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Tourists, Visitors and Urban Modelling

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4 R J Nairn BE, BEc, FIEAust, LFITE, CPEng, EngExec
5 13 Tanumbirini Street, Hawker, ACT 2614
6 rjnairn@grapevine.com.au

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Abstract

9 Urban travel modelling is normally based on the expected daily (or peak hour) travel of the
10 city's residents, but, at least partially, ignores travel by tourists and visitors.

11 This paper explores the problems and difficulties in attempting to identify and include visitor
12 travel into the modelling process and attempts to assess the probable effects of doing so.   It
13 relies on a study of Canberra (in 2013) to provide a case study.

14 ## 1.   Introduction

15 Urban travel modelling is normally based on the expected daily (or peak hour) travel of the
16 city's residents, although trips to and from external destinations are often included.

17 It is not normal to specifically identify the daily travel made by visitors and tourists even
18 though their travel habits are distinctly different than those of residents.

19 ## 2.   Why trouble with Visitors?

20 Dealing with visitor travel as a special issue may not be necessary because at least some
21 visitor travel data is already captured and taken into account in the modelling process, for
22 instance:-
23 • the traffic and patronage calibration process includes visitor travel;
24 • visitors entering the city by car are included in the external trip data if this is included
25   in the modelling; and
26 • Visitor travel data is captured in Household Interview Survey data, at least partially, if
27   hotels and motels are included in the sample and some visitors stay in the homes of
28   residents.

29 However:-
30 • traffic and patronage calibration seldom includes off-peak traffic when many visitors
31   seek to travel;
32 • external trip data usually does not identify coach travellers and is usually peak hour
33   data so is not particularly relevant to tourists and it does not identify destinations,
34   travel purposes, car-occupancy or associated internal travel taken during the day; and
35 • It is not normal to interview every person staying in a hotel or motel even when these
36   dwellings are included in Household Interview Surveys, so their sample size is so tiny
37   as to distort the visitor sample.

38 There are several reasons why it may be important to incorporate visitor trips in modelling:-

39   •   Trip totals - The daily travel by visitors and tourists may add significantly to the
40   number of trips undertaken. In Canberra it is estimated that visitors add about 15% to
41   the trips taken annually by residents;
42   •   Mode choice - it is more likely that visitors will take trips by public transport and taxis
43   than residents;
44   •   Peaks - the time when they travel will be less likely to be in peak hours and may be
45   greater in the evenings;
46   •   Destination concentration - visitor trips are less likely to be dispersed in the outer
47   suburbs but more likely to be concentrated in the Central Business District and tourist
48   areas which may lead to higher congestion estimates in these already congested areas;
49   •   In addition all visitors are likely to pay full fares when travelling by public transport
50   although some visiting students or pensioners may have concessional fares; and
51   •   Seasonality - visitor's trips vary much more seasonally than resident's trips.

52   **Figure 1 - Tourism seasonality**
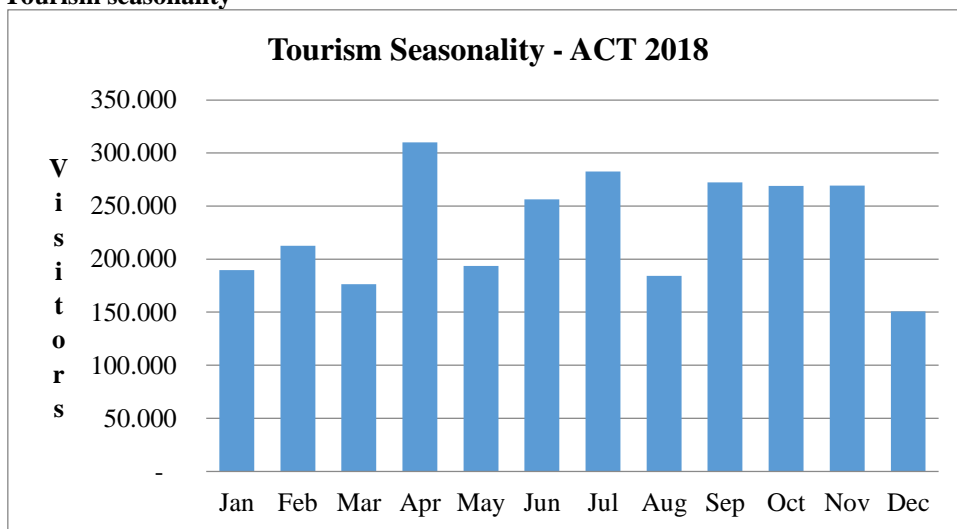
53
54   Source: Tourism Research Australia

55 While recreational travel is not confined solely to tourists and visitors, all day non-home-
56 based recreational travel is higher in such tourist towns as Gold Coast (32%), Merimbula
57 (29%) and Shellharbour (30%) than in the major capital cities – Melbourne is 9.4%[1].

58 Further, travellers' preference for public transport for recreational purposes is higher, except
59 for school, than any other non-home-based travel purpose in these towns.   Therefore the
60 impact of visitor travel is likely to be significant and at different times and in different places
61 than travel by residents.

62   In addition, visitor numbers in tourist areas have been growing faster than the resident
63 population – Canberra's visitors grew by 6% between 2013 and 2019[2].

64 Tourism is an important part of the local economy for many cities and towns and an
65 understanding of visitor's travelling needs may lead to better services for them.

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[1] Household Interview Travel Survey Data
[2] Australian Capital Tourism

66 # 3.   Canberra Case Study

67 ## 3.1.   Visitor Numbers

68 Visitor numbers[3] to Canberra for the year up to March 2013 as provided by Australian Capital
69 Tourism are shown in Table 1.

70 **Table 1 - Canberra Visitors 2013 – ('000)**

Purpose	Domestic	International
Pleasure/Holiday	548	82
Visit friends/Relatives	782	48
Business	591	26
Education	128	25

71 Source: Australian Capital Tourism

72 Over 2.2 million people visited Canberra in 2013.   Visitors for "education" purposes include
73 both school groups, which stay in Canberra for about 3 days, and University students
74 (particularly international students) who stay for much longer periods.   International students,
75 which are included in the above "visitor" statistics, stay more than three months on average.

76 Domestic visitor entrants visiting friends and relatives typically stay in Canberra for just over
77 3 nights whereas international visitors stay almost 4 weeks.   Those visiting for a holiday, if
78 domestic, stay for less than 3 nights but international pleasure-seekers stay more than 9
79 nights.

80 ## 3.2.   Modes of Visitor Travel to Canberra

81 Nearly all visitors arrive in Canberra by car, bus, train or air.   The estimated mode of arrival,
82 derived from Domestic and International Visitor Surveys, by all visitors, including business
83 and educational visitors, is shown in Table 2.   The "other" category is not defined in the data
84 but probably includes charter and light aircraft and military or diplomatic travel.

85 **Table 2 - Estimated Mode of Arrival to Canberra – 2013 ('000)**

Mode of Arrival	Domestic	International	Total	Percent
Car	1,399	95	1,494	66.5%
Aircraft	518	38	556	24.7%
Coach	80	44	124	5.5%
Railway	25	2	27	1.2%
Other	45	2	47	2.1%
Total	2,067	180	2,247	100.0%

86 Source: Australian Capital Tourism- Note: Day-trippers by car are not included

87 Visitors entering by car or coach comprise over 70% of all visitors to Canberra and only 35%
88 of them arrived for business or education purposes.   That is, over 1 million visit for holidays
89 by car or coach.   A further source provided travel by mode by travel purpose for travelers
90 between Canberra and just Sydney as shown in Table 3.

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[3] International and Domestic Visitor Surveys

91 **Table 3 - Mode and Purpose of Travel between Canberra and Sydney**

Purpose	Air	Coach	Car	Train	Total
Conference	1.26%	0.00%	3.77%	0.00%	5.03%
Business	5.92%	0.44%	11.10%	0.52%	17.99%
Holiday	1.18%	3.55%	27.09%	0.81%	32.64%
Visit friends	1.04%	0.59%	20.06%	1.33%	23.02%
Education	0.15%	0.96%	5.40%	0.00%	6.51%
Other	0.00%	0.59%	13.99%	0.44%	15.03%
Total	9.40%	6.07%	81.42%	3.11%	100.00%

92 Source: Transrapid Australia

93 3.3. Tourist/Visitor Expenditure

94 The total number and expenditure by tourists and visitors to Canberra in the financial year
95 2018-2019, excluding day-trippers, is shown in Table 4.

96 **Table 4 - Visitor/Tourist Expenditure in Canberra in 2018-2019**

Visitor/Tourist	Number Millions	Expenditure		
		Total Millions	Per person	Per night
International	0.27	$ 605	$ 2,274	$ 104
Domestic overnight	2.90	$ 1,870	$ 645	$ 245
Total	3.17	$ 2,475	$ 2,919	$ 350

97 Source: Australian Capital Tourism

98 3.4. Identifying Origins and Destinations

99 The origins and destinations of the daily travel of visitors for education purposes are relatively
100 simple to estimate as many University students live in on-site accommodation.   Visiting
101 school groups are provided with accommodation at a special site so their internal trip origins
102 are easily identified.   Their internal trips invariably include seeing the national parliament at
103 work.

104 The daily trip characteristics of those visitors with business purposes in Canberra, is
105 unknown, but their destinations are likely to be to the locations of the major defense, public
106 service, legal and private corporations, all of which have been identified in the Canberra
107 Strategic model network.

108 It is safe to assume that other visitors are likely to take trips to the main Canberra tourism
109 attractions such as the war memorial, parliament, art gallery, museum etc. as well as to the
110 major entertainment and restaurant locations.

111 The locations of these major Canberra tourist attractions have been identified in the Canberra
112 Strategic model network so the destination locations for these trips can be identified.

113 However, given the visiting hours of these attractions, no record is kept of the time of visitor
114 peaks.

115 The annual numbers of visitors to these major attractions are shown in Table 5.

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117 **Table 5 – Annual Visitors to Major Tourism Attractions – Year 2013**

Attraction	Domestic Visitors	International Visitors	Total
AIS	45,000	7,049	52,049
National Museum	82,000	39,314	221,314
Telstra Tower	78,000	25,346	103,346
War Memorial	373,000	77,692	450,692
Parliament	360,000	146,961	506,961
Galleries/Questacon	588,000	64,648	652,648
Arboretum*	60,000	25,000	85,000
Cockington Green	50,000	12,000	62,000
Mint*	50,000	12,000	62,000
Zoo*	53,000	12,288	65,288

118 Source: Australian Capital Tourism   Note * estimated

119 Visits to these destinations accounted for just over 2 trips per day per tourist/visitor in 2013.
120 If their arrival and departure trips and their trips for entertainment and/or food in the evenings
121 are considered, then it is reasonable to assume that tourists and visitors make more than 4
122 trips per day although no patronage records are available for restaurants or theatres.

123 ## 3.5. The entry origins and destinations of non-car travellers

124 Similarly the locations of the Canberra airport, bus and railway station have been identified in
125 the Canberra Strategic model network.   Therefore the origin of the first trips made in
126 Canberra for the visitors arriving by these modes can be identified.   Their next trips will be
127 from their accommodation.   It is safe to assume that, of those arriving by bus or train (about
128 half), they will not be day-trippers, although some of those arriving by air may be.   Those
129 who are not day-trippers may make their first trip to their accommodation, these trips perhaps
130 being close to peak hours, and then travel to other destinations.

131 Those travelling for holidays, business or conferences are likely to be accommodated in hotels
132 and motels, the locations of all of which have been identified in the Canberra Strategic model
133 network.   Those visiting friends and relatives will be in dispersed accommodation presumed
134 to be in proportion to the zones with resident population.

135 ## 3.6. Destinations of those arriving by car

136 The locations of the road entry/exit points to Canberra have been identified in the Canberra
137 Strategic model network and cordon traffic counts are available at these locations although
138 there is no information about their internal origins or destinations.   In addition, there is no
139 information identifying visitors from residents in these counts, although it is estimated that, if
140 external day-trip commuters are omitted, then other visitors comprise about 10% of the total
141 daily cordon counts.

142 ## 3.7. Visitor's Travel Modes

143 Those arriving by car and those visiting friends and relatives (about 73%) are unlikely to
144 travel by public transport.   The remaining visitors will preferably travel by taxi or public
145 transport. This is a greater proportion than that of residents travelling by public modes. It is
146 reported that those staying in the caravan park at Canberra's Exhibition Centre travel
147 extensively by Canberra's new light rail system.

148   ### 3.8.   Visitor's travel times

149   While it is expected that visitors will avoid peak hour travel to some extent, there is no data
150   identifying the times that visitors travel.   In an attempt to assess their travel times, Household
151   Interview Travel Survey data for several cities are compared in Table 6.   The selected mid-
152   morning and mid-afternoon travel hours are those most likely to be tourism travel hours.   The
153   mid-afternoon travel hour is earlier than the school peak.

154   **Table 6 – Tourism peak hour travel as a proportion of AM peak hour travel**

Tourism	City	% AM peak hour travel	
		Mid-morning	**Mid-afternoon**
High	**Gold Coast**	95.5%	87.1%
	Shellharbour	82.7%	86.4%
Less	**Sydney**	73.2%	70.1%
	Adelaide	74.5%	77.9%

155   Source: Various Household Interview Travel Surveys

156   One might expect greater peak spreading in the major cities, nevertheless off peak travel in
157   tourism cities seems to be higher than that for cities less dependent on tourists.

158   # 4.   The modelling process

159   The issues in establishing the probable origin and destination matrix for visitors has been
160   discussed and it remains to assess their mode choice and time of travel.   The proportion of
161   visitors that travel in the peak traffic periods can only be estimated.

162   It would be desirable that visitor travel matrices be added to resident travel matrices after the
163   mode split processes, however their mode choice characteristics, after their initial arrival, are
164   unknown.

165   In what may only be described as a "courageous" attempt, the Canberra Strategic model was
166   used to examine the probable effect of including visitor travel in both a morning peak
167   assignment and an all-day travel assignment.

168   In the model results for Canberra, shown in Table 7, the estimated visitor trip matrix was
169   simply added before the mode choice process.   Model re-calibration then included the
170   estimates of visitor travel.

171   # 5.   Impact of visitor travel in Canberra

172   The estimated impacts from including visitor travel are shown in Table 7.

173   **Table 7 – Estimated travel impacts from including Visitor Travel – Canberra 2013**

Travel Criterion	AM Peak increase	All Day increase
Total trips generated	4.3%	14.8%
Car Trips	4.2%	14.7%
Transit trips	5.2%	18.3%
Total distance travelled	4.6%	13.2%
CO Emissions	4.1%	13.0%

174   Source: Canberra Strategic Model

175 In view of the lack of appropriate data about visitor travel characteristics and the necessary
176 assumptions undertaken when carrying out this modeling, these results can only be regarded
177 as very roughly indicative of the effects quoted and should not be referenced.   In particular,
178 as seasonality has not been taken into account, the impacts may well be greater than those
179 stated.

180 It also should be borne in mind that Canberra probably has a higher proportion of visitors and
181 tourists than most Australian cities.

182 The peak hour results are not such that they might cause concern, bearing in mind the usual
183 accuracy expectations for modeling.   However the all-day results indicate that there is a need
184 to consider the travel impacts of tourists and visitors, at least when all-day traffic is important.

6.   Economic Issues with Tourist Travel

186 Visitor and tourism travel is of industrial importance in our cities.   About 17,000 people work
187 in the Tourism Industry in Canberra or about 1 in 7 employees.   Encouragement of tourism is
188 therefore of considerable economic importance.

189 As daily internal tourism travel in Canberra is likely to involve a higher proportion of transit
190 travel and be concentrated in the Central Business and Tourism Districts to a greater extent
191 than travel by residents, then opportunities may be lost to provide better travel facilities for
192 tourists if their travel is not identified in the travel modeling.

193 In addition, insofar as improved international tourism travel is induced, then additional
194 induced travel may accrue an added type of benefits to the transport project involved.

7.   Visitor and Tourist Data Sources

196 The main sources of information on visitor numbers to the ACT published by VisitCanberra
197 are:
198   • The National Visitor Survey (NVS) for domestic visitor figures (travel by Australian
199   residents) and
200   • The International Visitor Survey (IVS) for international visitor figures (travel by
201   overseas visitors).

202 Both of these surveys are managed by Tourism Research Australia (TRA).

203 The statistics are collected through interviews with visitors after their trip. Both the IVS and
204 NVS operate throughout the year.   Only those 15 years or over are interviewed for the
205 surveys.   Trips by international and domestic visitors of more than 12 months duration are
206 excluded.

207 The NVS is an 'origin based' survey – where respondents are surveyed over the telephone in
208 their home. Currently, the NVS involves around 120,000 interviews a year. The NVS
209 provides information about the characteristics and travel behavior of Australian residents.

210 For overnight trips, the National Visitor Survey includes questions about:
211   • The Visitor – e.g. gender, age, life-cycle stage, income etc,
212   • The Trip – e.g. travel party, length of trip, number/places of stopovers, information
213   sources, expenditure, etc, and

- Each Stopover Visit – e.g. for each place a visitor stopped overnight they are asked about transport used, accommodation, length of stay, leisure activities, purpose of visit etc.

8.   Conclusions

Canberra has probably a higher visitor proportion per capita than other major Australian cities, nevertheless the case study illustrates that daily visitor travel can be substantial and can distort the normal results using just resident's travel at least for all-day analysis.   Total travel, origin and destination mix, mode choice and travel peaks are likely to be altered, particularly in the Central Business District and in Tourism areas.

There are many other cities in Australia which rely heavily on tourism as a major part of the economic life – such as Gold Coast, Darwin and the Queensland Coastal cities.   The economic importance of tourism to these cities should earn some attention in our modeling.

However, it is also quite apparent that, with the current lack of appropriate data, any attempt to incorporate visitor travel into normal travel modeling is fraught with many presumptions and estimates so that normal expectations of precision will be frustrated.

The methodology used to collect the national visitor and tourist data is not amenable to be extended to collect internal urban trip making data so it is necessary to seek other methods.

In order to collect this data in Canberra attempts were made to initiate departing visitor surveys at Canberra Airport and the bus and rail stations, and to initiate visitor expectation surveys at the Tourism Information Centre.   However, these did not eventuate.   Without these data there is doubt that modeling travel can achieve the improved precision desirable for adequate traffic and patronage forecasts.   Important opportunities may be lost to promote the economic value of tourism if tourism travel is not identified in the travel modeling.

Acknowledgements

References

Data provided by Australian Capital Tourism

Tourism Research Australia publications

Transrapid Australia.   Canberra to Sydney Very Fast Train submission.

R J Nairn & Partners Pty Ltd.   Extracts from analysis of Home Interview Surveys conducted by State Road Authorities in Gold Coast, Sydney and Adelaide.

R J Nairn & Partners Pty Ltd.   Extracts from analysis of Home Interview Surveys conducted by the firm in Canberra and Shellharbour.

Canberra Light Rail Investigation