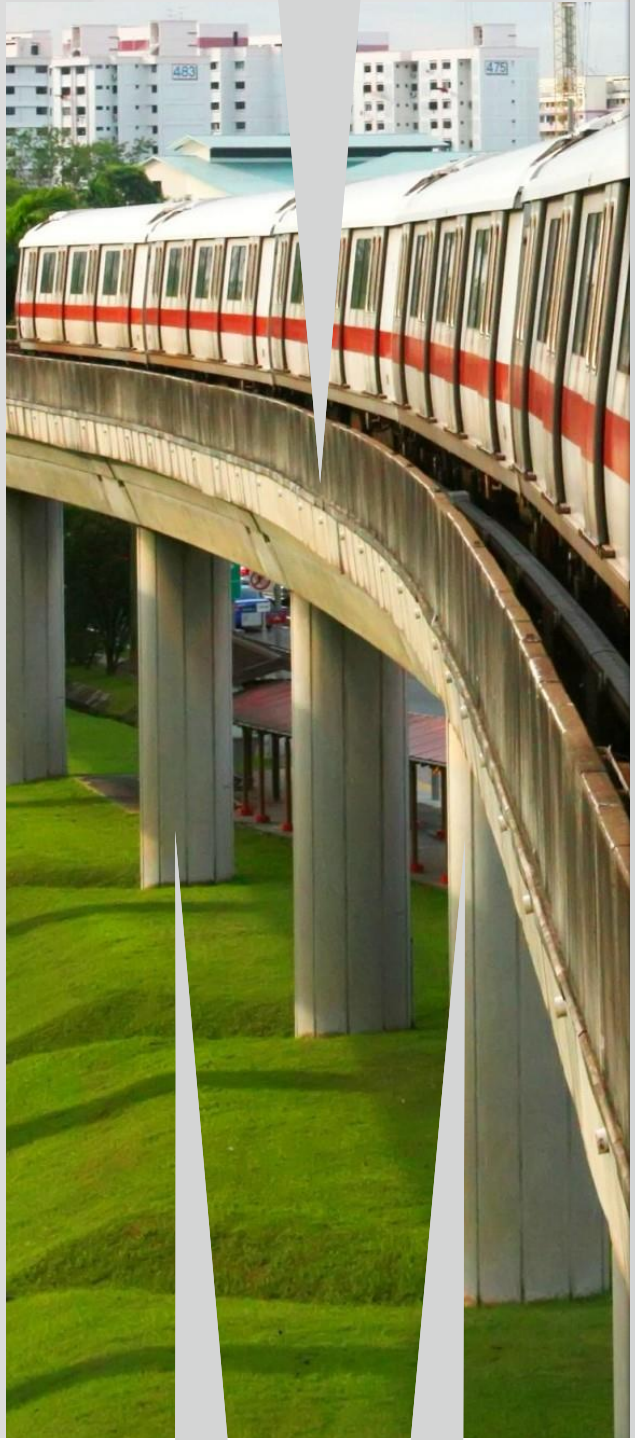

Monash research has explored social trends and their impact on transport including the impacts of an Ageing population and the global decline in youth driving licences

Ageing Population Research

Source: Currie G and Delbosc (2010) 'Exploring public transport usage trends in an ageing population' TRANSPORTATION Vol 37 pp 151-164

Transportation (2010) 37:151–164
DOI 10.1007/s11116-009-9224-x

Exploring public transport usage trends in an ageing population

Graham Currie · Alexa Delbosc

Published online: 15 September 2009
© Springer Science+Business Media, LLC. 2009

Abstract An ageing population remains one of the most significant challenges for Western society in the 21st century. Whilst public transport use has attractive sustainability features for older generations there is mixed evidence with regard to trends in travel and public transport use in ageing societies. This paper explores public transport trip rates amongst older age groups using travel survey evidence collected from a household travel survey in Melbourne, Australia for the period 1994 to 1999. A particular aim of the research was to establish trends in trip rates so as to explore the impact of the ageing Baby Boomer generation on travel by public transport. The results suggested that compared to those aged below 60, those aged over 60 years demonstrated 30% lower trip making overall and 16% lower public transport trip rates. Longitudinal trends in trip rates showed those aged over 60 had a very small decline in trip rates by public transport (−0.004 average daily trips per annum) but increasing rates for car trips. A further analysis showed a small but significant increase in longitudinal trip rates of public transport use amongst Baby Boomers (0.004 daily trips p.a., $p < .05$) while car usage for Baby Boomers was steady. The implication of these findings is that trends in the existing over 60s population are not necessarily going to flow through to behaviour patterns in the Baby Boomer generations. The Baby Boomer age group showed longitudinal trends in travel behaviour which contrasted with those of the existing over 60s generation notably with a trend towards increased public transport usage.

Keywords Travel behaviour · Public transport · Elderly · Travel · Trends

Introduction

An ageing population remains one of the most significant challenges for Western society in the 21st century (Metz 2003; Browning and Sims 2007). The mobility of older citizens is now

G. Currie (✉) · A. Delbosc
Institute of Transport Studies, Department of Civil Engineering, Monash University, Building 60, Clayton, VIC 3800, Australia
e-mail: graham.currie@eng.monash.edu.au

Springer

Youth Licensing Research

Source: Delbosc A and Currie G (2013) 'Causes of youth licensing decline: a synthesis of evidence' TRANSPORT REVIEWS Vol. 33, No. 3, 271–290c

Transport Reviews, 2013
Vol. 33, No. 3, 271–290, http://dx.doi.org/10.1080/01441647.2013.801929

Routledge

Causes of Youth Licensing Decline: A Synthesis of Evidence

ALEXA DELBOSC* AND GRAHAM CURRIE
Department of Civil Engineering, Institute of Transport Studies, Monash University, Building 69, Clayton, Victoria 3800, Australia

(Received 27 February 2013; revised 27 March 2013; accepted 30 April 2013)

ABSTRACT In recent decades, young adults in many developed nations have become increasingly less likely to acquire a driving license. If this trend continues it could have significant impacts on transport futures. Licensing reductions have only recently been identified and causes are only just being explored. This paper presents a first synthesis of available evidence including an assessment of more influential causal factors. It begins by documenting the declining trend evident in 9 of 14 documented countries; the average rate of decline is 0.6% per annum, with highest declines documented in Australia. A range of causal factors are documented from cross-sectional and longitudinal studies. Changes in life stage and living arrangements, changes in motoring affordability, location and transport, graduated driver licensing schemes, attitudinal influences and the role of e-communication are all explored. Evidence is in general weak and preliminary but suggests multiple causes rather than any single influence. However, of the evidence available life stage factors and affordability influences have stronger links to license decline but are only likely to have a low affect size.

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Against this backdrop a significant opportunity is arising: in many countries young people are less likely to get a car license and, if they can drive, they are driving less (Kuhnimhof, Buehler, & Dargay, 2011; Raimond & Milthorpe, 2010; Sivak & Schoettle, 2011, 2012a). This trend has only recently been identified and researchers are just beginning to explore its causes.

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Ageing population and the global decline in youth driving licences

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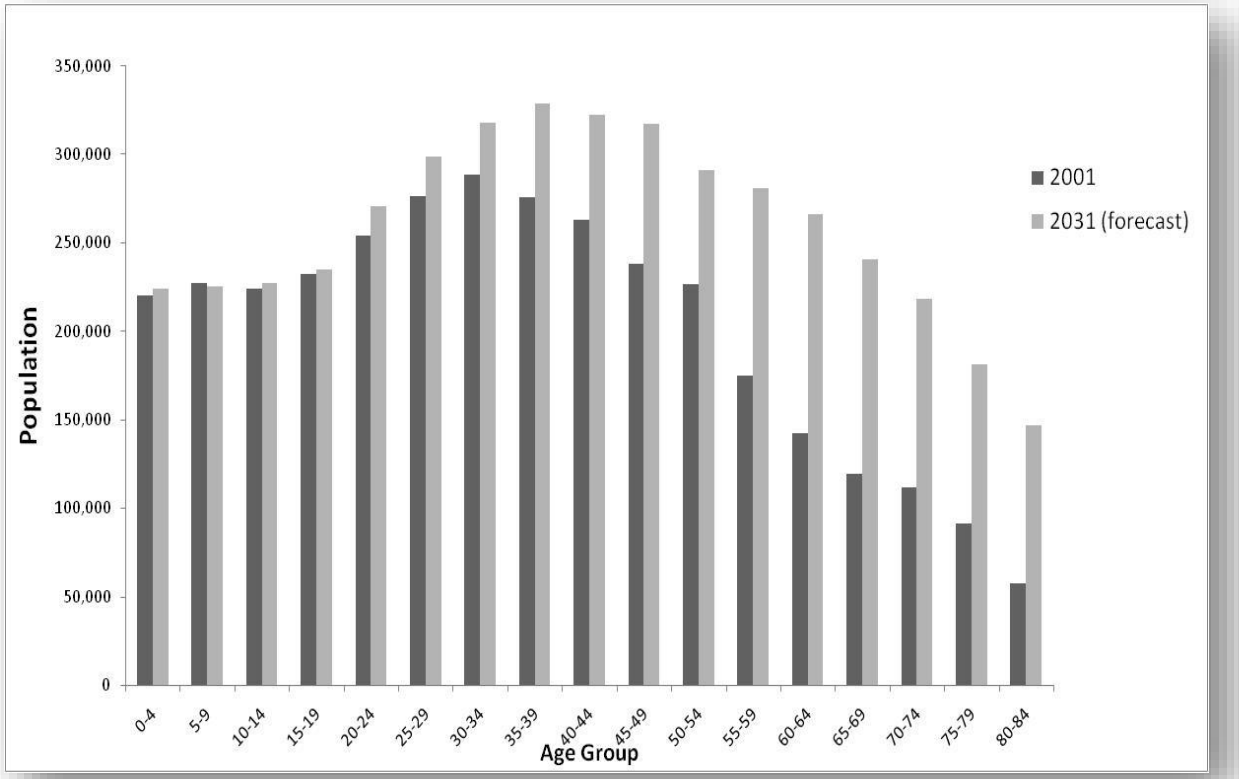
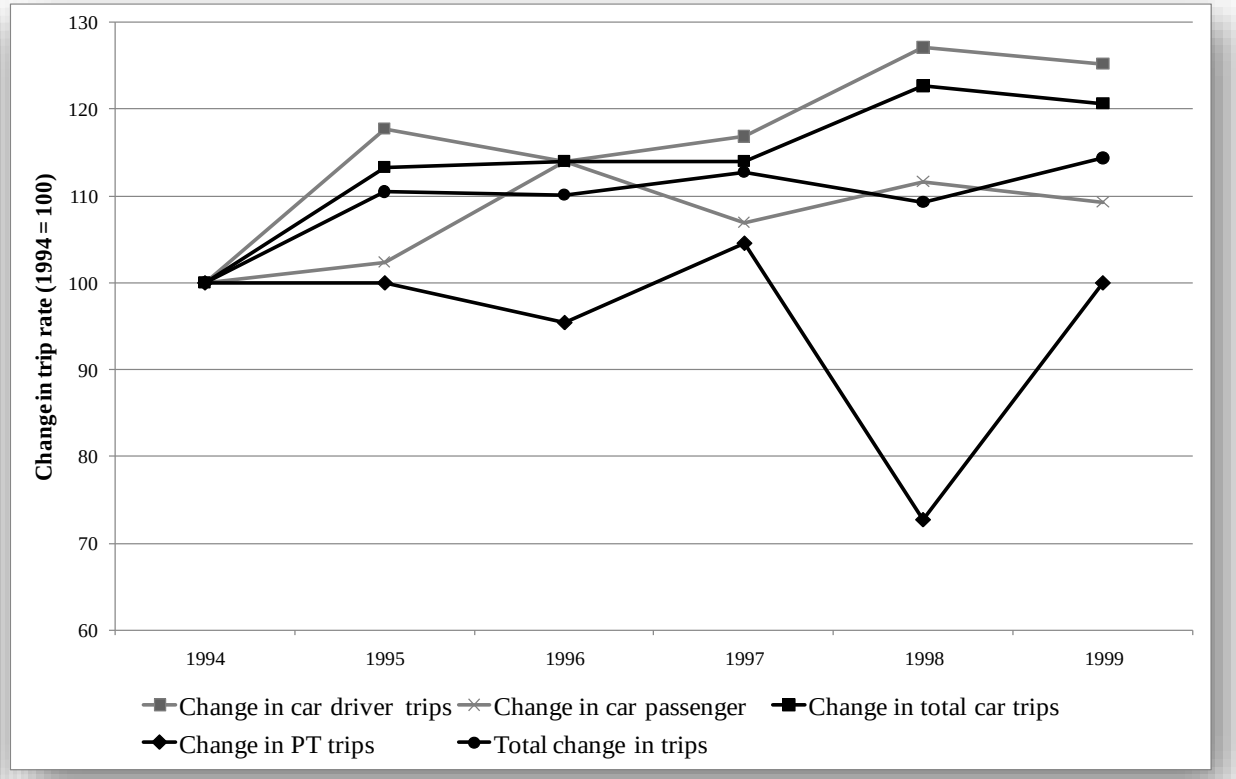
- paper explores public transport trip rates amongst older age groups using travel survey evidence collected from a household travel survey in Melbourne, Australia for the period 1994 to 1999.
- aim to establish trends in trip rates so as to explore the impact of the ageing Baby Boomer generation on travel by public transport.

Forecasts show an ageing population – trends suggestion motorisation, less sharing and PT use growth for those over 60



Metropolitan Melbourne Age Structure 2001-2031 (DSE, 2004)

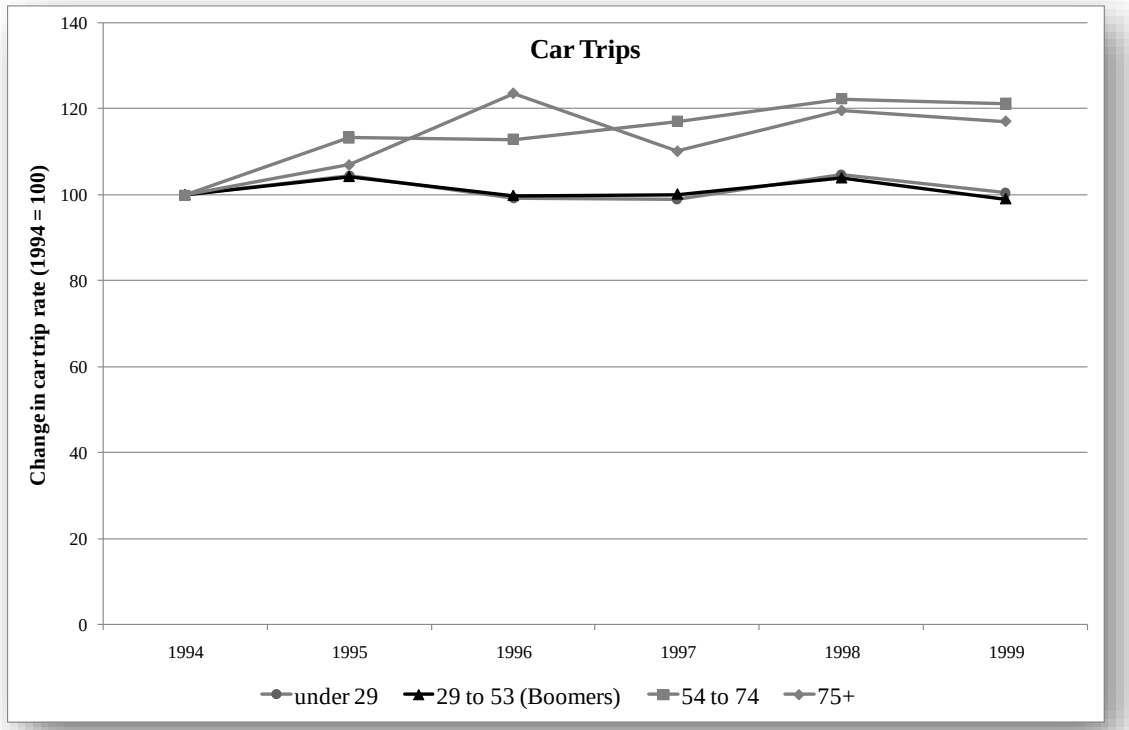


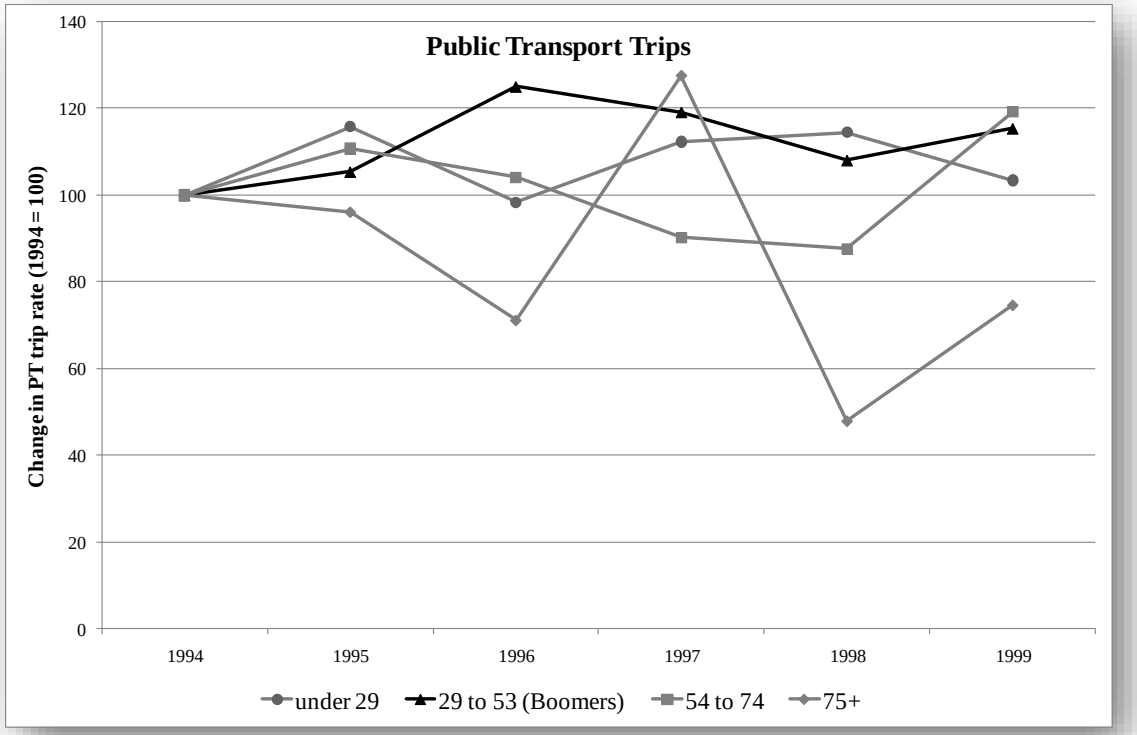
Change in trip rates for those aged 60+

Source: Currie G and Delbosc (2010) 'Exploring public transport usage trends in an ageing population' TRANSPORTATION Vol 37 pp 151-164

By age cohort – driving growth is flat for the Baby Boomers; higher for others – PT use growth is up for all cohorts except the over 75's

Change in car and public transport trips by age cohort





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PT growth in up for over 60's living in inner Melbourne where PT service levels are higher and more competitive with the car

Public transport trips per day by region for persons aged 60+, 1994-1999

	1994	1995	1996	1997	1998	1999	Trend slope
Inner Melbourne	.44	.51	.36	.65	.47	.51	.015
Middle Melbourne	.22	.24	.24	.24	.15	.24	-.005
Outer Melbourne	.17	.13	.10	.15	.11	.12	-.007

** Regression slope is statistically significant to p < .01*

- Compared to those aged below 60, 60+ demonstrated 30% lower trip making overall and 16% lower public transport trip rates. This varied by PT mode; train 36% less, tram 14% less but bus had trip rates which were 33% higher.
- Longitudinal trends – 60+ had a very small decline in trip rates by public transport (-0.004 average daily trips p.a.) but increasing rates for car trips.
- However age cohort analysis show Baby Boomers (aged 29-53 at the time of the survey)have a small but significant increase in longitudinal trip rates of public transport (0.004 average daily trips p.a., $p < .05$). Conversely, car usage amongst Baby Boomers did not significantly change during the course of the study.

Source: Currie G and Delbosc (2010) 'Exploring public transport usage trends in an ageing population' TRANSPORTATION Vol 37 pp 151-164

Monash research on the global decline in youth driving licences sought to explore evidence for the trend and likely causes

Youth Licensing Research

Transport Reviews, 2013
Vol. 33, No. 3, 271–290, http://dx.doi.org/10.1080/01441647.2013.801929

Causes of Youth Licensing Decline: A Synthesis of Evidence

ALEXA DELBOSC* AND GRAHAM CURRIE

Department of Civil Engineering, Institute of Transport Studies, Monash University, Building 69, Clayton, Victoria 3800, Australia

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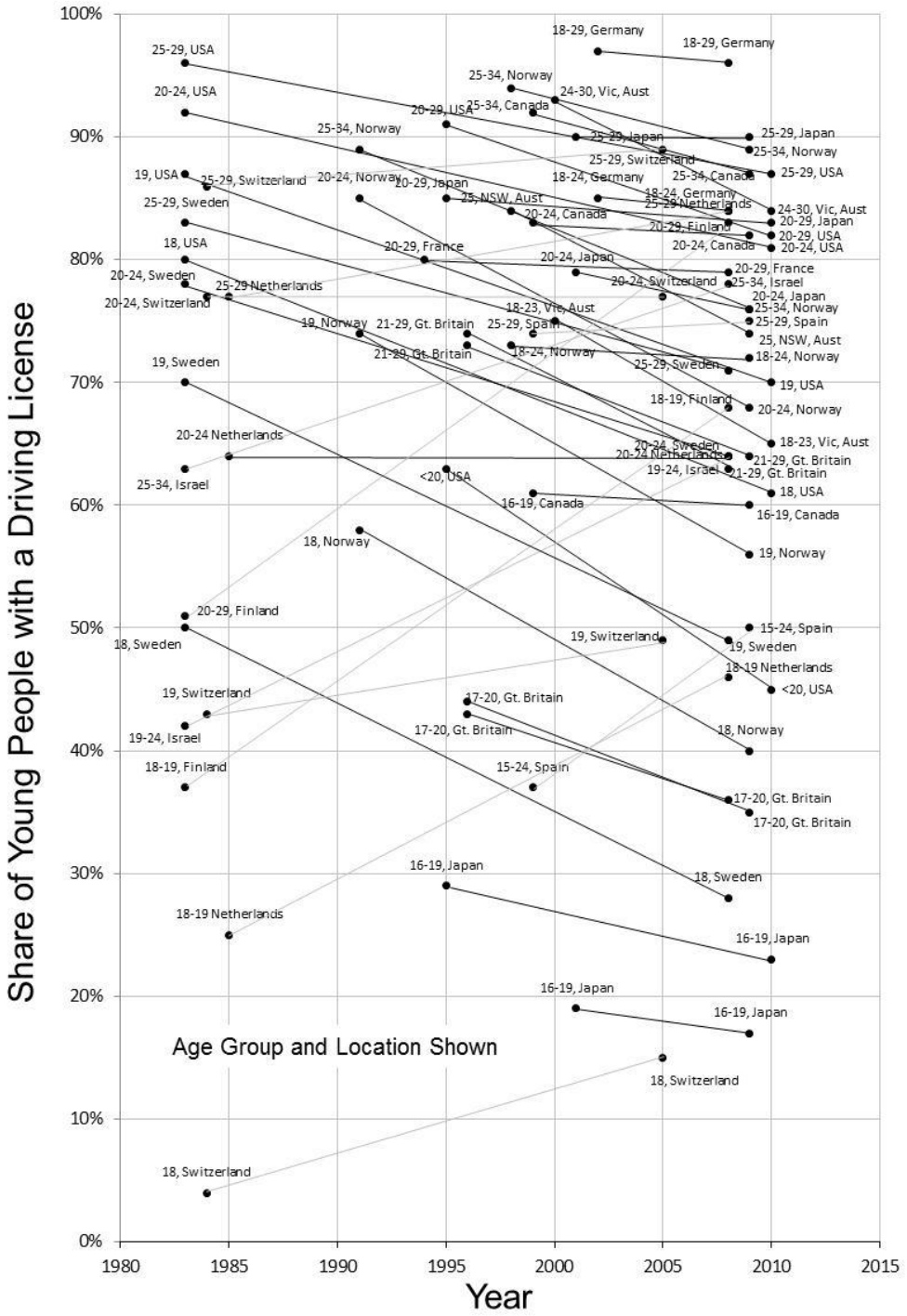
Source: Delbosc A and Currie G (2013) 'Causes of youth licensing decline: a synthesis of evidence' TRANSPORT REVIEWS Vol. 33, No. 3, 271–290c

A major personal contribution to this research was this difficult though convincing diagram – it took 1 days work



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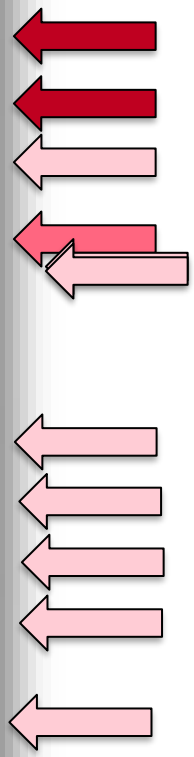
Research found multiple causes – growth in education participation and later life stage employment were suggested as larger scale impacts but actual impact is unknown

Table 3: Assessment of Causal Factors

Explanation	Link to Youth License Decline	Scale of Impact	Rationale for rating
Life stage			
Increasing rate of educational participation	Yes	Medium	Rate of change similar to licens change
Decreasing full-time employment rates	Yes	Medium	Rate of change similar to licens change; flow-on effect to affordability
Delaying marriage/ children	Yes	Low	Affects only a small share
Living with parents longer	Unclear	Unclear	Affects only a small share
Affordability			
Insurance Cost	Yes	Medium-Low	Common issue
Cost of petrol	Yes	Low	Not a high share of costs
Cost of car purchase	Unclear	Unclear	Real costs reducing
Disposable income	Unclear	Unclear but possibly high	Complex effect
Recession / economy	Unlikely	Low	Decline occurs outside of recessions
Location and Transport			
Use PT /other modes instead	Yes	Low	Mode shift is small
Moving to inner-city / accessible areas	Yes	Low	Good evidence but only relate small share of young people
Graduated driver licensing			
Licensing regimes became more strict	Yes	Low	Many cases where decline occ before/ without GDL schemes
Household car access / driving supervisor	Yes	Low	
Attitudes			
Want to help the environment	Unlikely	Unclear	Little evidence in support
Cars no longer a status symbol	Yes	Low	Attitude differs by country
Too busy / other priorities	Unclear	Unclear	Limited evidence
E-communication			
E-comms replacing face-to-face contact	Unlikely	Unclear	Much further research needed
E-comms suit PT use	Unclear	Unclear	



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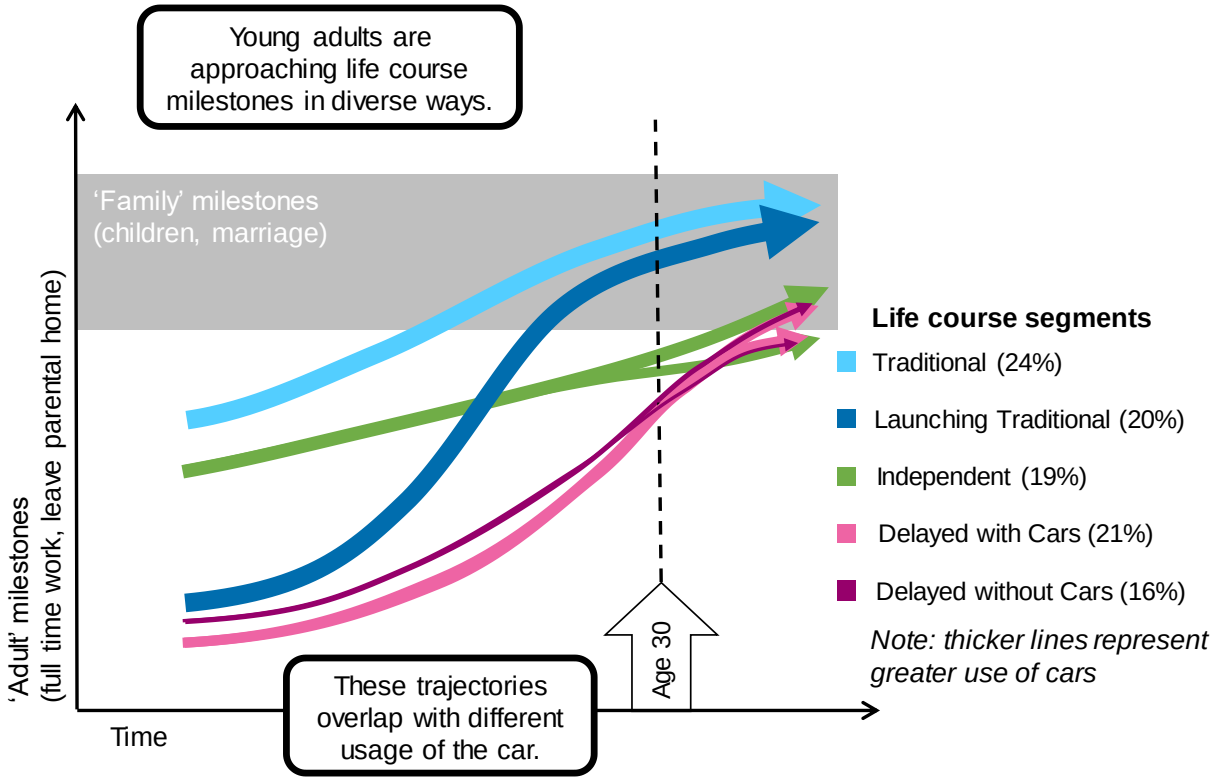
STOP PRESS – Monash Millennials Mobility Panel Survey – Life Stage Effect Confirmed



http://millennialmobility.info/research-findings/

Take home message is:

- some young adults are happy to follow a traditional path of marriage, kids and cars,
- but a significant minority are delaying those life stages and living much longer without being dependent on the car.

Dr Alexa Delbosc

MONASH University

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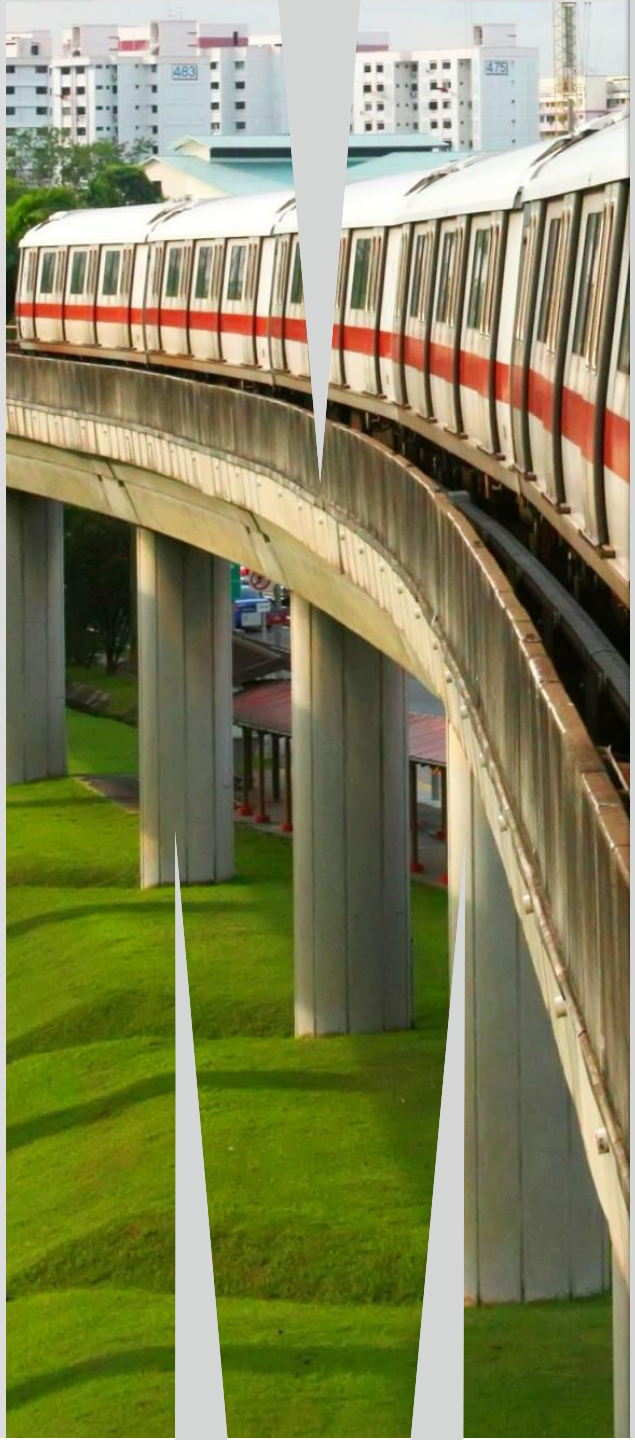


Last August I ran a Workshop on DRT at Thredbo 16 in Singapore and author a DRT paper on 'Why most DRT/Micro-Transits fail..'; key findings are now outlined

PUBLIC TRANSPORT RESEARCH GROUP

WORKSHOP 4 : Realising the Potential Benefits of Demand Responsive Travel

Thredbo

16th International Conference Series on Competition and Ownership in Land Passenger Transport - Singapore - August 2019

Why most DRT/Micro-Transits fail – what the survivors tell us about progress

Graham Currie[a] and Nicholas Fournier[a,*]

[a] Public Transport Research Group, Institute of Transport Studies, Monash University, Clayton VIC 3800, Australia
* Corresponding author: Public Transport Research Group, Institute of Transport Studies, Monash University, Clayton Victoria 3800, Victoria, Australia +61 02 9905 3894 nick.fournier@monash.edu

Keywords (up to 8, separated with a semi-colon):
Micro-transit; DRT; Demand Responsive Transit

Classification codes (minimum of 3, maximum 6):
ROH

ABSTRACT

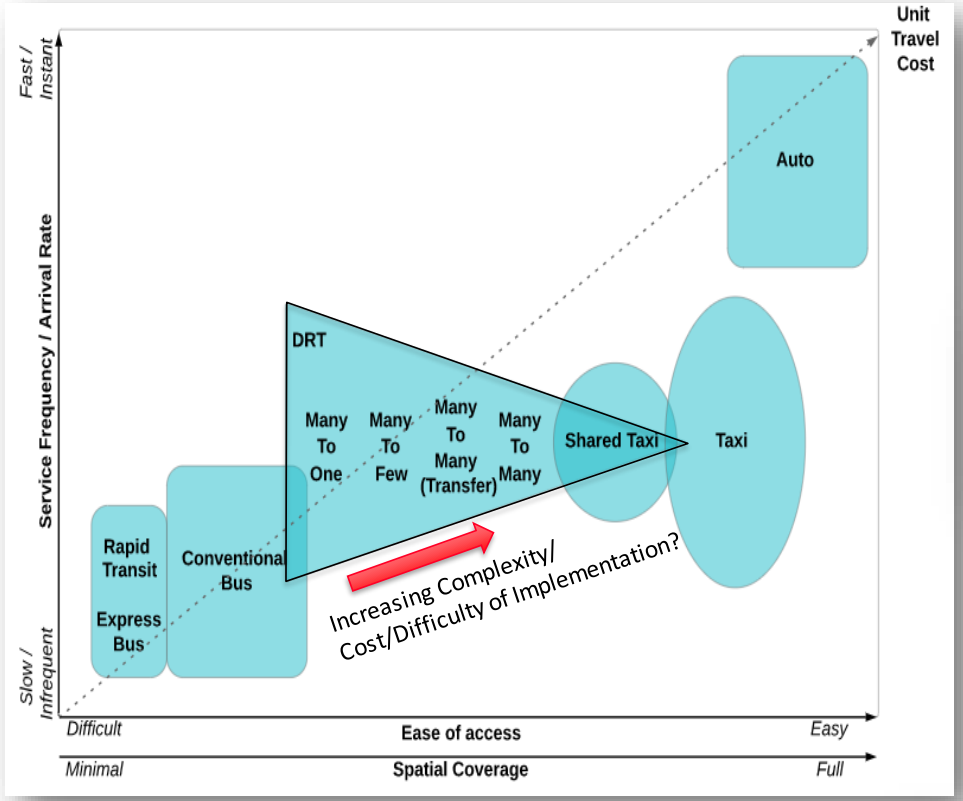
It is common to read about exciting new ways of operating urban public transport systems in social and mass media including app-based demand responsive transit (DRT) systems and what is now termed 'micro-transit' (MT). This broadcast coverage involves a great deal of marketing 'hype' on how new technologies provide new opportunities to 're-invent' what is implied to be old, inefficient and in-decline fixed route transit systems using conventional technologies and fixed route scheduled services. These discussions almost never use financial and economic performance data of DRT/MT based systems and rarely if ever note that most DRT systems and many current micro-transit initiatives fail.

This paper reviews the performance of DRT/MT systems using a review of current practice and systems with particular focus on factors influencing failure. Results show DRT is very failure prone with 50% of all DRT lasting less than 7 years, 40% lasting less than 3 years, and about a quarter failing within 2 years. In the UK, 67% of DRTs have failed, and in Australasia, 54% of DRTs have been withdrawn. Results identify and explore three distinct phases of global DRT development since the earliest trials in the 1970s.

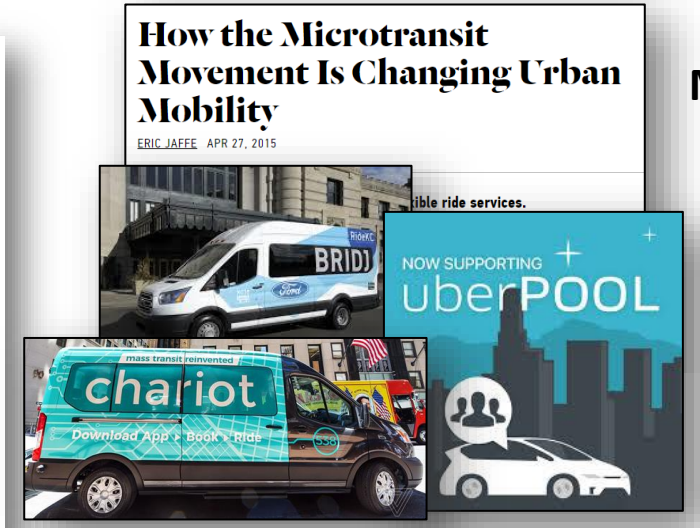
Results show a strong and definitive link between DRT failure and higher costs. Specialist DRT services for disabled people were found to be relatively cheaper to operate while no link was found between cost reduction and modern improvements in information and communications technology (ICT), such as 'micro-transit'. Results did imply that simpler (e.g., many-to-few or route deviation) operations had lower failure rates compared to more comprehensive and complex many-to-many service types.

Conclusions suggests that despite 40 years of experience, the high failure rate of DRTs suggest they are still a high cost, experimental, uncertain and unreliable solution for cities. The paper explores policy implication of these findings and areas for future research.

DRT CONTEXT – typology, microtransit, paratransit and developing world models



Typology



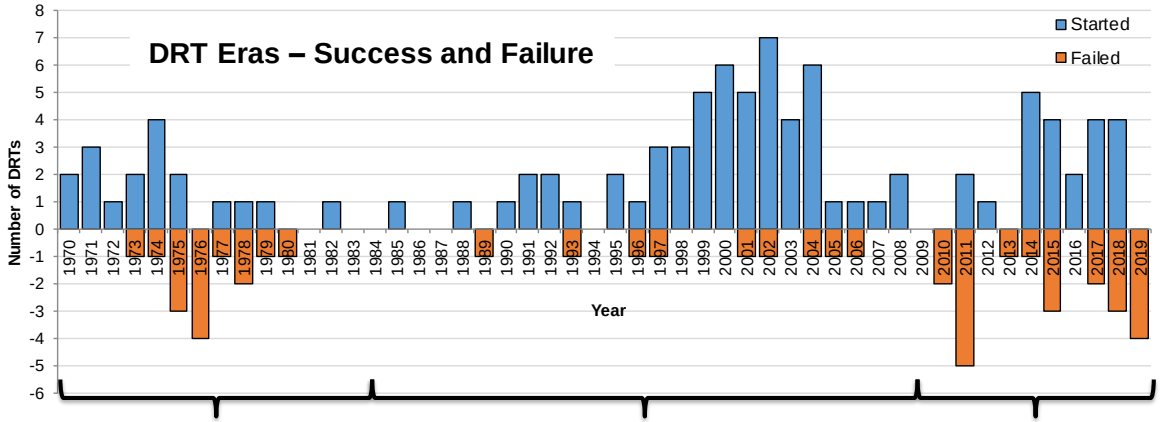
Microtransit

Paratransit
(Community Transport)

Developing World DRT

[Developed world] DRT Review results ; Most DRT's fail ; 3 Eras – Microtransit biggest failure rate – high cost the key driver

30% of all DRT's withdrawn in 2 years
50% of microtransit DRT withdrawn in 2 years
Para/Community Transit highest retention rate

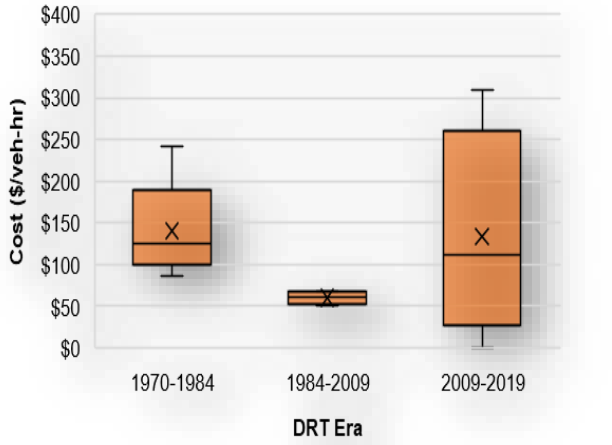


First attempts to run demand responsive services

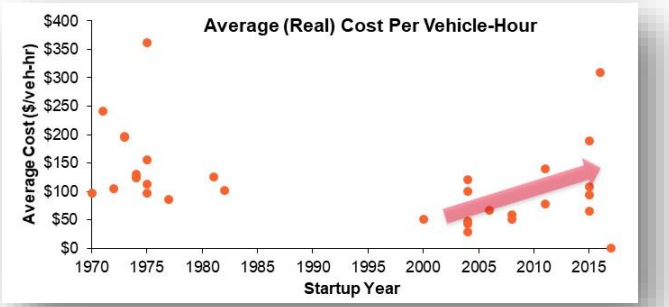
US paratransit services developed in response to Americans with Disability Act (ADA)

UK bus deregulation outside London resulted in investment in special need style services to fill gaps in withdrawn social bus services

New technologies are being deployed for modern 'micro-transit' based DRTs

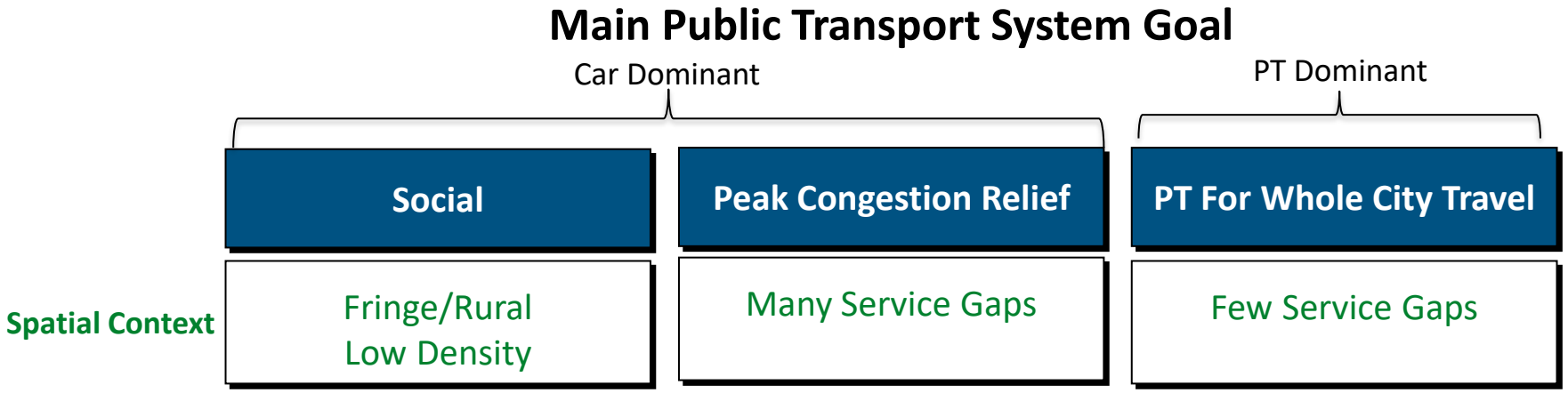


	Early 'dial-a-bus'	Para/Community Transport	Tech Based Micro-Transit
Av. Cost $/veh-hr	150.37	**63.07**	123.18
Av. Cost $/pax	21.26	**13.8**	42.72



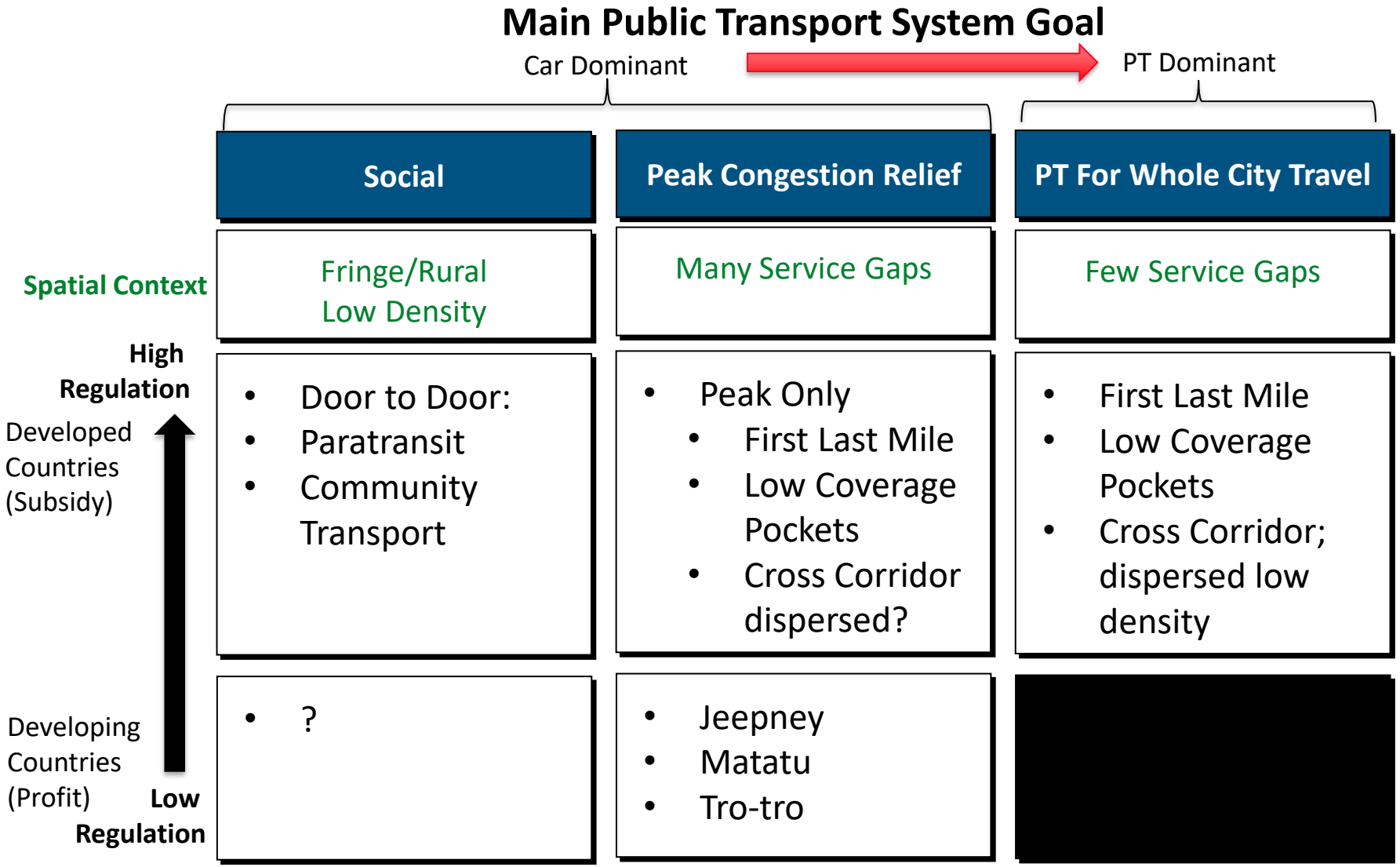
Source: Currie G and Fournier N (2019) 'Why most DRT/Micro-Transits fail – what the survivors tell us about progress' 16th International Conference Series on Competition and Ownership in Land Passenger Transport Singapore Aug 2019

Thredbo workshop developed a new DRT global Framework to help understand policy context, aims and models



Source: Currie G and Wong T (Under Review) 'Workshop 4 Report: Realising the Potential Benefits of Demand-Responsive Travel.' Research in Transport Economics

High/Low Regulation DRT's fit into this framework explaining objectives, types within their context



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Thredbo Workshop 4 - Opportunities, Challenges and Policy Recommendations

- Opportunities
  - Multi-service passenger info - MaaS
  - [Scalable cost effective focussed] tech
  - Learning from the lessons and history
  - Shift away from the private single occupancy vehicle
  - More and growing attention to objectives behind DRT
  - Moving RIGHT (on our graphic)

- Challenges
  - Protectionist attitudes from many
  - Telecommuting
  - Mindless TECH HYPE promotions
  - Competition from new tech modes
  - Aligning DRT and Transit policy

- Policy Recommendations
  - Flexible AGENCY FOR Intermediate Mobility Services (FAMS); MaaS
  - Review, share, focus existing knowledge (smarter website, MAMBA knowledge base repository)
  - Policy – clearer objectives and resource support to solve it, allocation of responsibility to implement
  - Clarity relative roles and public and market
  - Beaurocracy – need to be proactive not reactive
  - Occupancy targets minimum occupancy minimum, employ VMT caps
  - Developing; coordination, regulation, public from informal and informal sector

Source: Currie G and Wong T (Under Review) 'Workshop 4 Report: Realising the Potential Benefits of Demand-Responsive Travel.' Research in Transport Economics

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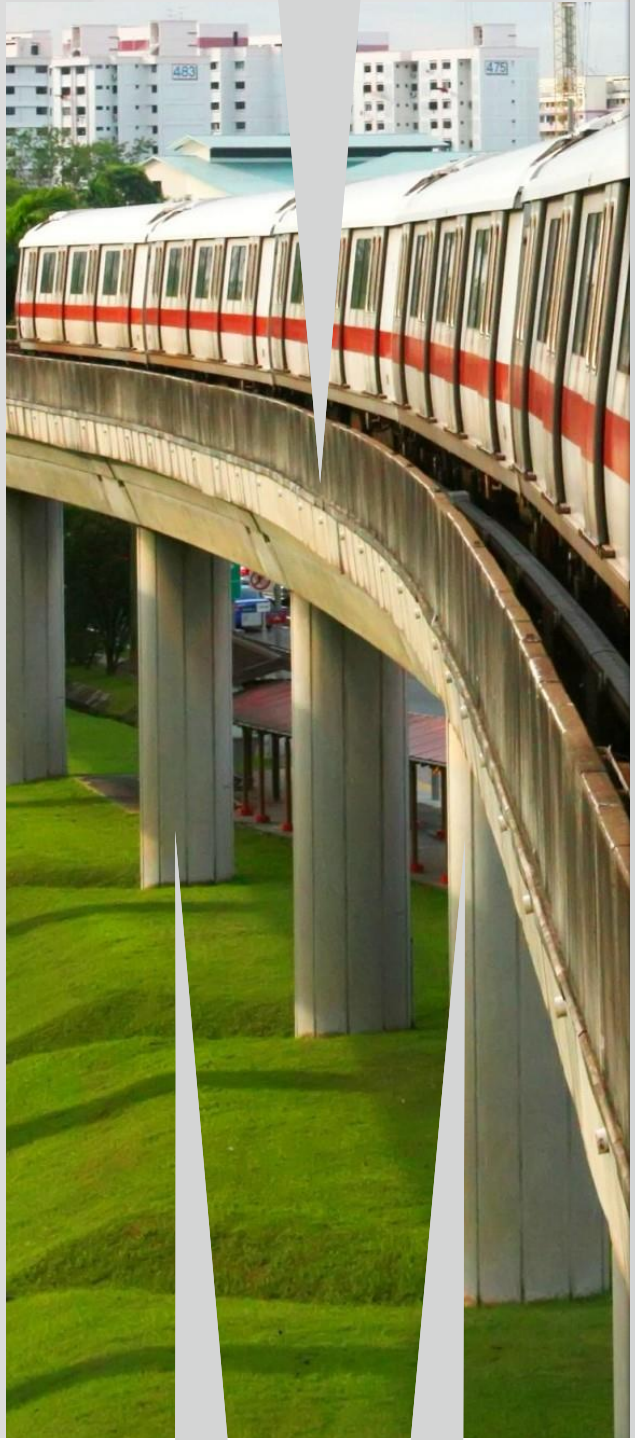
Travel Behavior Change

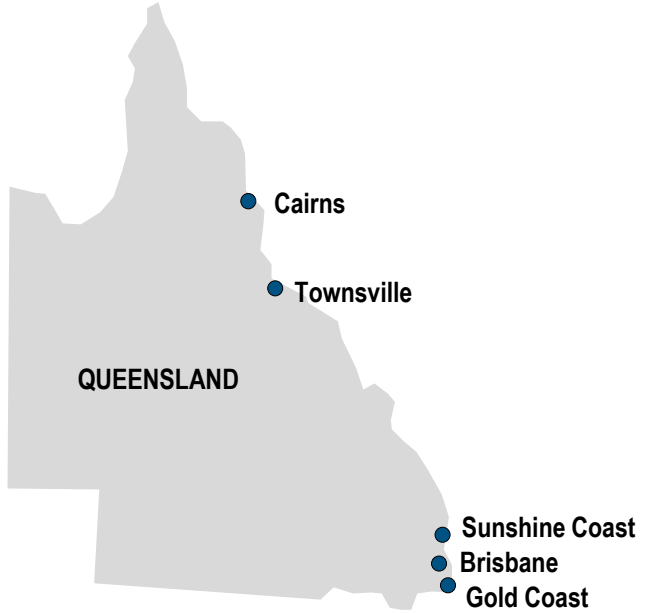
Pragmatic Priority



In 2015 Monash developed a new index to measure the quality of PT for international visitors – Incl: Singapore & 3 other cities – in 2016, we updated expanded to Queensland cities for Tourism Queensland

- Yang Y Currie G Peel V and Liu Z (2015) 'A New Index to Measure the Quality of Urban Public Transport for Internatonal Tourists' Transportation Research Board 94th Annual Meeting

- De Gruyter C, Currie G Reynolds J, Peel V and Yang Y (2016) 'Benchmarking public transport for international tourists in Queensland cities' Australasian Transport Research Forum 2016 Proceedings 16 – 18 November 2016, Melbourne, Australia



Previous research suggests elements of PT are considered important to international tourists

Element	Examples	Supporting literature
Information Access	▪ General information ▪ Advanced traveller information ▪ Language selections	Andereck & Caldwell (1994); Garín-Muñoz & Pérez-Amaral (2011); Grotenhuisa et al (2007)
Cost and Ticketing	▪ Fare price ▪ Tourist ticket options ▪ Ease of use	Cossu et al (2010); Griffin et al (2012); Gronau & Kagermeier (2007)
Service Level	▪ Frequency and waiting time ▪ Travel time ▪ Access to stations/stops	Gronau & Kagermeier (2007); Guiver et al (2007)
Special Tourist Services	▪ Links to international access points, e.g. airports ▪ Free tourist services	Dubey (2011)
Other Elements	▪ Service reliability ▪ Comfort ▪ Personal safety	Aquino (2008); Anable & Gatersleben (2005); VTIC & VIEC (2010)

Framework developed by Yang et al (2015) includes 26 weighted criteria

Element	No. criteria	Max possible score	Share (%)
Information Access	11	45	22%
Cost and Ticketing	6	40	20%
Service Level	7	95	48%
Special Tourist Services	2	20	10%
Total	**26**	**200**	**100%**

- Criteria and relative weights informed by the research literature
- Cities given a score of between 0 and 5 depending on how well they meet each criteria; maximum possible total score is 200 points

‘Information Access’ covers availability, reliability and understandability

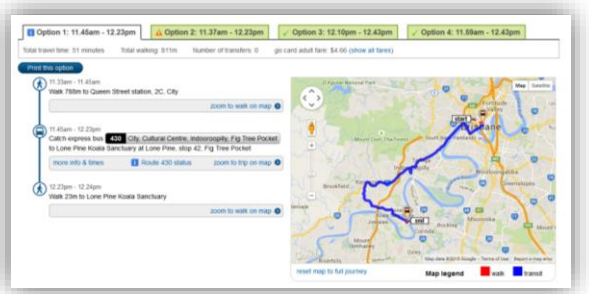
Criterion		Score method	Weighting
Availability			
A1	General information about PT	0 = not available, through to 5 = detailed information available	0.5
A2	Fare information on PT websites	0 = not available, through to 5 = detailed information available	1
A3	Journey planner performance	0 = no timetable/network info, through to 5 = journey planner with detailed results or transit planning available in Google Maps	2
A4	Tourist information on PT websites	0 = no tourist information, through to 5 = tourist guide page	1
A5	PT information on attraction websites	0 = no PT info, through to 5 = PT info with links to PT websites	0.5
A6	PT information on accommodation websites	0 = no PT info, through to 5 = PT info with links to PT websites	0.5
A7	PT information on airport/station websites	0 = no PT info, through to 5 = PT info with links to PT websites	0.5
A8	Mobile PT information service	0 = no mobile service, through 5 = telephone service with free mobile phone app providing detailed info and journey planner	1
Reliability			
A9	Last update time/date of PT websites	0 = more than 2 months/no statement, through to 5 = real-time	0.5
Understandability			
A10	Language selection on PT websites	0 = no English, through to 5 = English + four more languages	1
A11	Language selection on PT mobile apps	0 = no English, through to 5 = English + four more languages	0.5

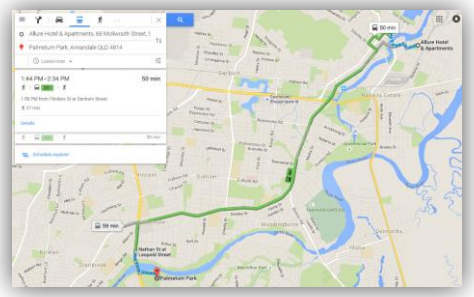
‘Cost & Ticketing’ covers ease of purchase, use and value for money

Criterion		Score method	Weighting
B1	Ease of buying and reloading tickets (number of locations to purchase tickets)	0 = less than 5 locations, through to 5 = every station, some stops, airports, attractions, accommodations, online, via phone	1
B2	Ease of using tickets	0 = paper tickets with different ticketing system for each mode, through to 5 = universal smart card for all PT services	1
B3	Special tourist tickets	0 = no special tickets, through to 5 = special ticket is a universal smart card with mobile ticketing or contactless payment	1
B4	Tourist/general ticket discounts	0 = special tickets more expensive, through to 5 = additional discounts available at tourist attractions	2
B5	Refund availability	0 = not refundable, through to 5 = refundable	1
B6	Fare price/value	0 = More than AU$18/day, through to 5 = less than AU$10/day	2

‘Service Level’ covers frequency, travel time and accessibility

Criterion		Score method	Weighting
Frequency			
C1	Service frequency – weekdays	0 = 15 minutes or more, through to 5 = 5 minutes or less	3
C2	Service frequency – weekends	0 = 15 minutes or more, through to 5 = 5 minutes or less	3
C3	Waiting time – weekdays (10am)	0 = 15 minutes or more, through to 5 = 5 minutes or less	3
C4	Waiting time – weekends (10am Sunday)	0 = 15 minutes or more, through to 5 = 5 minutes or less	3
Travel time			
C5	Travel time – weekdays	0 = 85 minutes or more, through to 5 = 25 minutes or less	2
C6	Travel time – weekends	0 = 85 minutes or more, through to 5 = 25 minutes or less	2
Accessibility			
C7	Average walking time	0 = 25 minutes or more, through to 5 = 5 minutes or less	3





‘Special Tourist Services’ cover airport access and tourist services

Criterion		Score method	Weighting
D1	Transport services linked with airports	0 = no PT service between airport and city, through to 5 = express and direct rail link between airport and city	2
D2	Special tourist services & recreational routes	0 = no special PT service or routes for tourists, through to 5 = free PT service for tourists	2

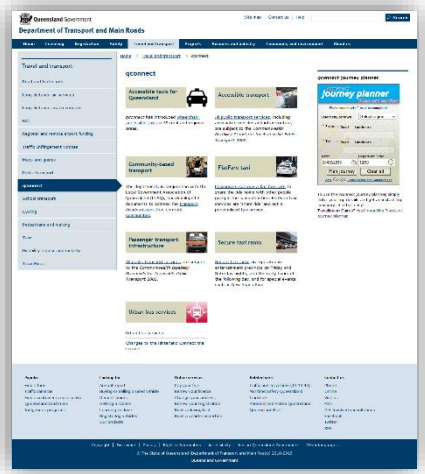
Information on key websites was used as a basis to score each city …

TransLink

www.translink.com.au

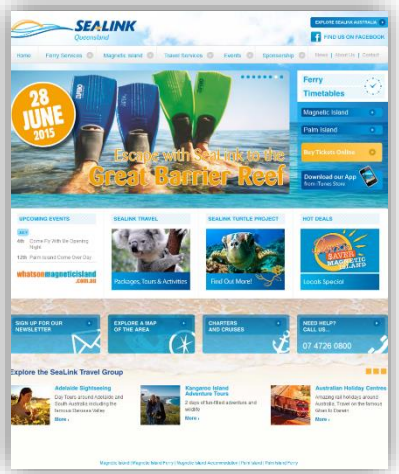
Sunbus

www.sunbus.com.au



qconnect

www.tmr.qld.gov.au/travel-and-transport/qconnect.aspx



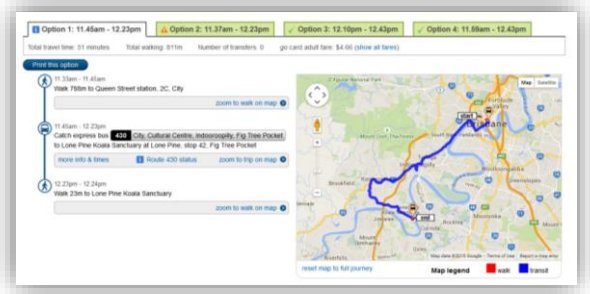
SeaLink

www.sealinkqld.com.au

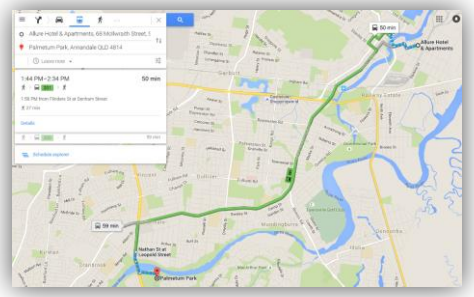
- Provides an inexpensive method over field observations and allows for comparisons across cities to be easily made
- May create methodological concerns where cities have limited internet access but not applicable to cities included in this study

…with TripAdvisor & journey planners used to score ‘Service Level’ criteria

- Top 10 tourist accommodation sites (origins) and top 10 tourist attractions (destinations) were selected from TripAdvisor for each city
- Trips between these origins and destinations (total of 100 trips) assessed for each city using TransLink journey planner and Google Transit
- While not representative of all tourism travel, the approach can be applied consistently across all cities
- Scores tend to be biased towards smaller, more compact cities due to the lower travel times involved

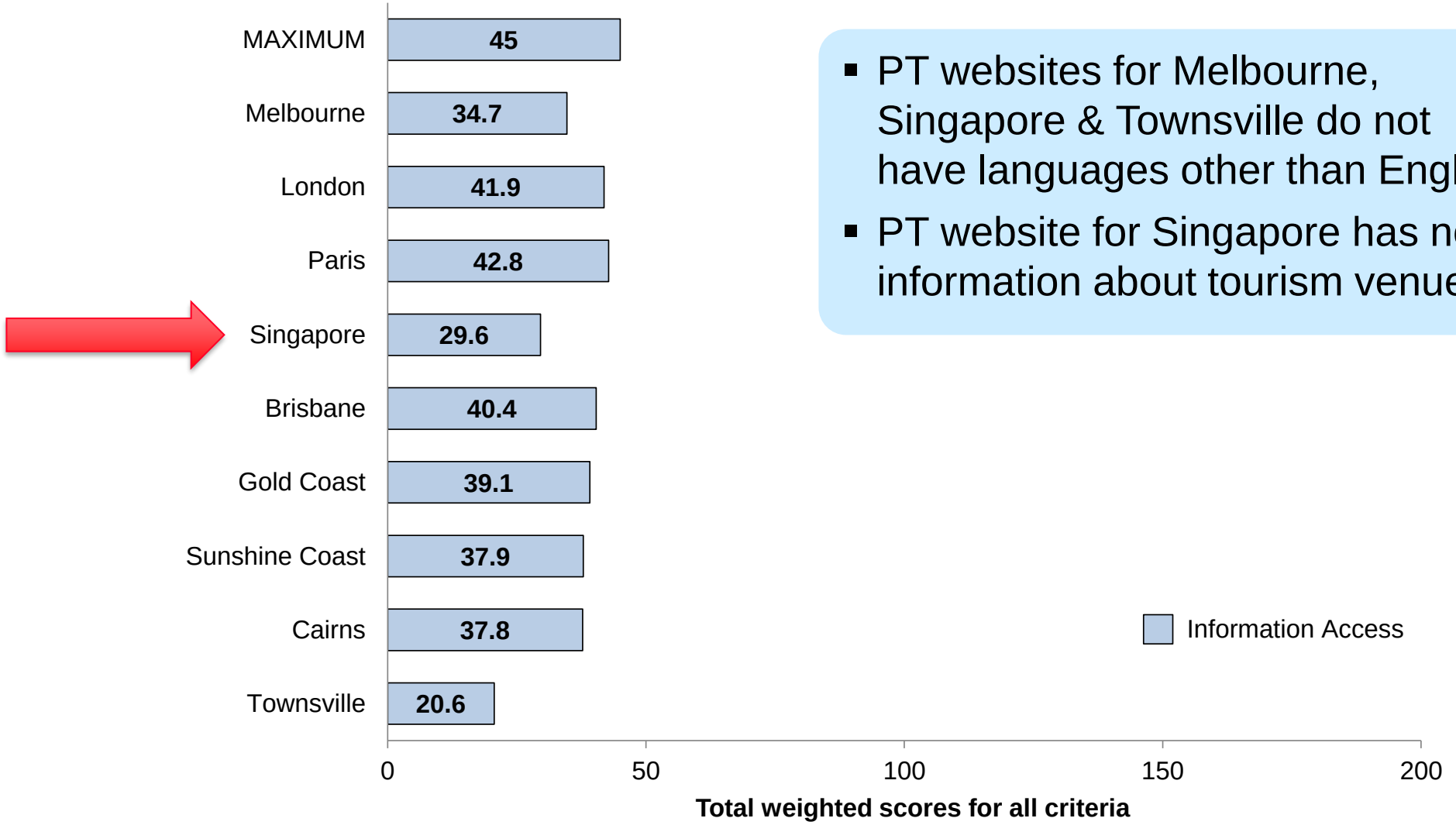


TransLink journey planner



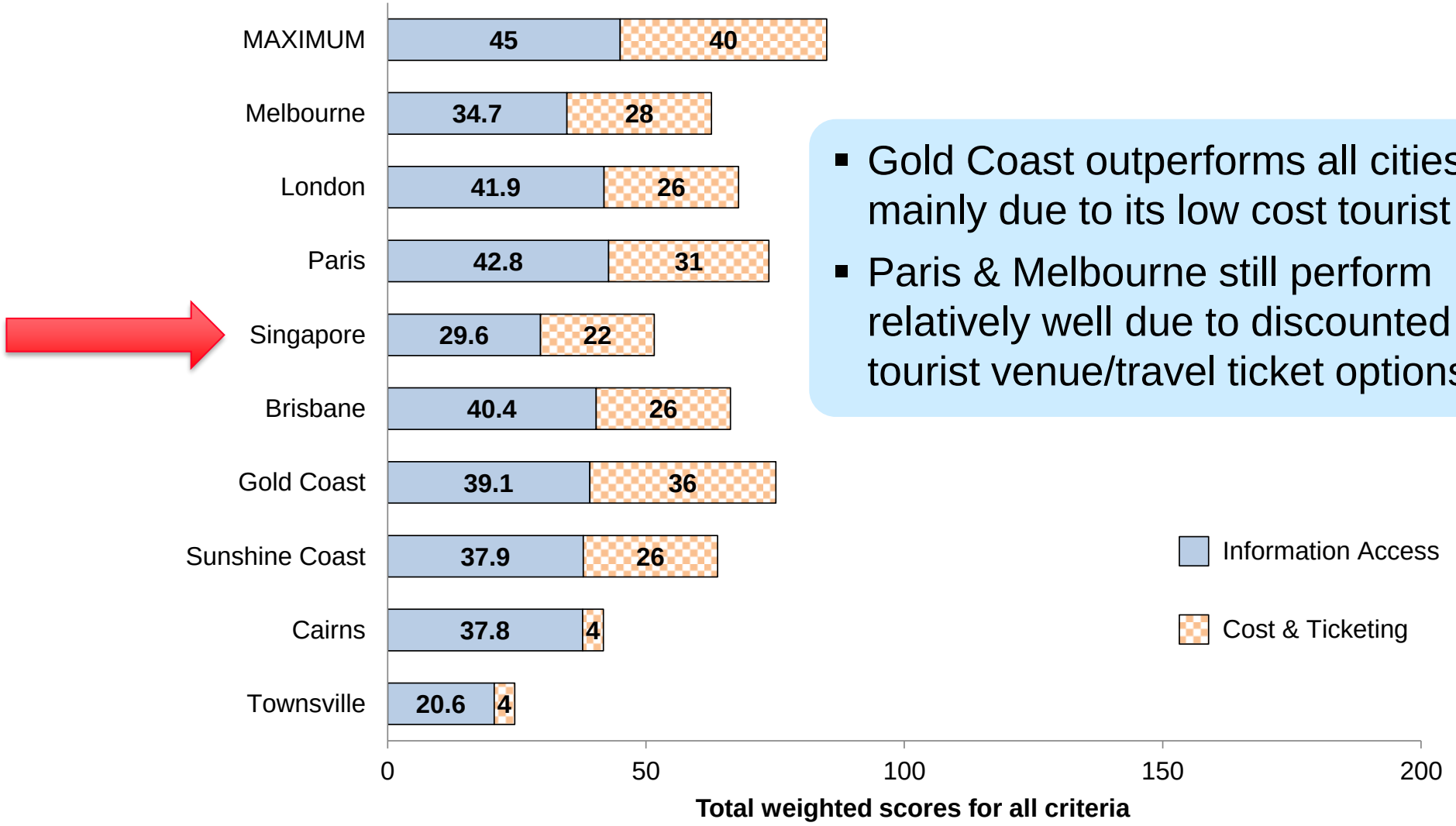
Google Transit

RESULTS - Information Access – Paris & London score highest; Brisbane close behind



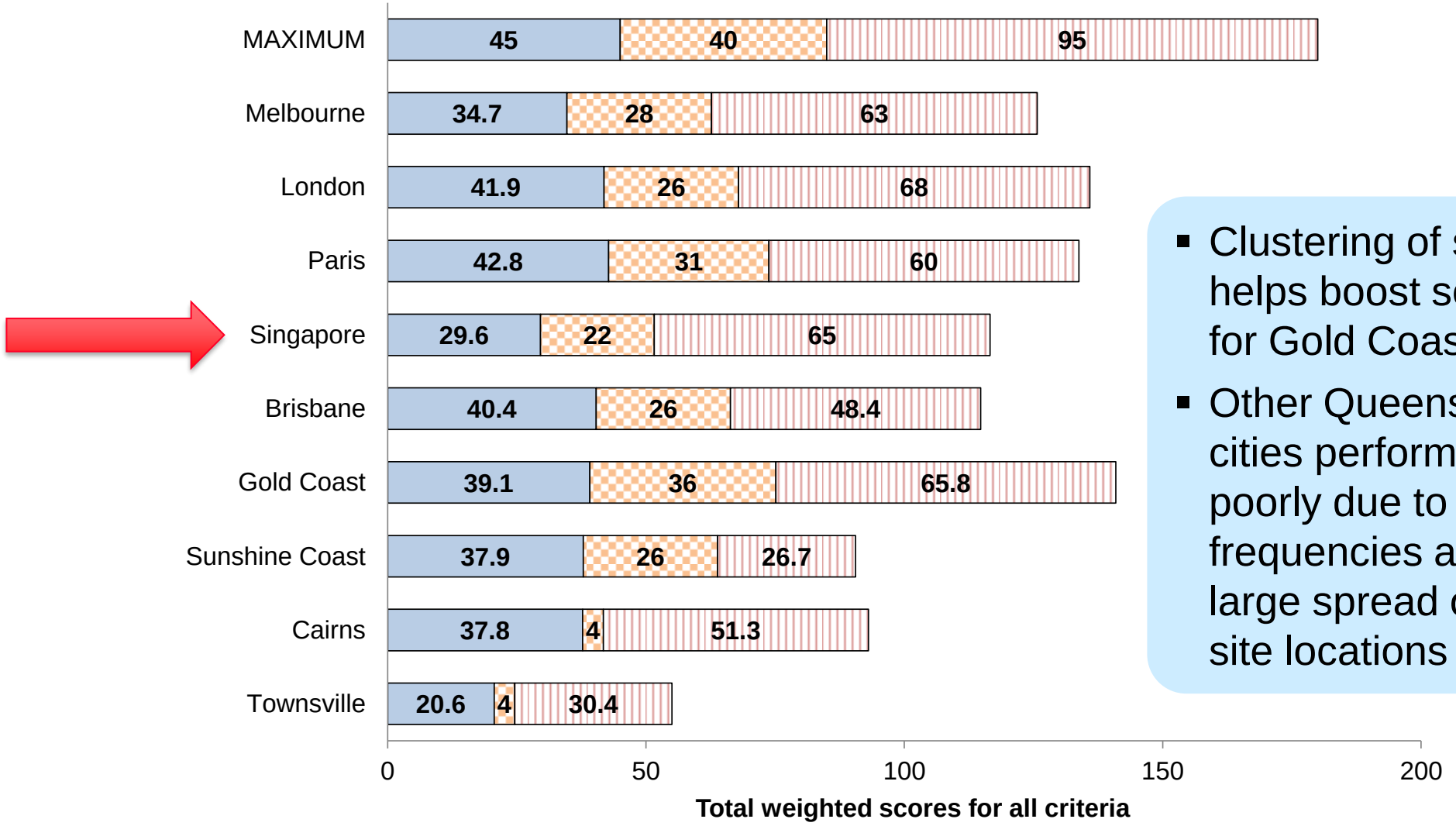
- PT websites for Melbourne, Singapore & Townsville do not have languages other than English
- PT website for Singapore has no information about tourism venues

Cost & Ticketing – Gold Coast highest by far due to $10/day tourist ticket



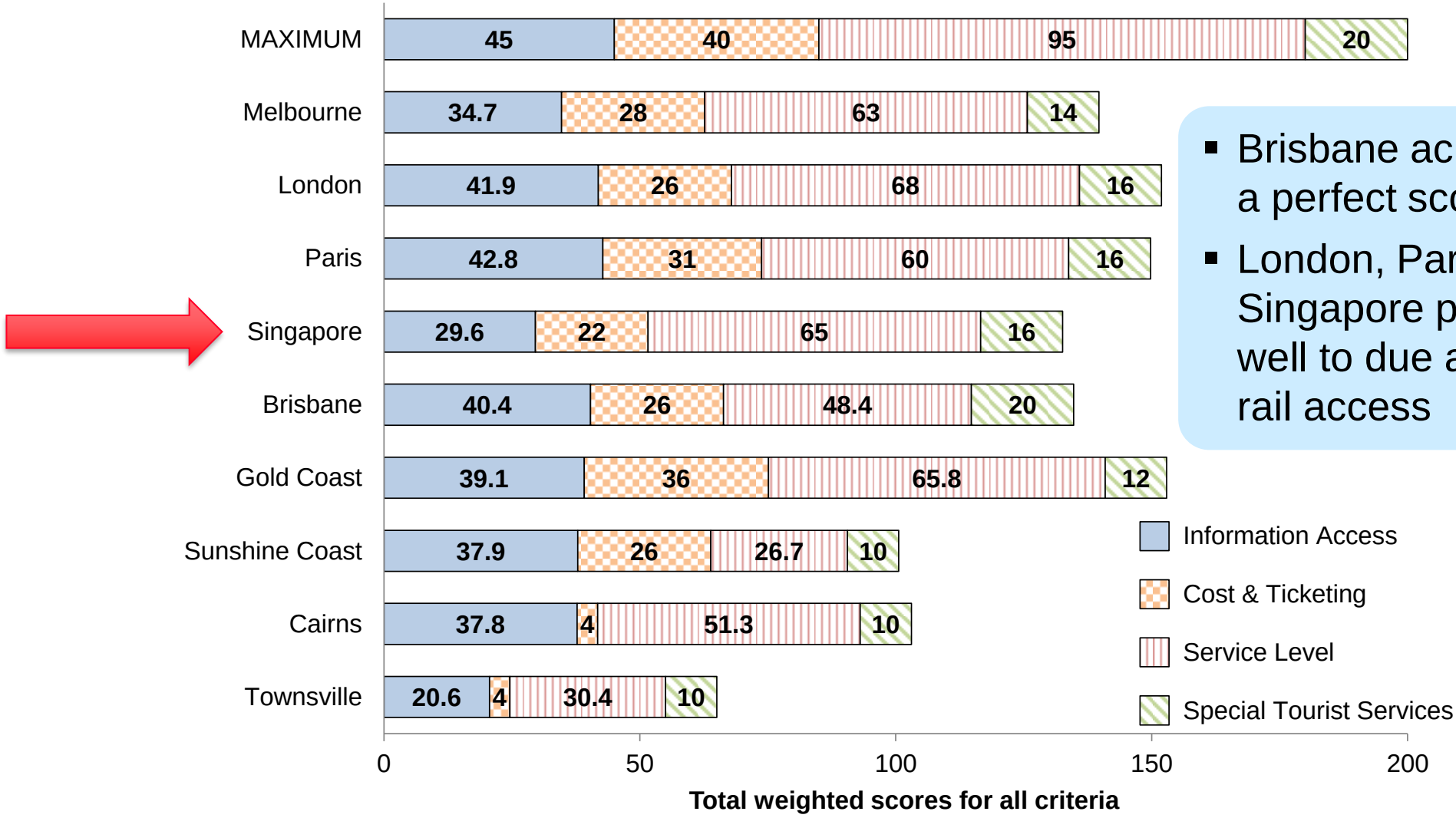
- Gold Coast outperforms all cities mainly due to its low cost tourist ticket
- Paris & Melbourne still perform relatively well due to discounted tourist venue/travel ticket options

Service Level – London highest, followed by Gold Coast & Singapore



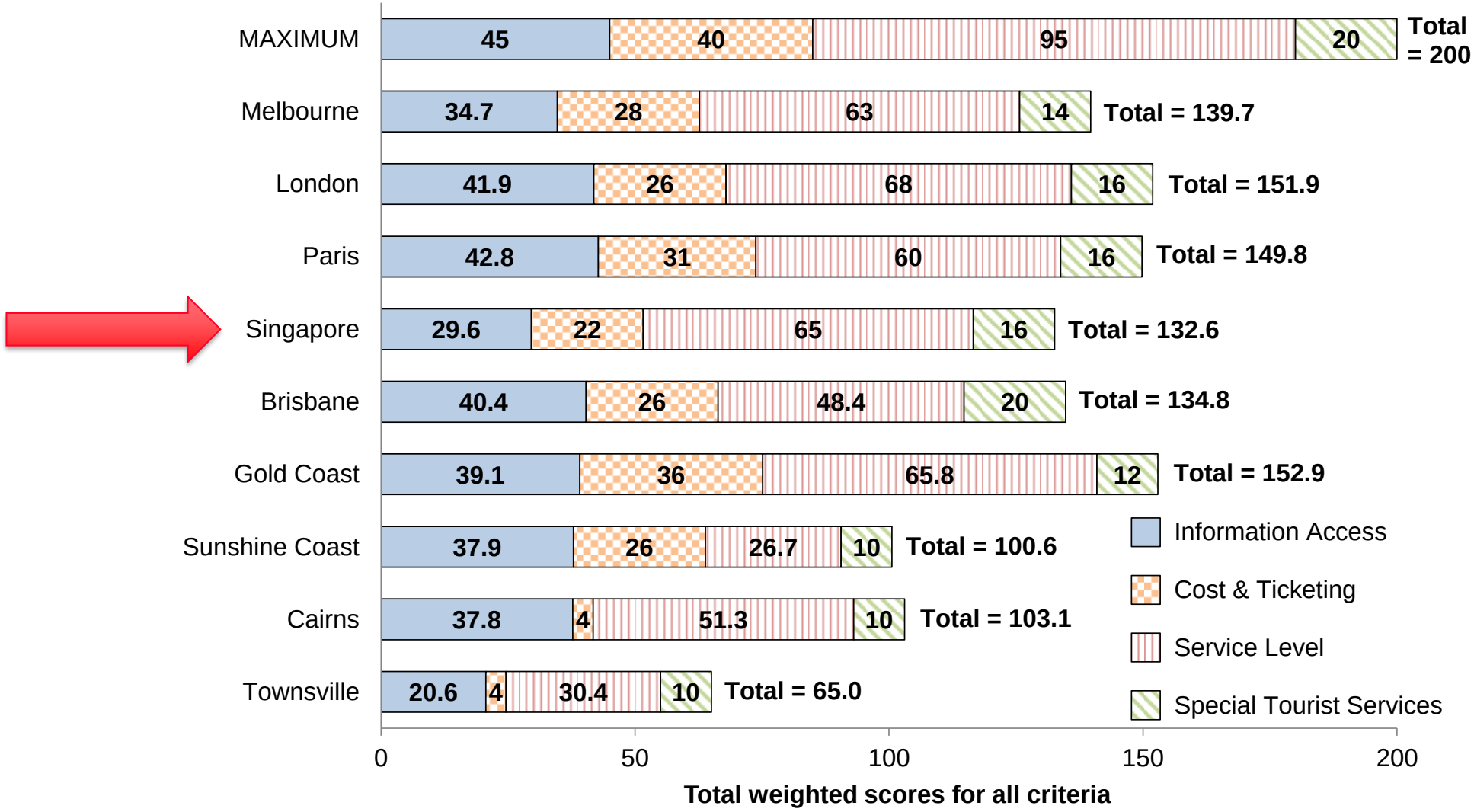
- Clustering of sites helps boost scores for Gold Coast
- Other Queensland cities perform poorly due to low frequencies and large spread of site locations

Special Tourist Services – Brisbane highest of all cities with perfect score

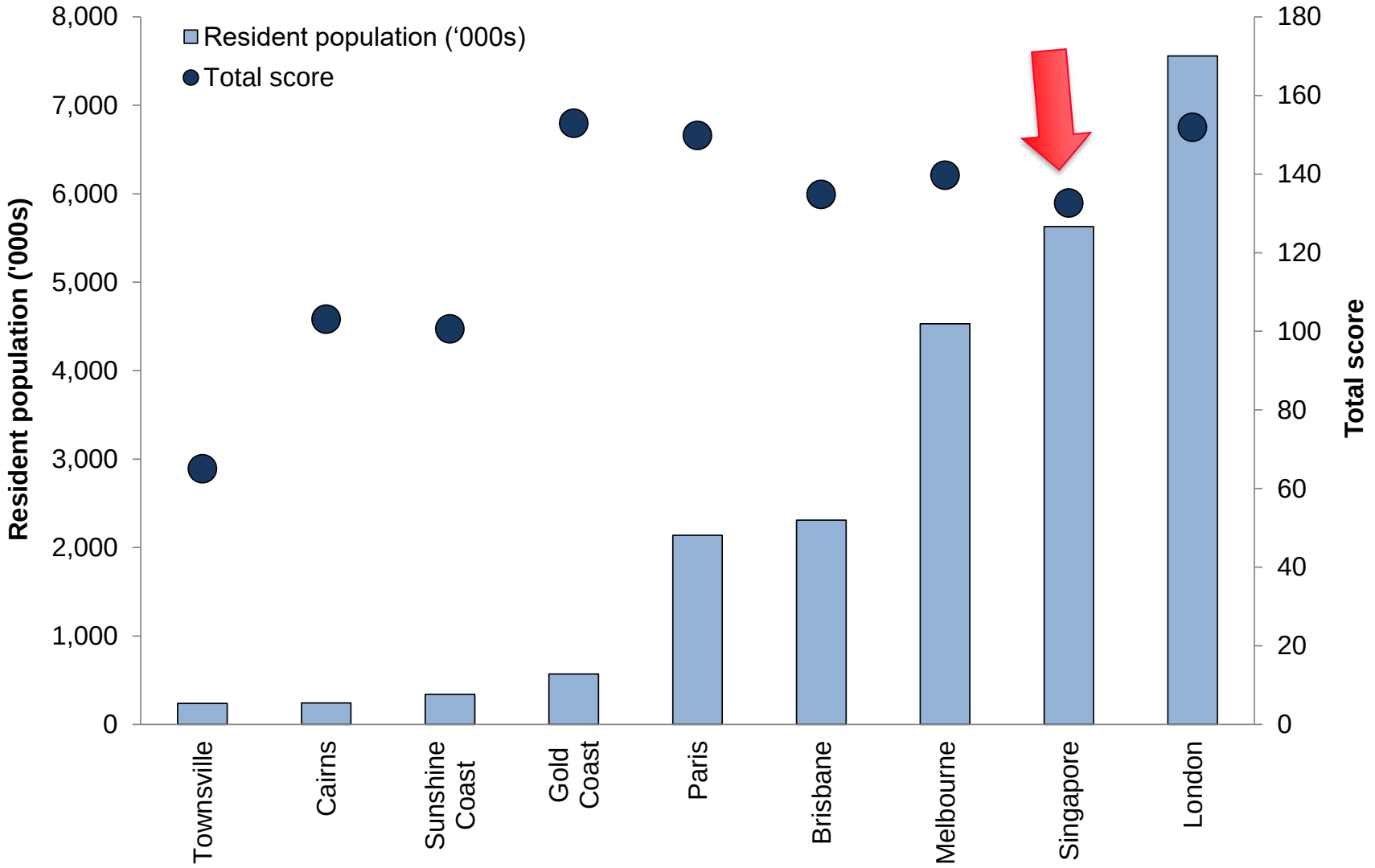


- Brisbane achieves a perfect score
- London, Paris & Singapore perform well to due airport rail access

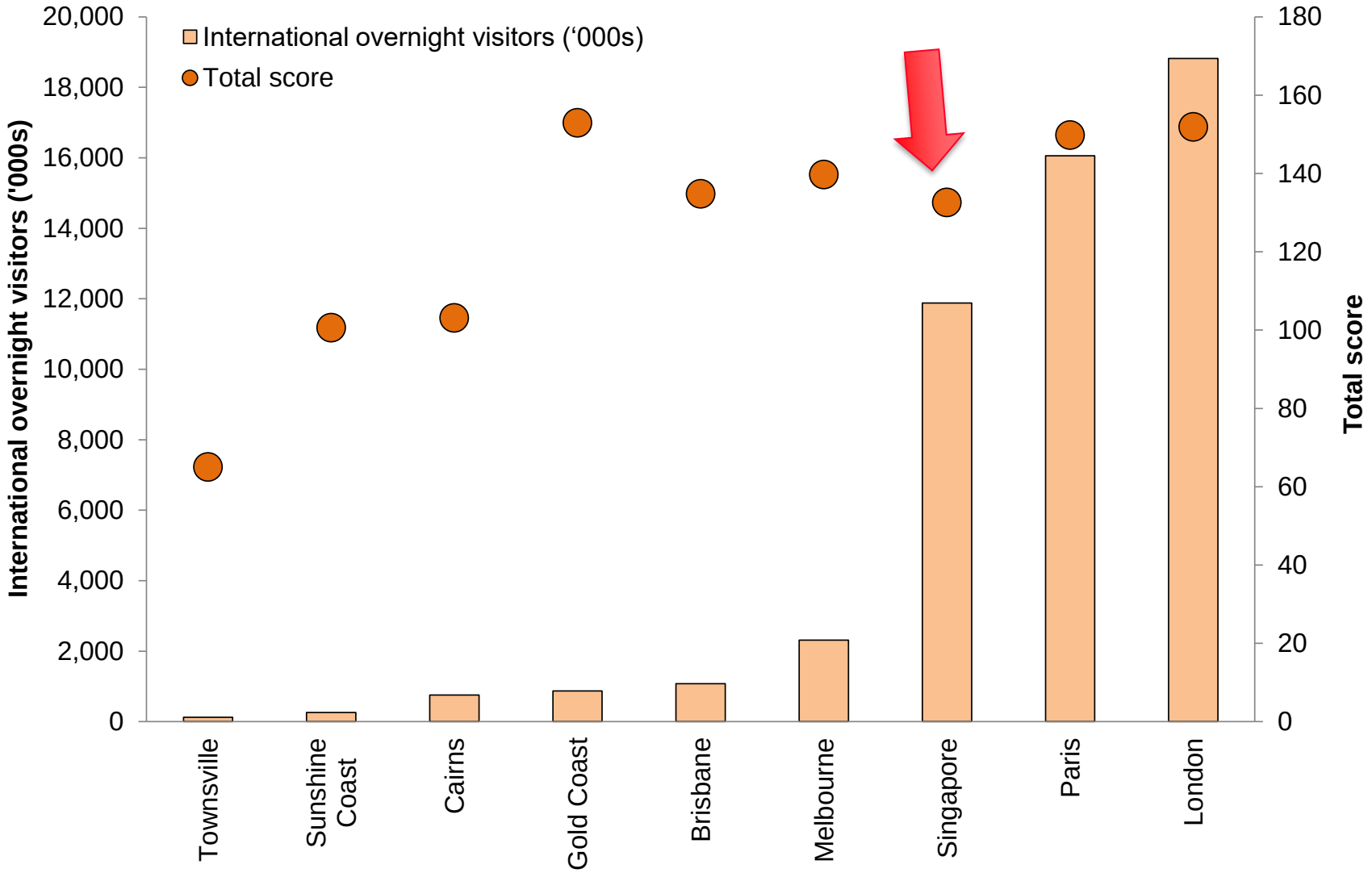
Total – Gold Coast highest overall, followed closely by London & Paris



Is it fair to compare small Queensland cities with large international cities?



Particularly when international tourist numbers are taken into account?



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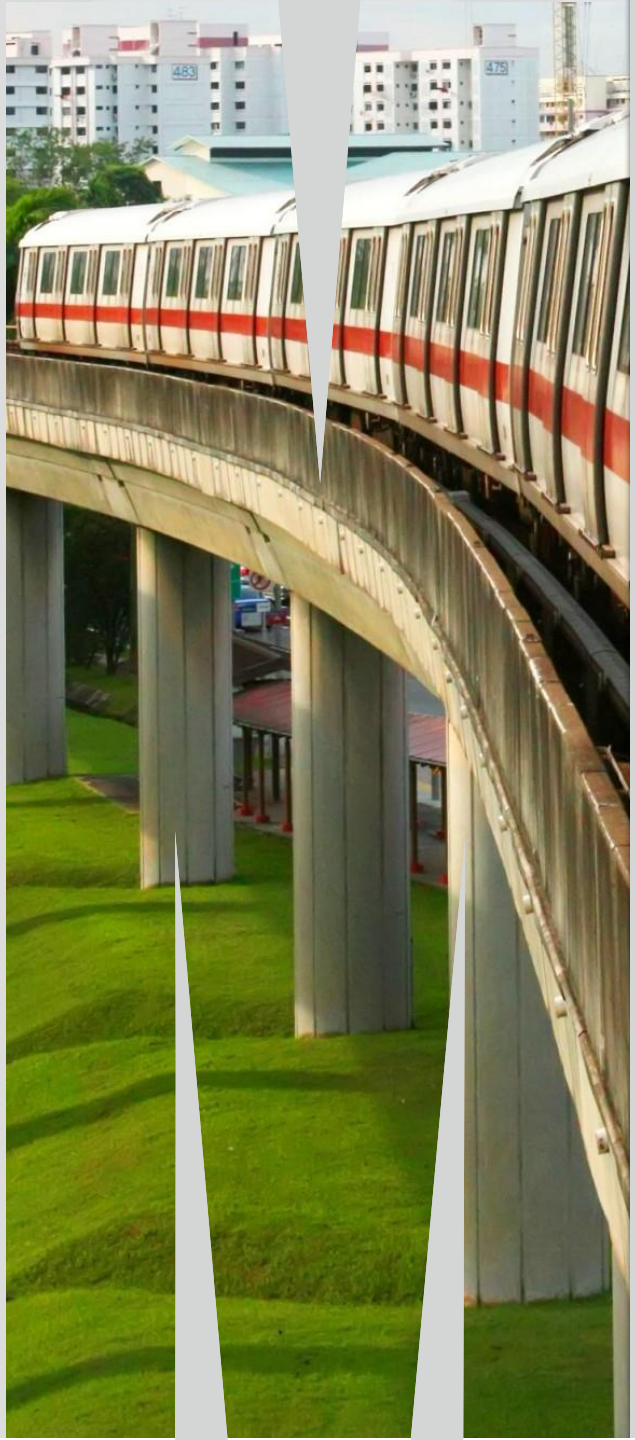

Monash PhD student Rita Seethaler explored how ‘Principles of Persuasion’ theory could be used to increase takeup of travel behaviour change programs

Six Principles of Persuasion to Promote Community-Based Travel Behavior Change

Rita K. Seethaler and Geoff Rose

Social psychology offers a series of persuasion techniques that are able to strengthen the impact of travel demand management programs. This is particularly the case for community-based programs of voluntary travel behavior change such as the TravelSmart programs currently being conducted in Melbourne, Australia. This paper presents the results of an experiment that has applied six particular persuasion techniques as part of a community-based TravelSmart campaign. In a pilot test of 160 households, combinations of persuasion elements were tested with eight different treatment groups while a number of sociodemographic variables were controlled. Although the results were not statistically significant at the 95% confidence level because of a limited sample size, the results indicated an increase in the rate of participation when persuasion strategies were integrated into the TravelSmart recruitment process. Modeling of the intervention uptake as a function of sociodemographic variables indicated the problem of linguistic barriers in association with a multicultural urban population. In contrast, bicycle availability and the current use of public transit both had positive impacts on TravelSmart participation. Initial analysis of the results from a larger field test of some 800 test and control households reinforced the positive impact of the persuasion strategies. Overall, the results indicate the need to explore an extension of the persuasion principles from their use in the recruitment process to all other implementation stages of voluntary travel behavior change programs.

Travel demand management policies aimed at increasing the sustainability of urban transport often face the problem of overcoming unsustainable behavior patterns that are principally centered on the car and that are largely dominated by routine choices that do not take sustainability considerations into account. To overcome the barrier of habitual behavior patterns, current travel behavior change campaigns are principally based on the provision of information about the effects of modal choices and the availability and benefits of modes other than the car.

In Australia, under the umbrella term of TravelSmart, different behavior change programs. For example, in the state of Victoria, TravelSmart is an official policy tool of the Victorian government as part of the Metropolitan Strategy 2030 (*1*) and the Victorian Greenhouse Strategy (*2*). The aim of TravelSmart is “to reduce the negative impacts of car travel through a reduction in vehicle trips and kilometers travelled, achieved through voluntary changes by individuals, households and organizations toward more sustainable travel choices” (*1*).

Behavioral change is particularly difficult, as travel behavior is to a large extent habitual (*3*). In general, habits are recognized to be useful and necessary routines that prevent people from spending much effort thinking about many daily repetitive activities (*4*). However, when external conditions change—for example, when environmental problems emerge—old habits may no longer be appropriate. To overcome the barrier of habitual behavior patterns, that is, to “unfreeze” driving habits (*5, 6*), current travel behavior change campaigns are principally based on the provision of information about the effects of modal choices and the availability and benefits of modes other than the car. However, current research in the domain of public health, energy consumption, waste management, and so forth have shown that information-based campaigns, including the use of incentives, are, by and large, insufficient to stimulate lasting behavioral change (*7*). Tertoolen et al. observed that environmental and economic information even had a negative impact on proenvironmental travel behavior, indicating the presence of reactance and cognitive dissonance effects triggered by a travel behavior change campaign itself (*8*). In this context, social psychology offers a series of six specific persuasion techniques (*9*) that have seen application in both private-sector marketing and community-based social marketing strategies and that are able to reach beyond the mere raising of awareness and increasing knowledge.

This paper begins with an overview of the aspects of social psychology that are relevant in the context of travel behavior change and introduces a set of six persuasion principles that are discussed in the particular context of a community-based TravelSmart program. The paper then considers the design and results of two community-based TravelSmart field tests in which the six persuasion techniques were integrated into the design of the campaign in different ways. As a principal measure of success, the rates of intervention uptake on the household level, that is, whether the household agreed or did not agree to participate in the TravelSmart program, are compared among the different treatments. Statistical analysis provides insight into the success of the intervention as well as the factors influencing intervention uptake.

TRAVEL BEHAVIOR CHANGE AND ASPECTS OF SOCIAL PSYCHOLOGY

Determinants of Behavioral Change

Engaging people to reconsider decisions about their habitual behavior patterns requires an understanding of some of the underlying psychological processes. This is particularly the case when people

Department of Civil Engineering, Institute of Transport Studies, Monash University, Clayton, Building 60, Victoria 3800, Australia.

Transportation Research Record: Journal of the Transportation Research Board, No. 1956, Transportation Research Board of the National Academies, Washington, D.C., 2006, pp. 42–51.

Seethaler RK and Rose G (2006) ‘Six Principles of Persuasion to Promote Community-Based Travel Behavior Change’ Transportation Research Record, vol. 1956, 1: pp. 42-51

The research is based on the ‘Six Principles of Persuasion’ developed from social psychology

- Social psychology has developed many taxonomies to encourage people to do things –
- This research based on the SIX PRINCIPLES OF PERSUASION based on:
  - Cialdini, R. B. Influence: Science and Practice. Allyn & Bacon, Needham Heights, Mass., 2001
  - Groves, R. M., R. B. Cialdini, and M. P. Couper. Understanding the Decision to Participate in a Survey. Public Opinion Quarterly, Vol. 56, No. 4, 1992, pp. 475–495.
  - McKenzie-Moor, D., and W. Smith. Fostering Sustainable Behaviour: An Introduction to Community-Based Social Marketing. New Society Publishers, Gabriola Islands, British Columbia, Canada, 1999.

The research is based on the 'Six Principles of Persuasion' developed from social psychology – and adjusted to apply to a travel behaviour change program…

Six Principles of Persuasion	Travel Behaviour Program Adjustments
1. **Reciprocation** - Groves et al. "people thus feel obligated to respond to positive behavior received (e.g., gifts, favors, services, concessions) with positive behavior in return."	Unconditional gift – environmentally friendly Green Bag for shopping & a discount voucher for the local shopping strip - to trigger a positive reciprocation response
2. **Commitment and Consistency** - Once an individual has taken a freely chosen position, a tendency to act in line with the commitment has been found to guide further actions. Before the mechanism of consistency is activated, an initial commitment must be generated in the target person. Even if the first commitment is small, bigger requests later on will still be accepted because of the consistency requirement.	small initial commitment to induce further action - necessity of recycling, water savings, reduction of the use of plastic bags
3. **Social Proof** - The willingness to comply with a request is increased when it is supported by the belief or evidence that similar peers comply with it as well.	Support of local community groups and business groups shown on all marketing
4. **Liking** - People are increasingly inclined to follow a request brought forward by someone they like. Factors enhancing liking have been found to be similarity of attitude (34), background (35), physical attractiveness (36), dress (37), and finally, the use of praise (38) and cooperation (39). E.g. Tupperware party's	carefully select facilitators – esteemed/ liked. Use a peer group setting e.g. church group for meetings. All materials designed and presented in an attractive fashion (i.e., as a gift).
5. **Authority** - When a person makes a decision, it is common to seek expert advice from an acknowledged source, for example, medical, legal, financial, or any other professional expertise or to comply with the rules of a properly constituted authority	staff members had to wear identification badges, presented an authorization letter from Government, and introduced as staff of an official TravelSmart campaign
6. **Scarcity** - More scarce opportunities are perceived as more valuable because of loss of future opportunities. Social psychology recommends the use of negative message framing for the promotion of proenvironmental behavior and to emphasize losses, which occur as a result of inaction, rather than savings, which occur as a result of taking action.	Demonstrating the loss in money and time spent on traveling and the loss in opportunities for physical activity when travel patterns remain unchanged. On a community level, the loss of neighborhood quality and a pollution and noise-free environment would be the negative message framing.

…at various stages in the program – including a case and control method to assess performance in recruiting participants

TABLE 1 Persuasion Strategies for Recruitment in TravelSmart Program

Communication Element	Persuasion Principle	Implementation Form
Preintervention phase	Reciprocation	Durable "green" shopping bag and shopping voucher provided 10 days before TravelSmart.
	Commitment and consistency	Accompanying letter with request to reduce plastic bag use. First commitment step.
	Authority	Accompanying letter is signed by the local council and the local traders association, who together promote the Green Bag.
	Social proof	The Green Bag is widely distributed in the local area; shoppers seeing each other carrying the bag reinforce each other in doing so.
	Liking	The Green Bag is presented as a gift (rapped with a ribbon) including a voucher for the local shopping strip.
TravelSmart announcement letter	Authority	Same source, logo, and appearance of the TravelSmart announcement letter as used for the letter of the Green Bag (support from local council and traders).
	Liking	The local residents are praised for their (highly visible) participation in using the Green Bag.
	Commitment and consistency	Based on the success of the Green Bag program, the local residents are invited by the promoters to participate in the next step.
	Scarcity	As rationale for the TravelSmart the loss in neighborhood quality due to local congestion and air pollution–noise levels is pointed out.
	Reciprocation	The TravelSmart announcement letter mentions some of the services that TravelSmart offers free of charge.
TravelSmart recruitment call	Authority	The caller identifies himself/herself as being part of the TravelSmart staff authorized by the local council and the local traders association.
	Commitment and consistency, social proof	The caller draws attention to the fact that the promoters of the Green Bag now follow up with their promotion of TravelSmart. The promoters themselves are consistent and committed to further action.
	Reciprocation, liking	The caller offers the respondents the opportunity to "have their say" on personal transport related issues that are found to be important and urgent. A caller showing concern for one's problem is generally appreciated.
	Reciprocation, liking	The conversation on personal transport issues is then used to offer those TravelSmart services that are best able to alleviate a transport problem reported by a particular respondent.
	Social proof	Social proof is engaged by pointing out that the TravelSmart services have found to be useful by participants in other program areas.
	Scarcity	The scarcity principle is engaged by pointing out that the recruitment phone call is a unique opportunity to receive different TravelSmart services that are normally not free of charge.

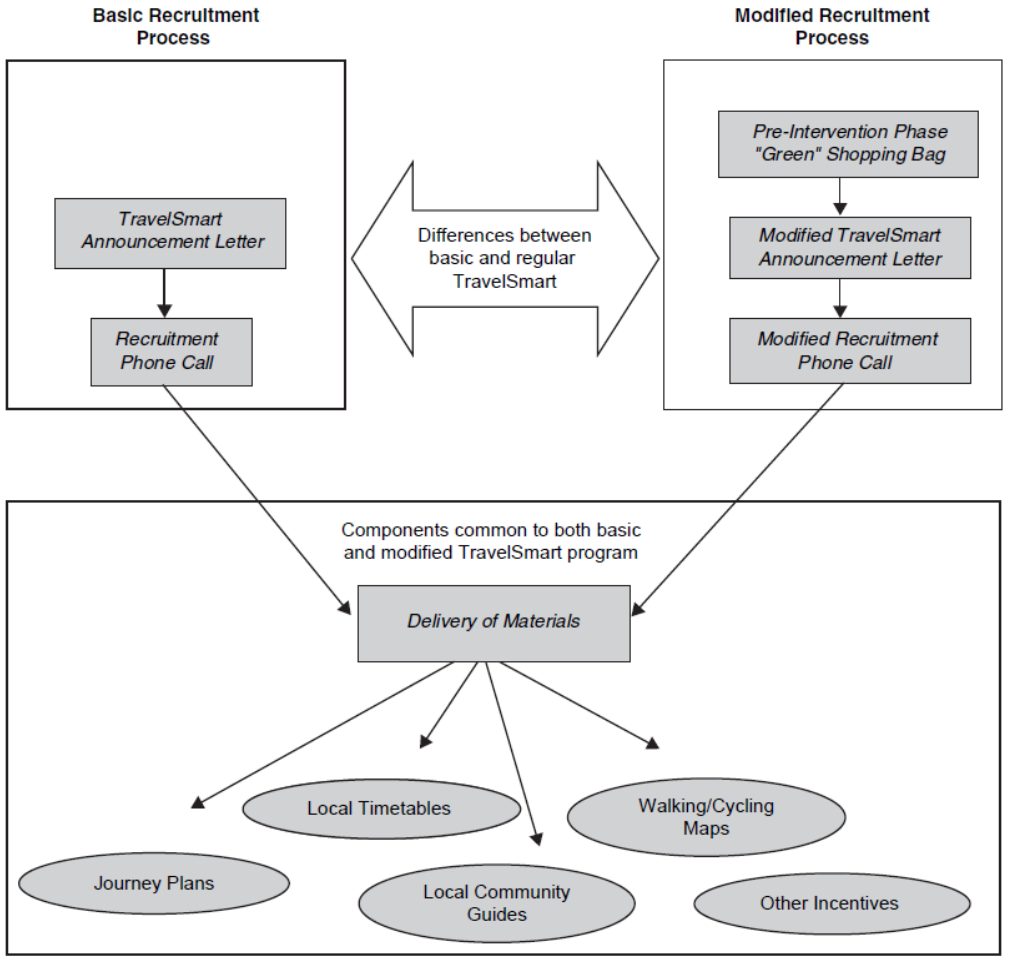

FIGURE 1 Structure of TravelSmart program with basic and modified recruitment processes.

Results suggest a new letter based on the 6 principles considerably improved performance between 2.8% and 10% in all tests undertaken

TABLE 2 Combined Effects of All Three Components

Component 1	Component 2	Component 3	Group #	Intervention Uptake (%)	
Old call	Without PIP	Old letter	1	60.0	+10%
Old call	Without PIP	New letter	3	70.0	
Old call	With PIP	Old letter	5	75.0	+2.8%
Old call	With PIP	New letter	7	77.8	
New call	Without PIP	Old letter	2	80.0[a]	+5%
New call	Without PIP	New letter	4	85.0[b]	
New call	With PIP	Old letter	6	70.0	+5%
New call	With PIP	New letter	8	75.0	

PIP = preintervention phase.
[a]Statistically significant at 90% confidence level.
[b]Statistically significant at 95% confidence level.

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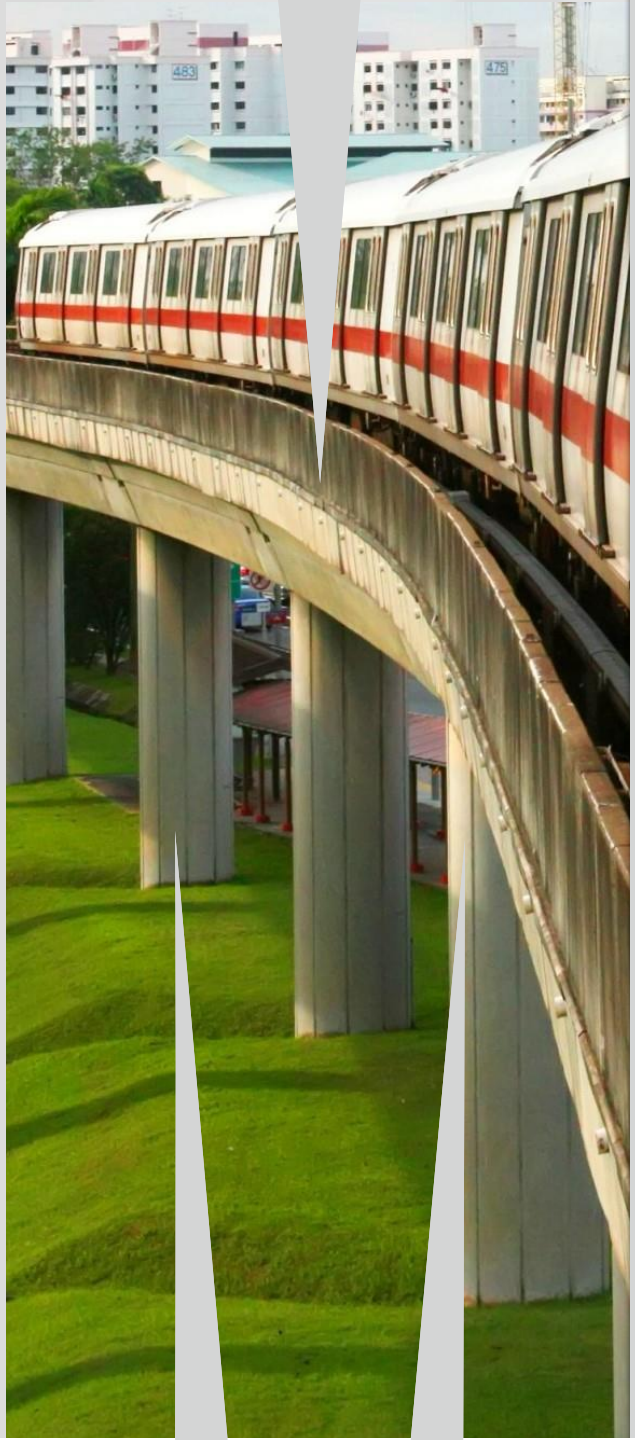
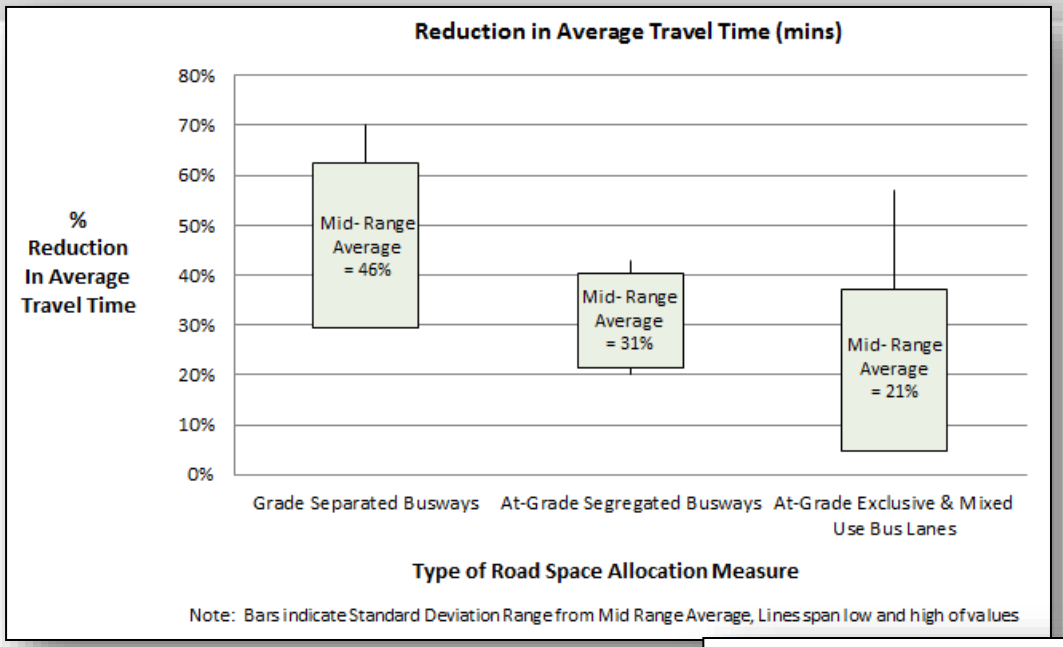
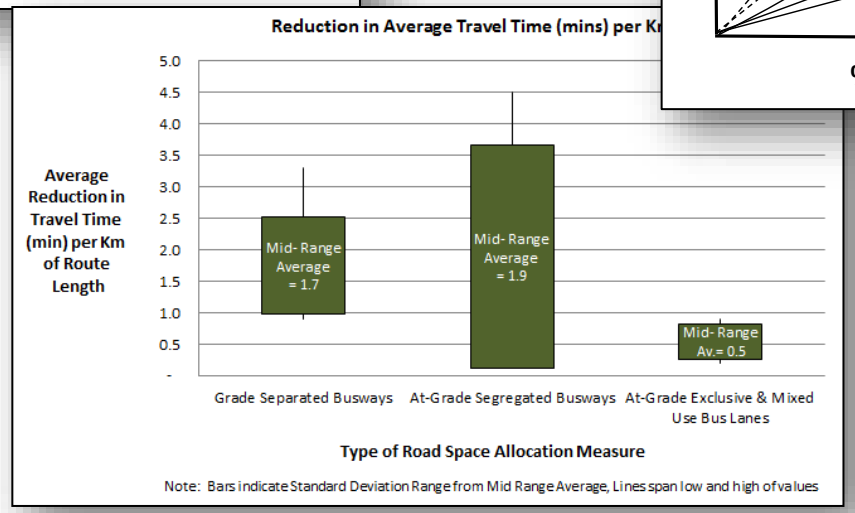


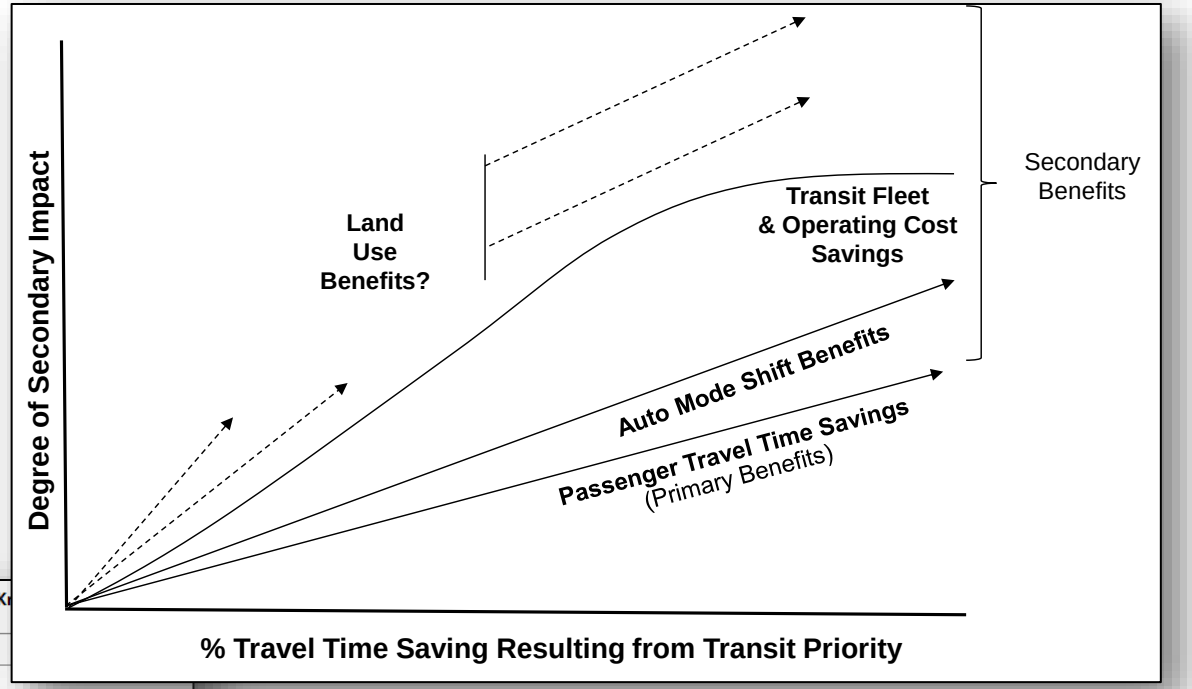
We all know PT is more efficient on roads due to people carrying ability

We know that substantial benefits will result from implementing priority…



Source: Goh and Currie (2013) Before and After Studies of the Operational Performance of Transit Priority Initiatives ITS Report Feb 2013





Source: Currie G and Sarvi M (2012) 'A New Model for the Secondary Benefits of Transit Priority' TRANSPORTATION RESEARCH RECORD No. 2276, Journal of the Transportation Research Board pp 63–71

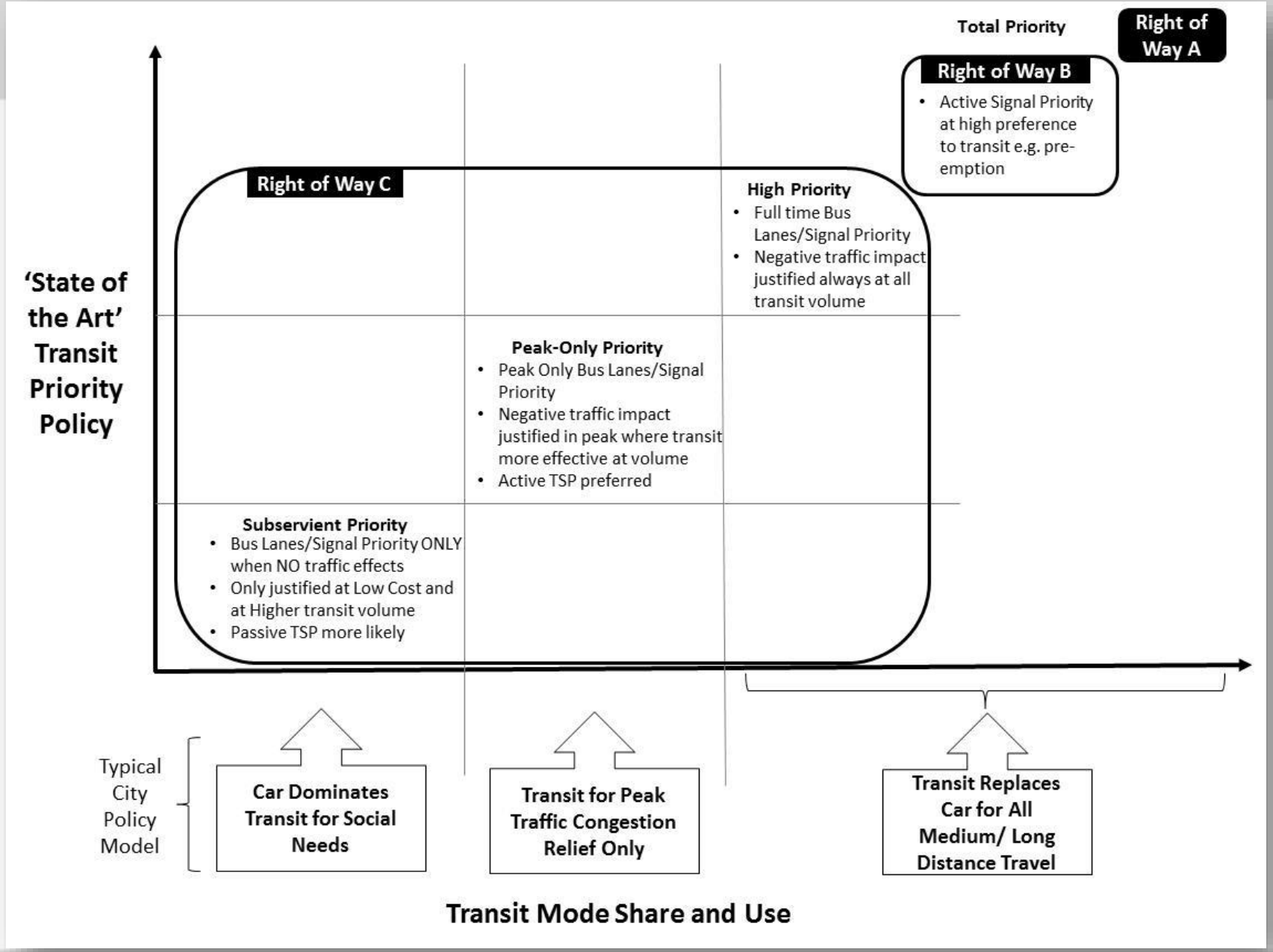
..but very little gets implemented.

Questions of Governance: Rethinking the Study of Transportation Policy
Transportation Research Part A Policy and Practice 101 · May 2017

"…there is a need to … pay greater attention to context, politics, power, resources and legitimacy"

(Marsden and Reardon 2017)

State of the Art – Priority Design



Source: Currie G (2016) 'Managing On-Road Public Transport in Traffic' in Bliemer M Mulley C and Moutou C Handbook on Transport and Urban Planning in the Developed World, Edward Elgar Publishing Ltd UK

Topic 11. James Reynolds – Pragmatic Transit Priority

1. TOD & Transit
Laura Aston

2. Big Data & Visualisation
Homayoun Rafati

3. Network Synchronisation
Rejitha Ravindra

4. Shared Mobility
Taru Jain

5. Changing Travel Behaviour
Laura McCarthy

6. Tourism & Public Transport
Victoria Radnell

7. Reliability Engineering Approaches in Best Practice Railways
Maryam Nawaz

8. Improving Gender Diversity in the Public Transport Workforce
Rachel Mence

9. Future Train
Lisa Fu

10. Designing Urban Rail to Reduce Vandalism
Amy Killen

11. Bus & Tram Priority Implementation
James Reynolds

12. Simulating Bus & Tram Priority
Samithree Rajapaksha

13. Placemaking & Street Redesign
Matthew Diemer

14. Passenger Falls in Trams
Luke Valenza

15. Transit Network Design
Nora Estgfäller

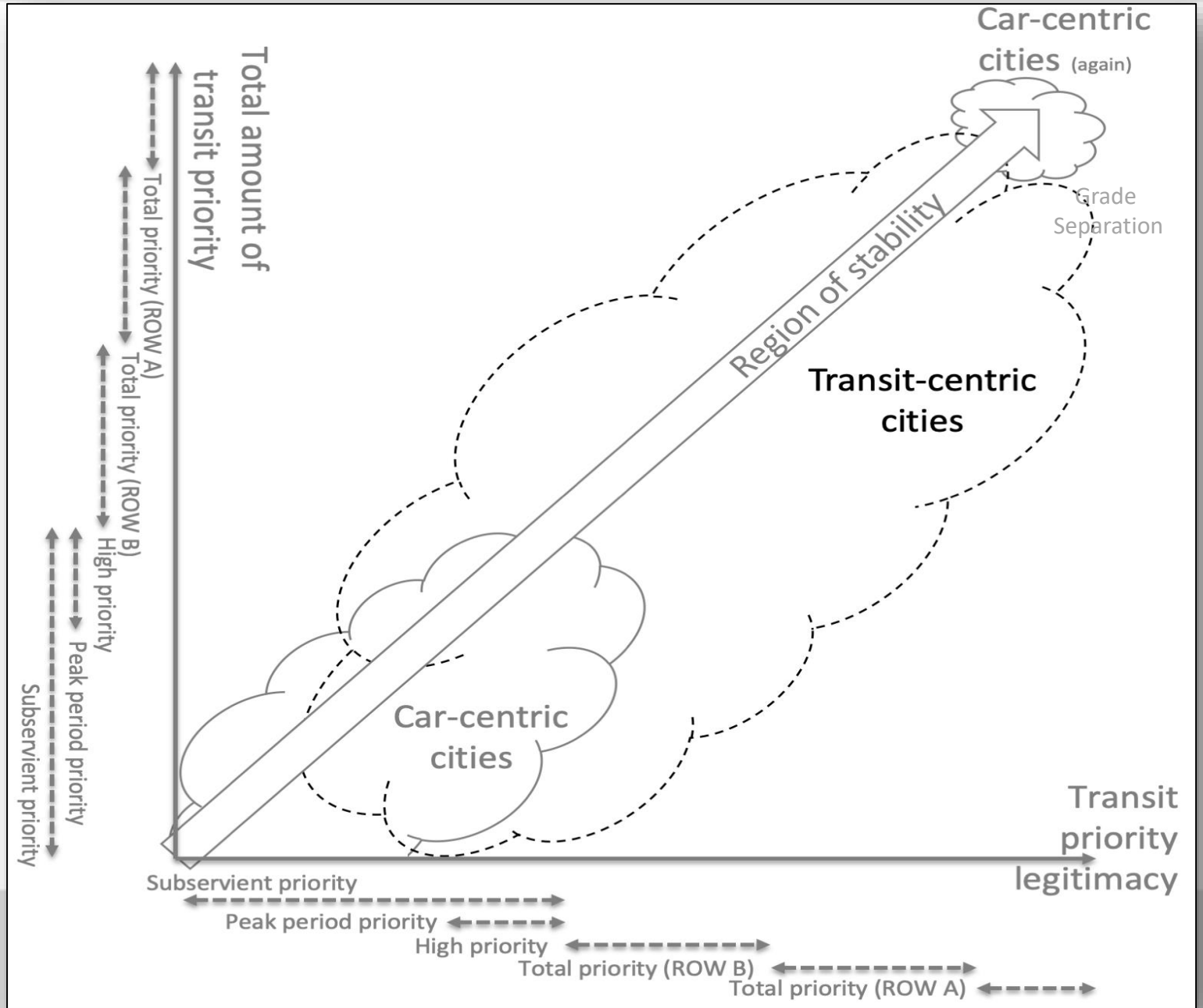
16. Future Bus
Sarah Roberts

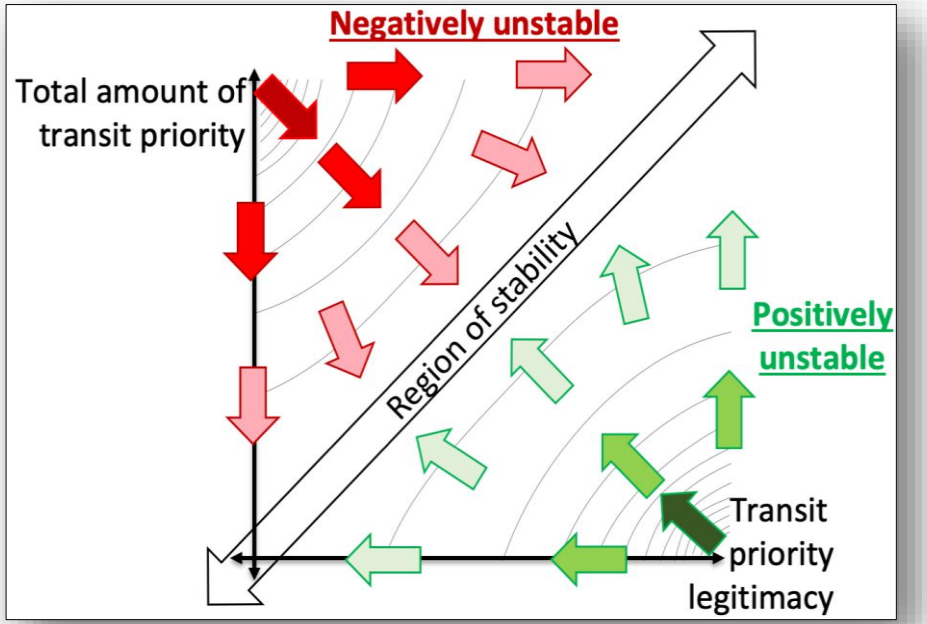
17. The New Bus Rider
Prudence Blake

18. Road Safety Impacts of Bus Safety Inspections
Jianrong Qiu

Why can London and Zurich have top quality priority, yet car dominated cities cant?....

…because they have LEGITIMACY





How can car dominated cities get priority without LEGITIMACY? We identified **THREE APPROACHES AND EIGHT PRAGMATIC STRATEGIES**

Build legitimacy BEFORE implementation

AVOID IMPACTS on other road users

Build legitimacy THROUGH IMPLEMENTATION

How can we get priority when we don't have LEGITIMACY? We identified **THREE APPROACHES AND EIGHT PRAGMATIC STRATEGIES**

Build legitimacy BEFORE implementation

1. Technical enquiry
2. Transport planning, and/or
3. Public processes or hearings

AVOID IMPACTS on other road users

4. Grade separation
5. Subservient priority

Build legitimacy THROUGH IMPLEMENTATION

6. Bottom-up and incremental
7. Pop-ups
8. Trials

Technical/Public Enquiries – such as the St Clair streetcar corridor in Toronto

Build legitimacy BEFORE implementation

1. **Technical enquiry**
2. **Transport planning, and/or**
3. **Public processes or hearings**

AVOID IMPACTS on other road users

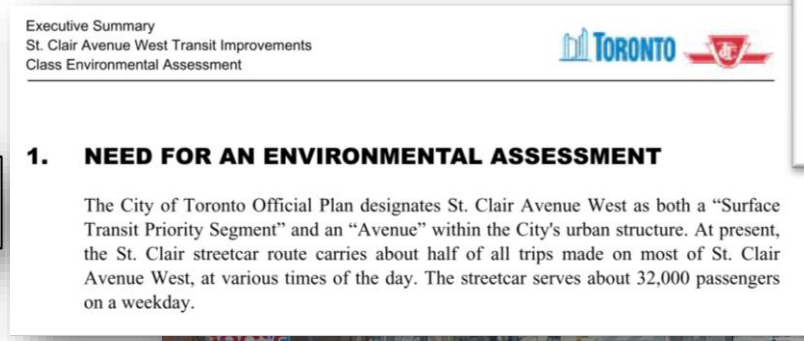
4. **Grade separation**
5. **Subservient priority**

Build legitimacy THROUGH IMPLEMENTATION

6. **Bottom-up and incremental**
7. **Pop-ups**
8. **Trials**

Mediate, arbitrate or resolve issues & build **legitimacy**

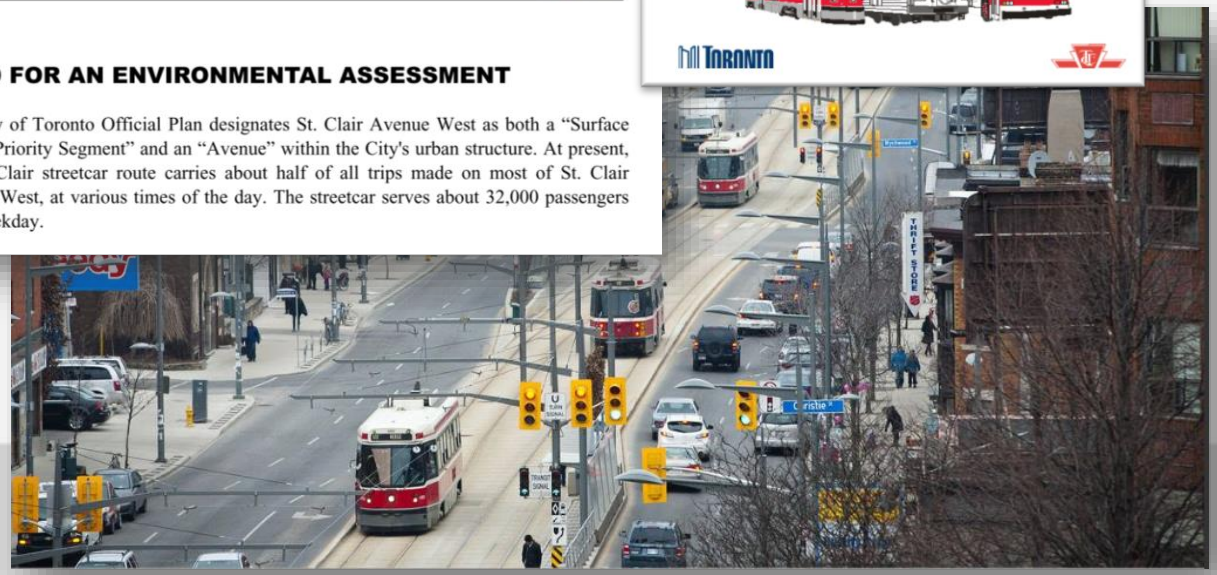
- Transport study
- Environmental effects statement process
- Planning processes
- Independent study
- Public enquiry
- Plebiscite (Switzerland only)


Executive Summary
St. Clair Avenue West Transit Improvements
Class Environmental Assessment

TORONTO

1. NEED FOR AN ENVIRONMENTAL ASSESSMENT

The City of Toronto Official Plan designates St. Clair Avenue West as both a "Surface Transit Priority Segment" and an "Avenue" within the City's urban structure. At present, the St. Clair streetcar route carries about half of all trips made on most of St. Clair Avenue West, at various times of the day. The streetcar serves about 32,000 passengers on a weekday.



MONASH University

4. Grade Separation; Adelaide and Brisbane Busways

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5. Subservient Priority; Melbourne; Eastern Freeway emergency lanes, Smartbus Road Widening and Tokyo Bus Tubes

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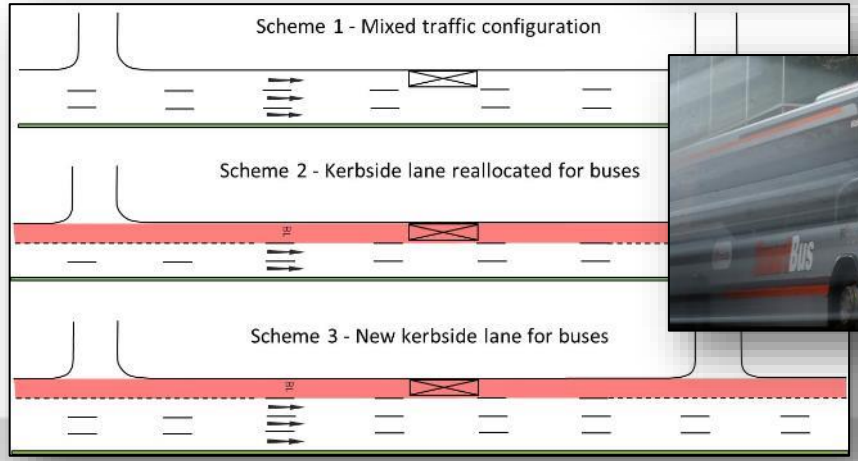

6. Bottom-up & Incremental; **Melbournes vanishing streetcar secret**

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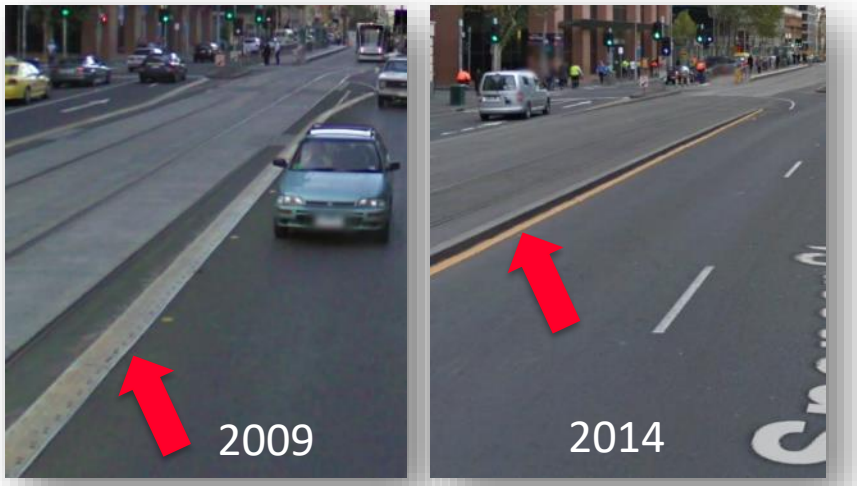

MONASH University

7. Pop-ups; do priority tomorrow; with traffic cones – Boston, USA

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Tactical urbanism

Boston Tests Faster Bus Service Simply By Laying Out Orange Cones

The same low-cost approach that cities have used to quickly reallocate street space to walking and biking can also be used to try out transit improvements.

By Angie Schmitt | Dec 12, 2017 | 77

Boston set up a bus lane using orange cones. Photo: Jacqueline Goddard

8. Trials; Toronto King Street Trail; and the great Melbourne Clarendon Street Trial Failure; or was it Success?

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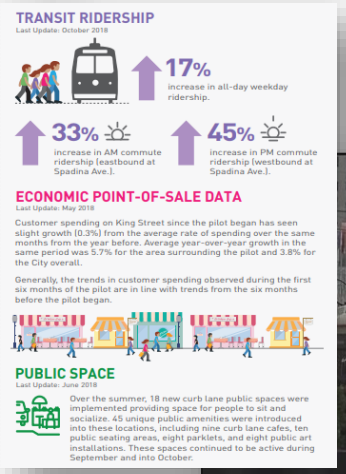
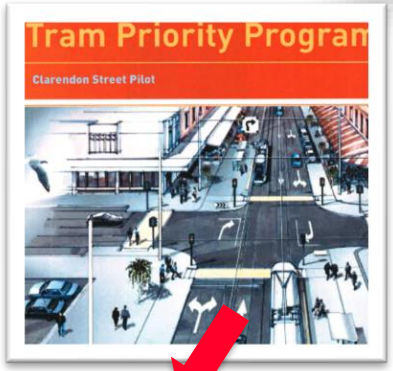




vic roads

Clarendon Street Tram Stop Works

Following a trial of traffic treatments along Clarendon Street, the State Government, City of Port Phillip, Yarra Trams and business representatives have agreed on some changes to the

CITY OF PORT PHILLIP REPORT

STRATEGY AND POLICY REVIEW COMMITTEE
6 JUNE 2005 *POLICY AND PLANNING*

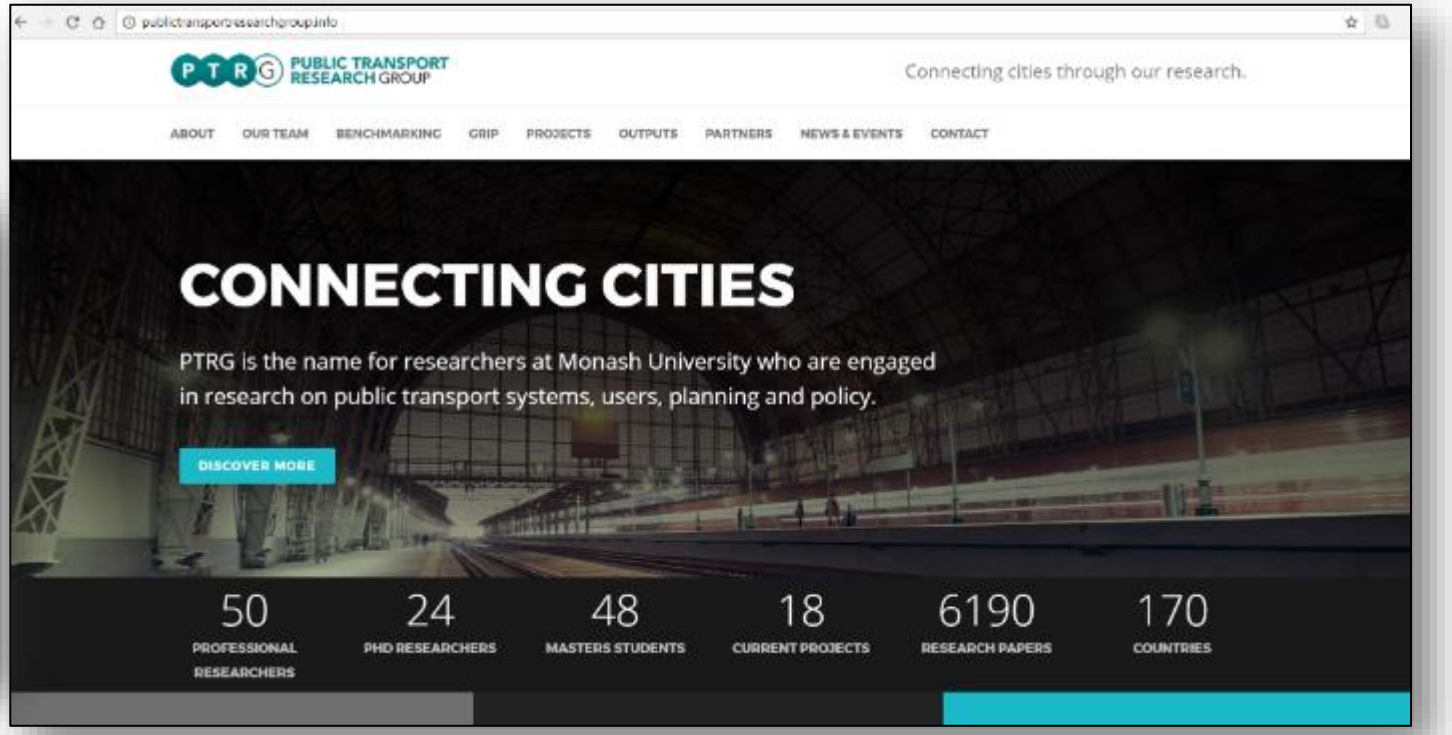
A3	CLARENDON STREET THINK TRAM TRIAL PROJECT
LOCATION/ADDRESS:	CLARENDON STREET, SOUTH MELBOURNE
RESPONSIBLE EXECUTIVE DIRECTOR:	GEOFF OULTON, EXECUTIVE DIRECTOR CITY DEVELOPMENT
AUTHOR:	PAUL SMITH, COORDINATOR SUSTAINABLE TRANSPORT
FILE NO.:	70/04/12
ATTACHMENTS:	13

Contact us via our website PTRG.INFO, LinkedIn or Twitter

Professor Graham Currie FTSE

Director, SEPT-GRIP, PTRG

Connect with us on LinkedIn twitter



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