

Benchmarking public transport for international tourists in Queensland cities

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Abstract

High quality public transport is key to supporting the development of international tourism in cities. However, there is little understanding of how public transport is perceived by international tourists. The aim of this research was to benchmark the quality of urban public transport for international tourists using case studies of major cities in Queensland, Australia, and to compare them to Melbourne, London, Paris and Singapore. The selected case study cities were Brisbane, Gold Coast, Sunshine Coast, Cairns and Townsville.

A scorecard approach, developed in previous research, was used to assess each city based on 26 weighted criteria covering the areas of information access, fares and ticketing, service levels, and special tourist services. Results showed that the Gold Coast had the highest aggregate score (152.9 out of 200), followed by Brisbane (134.8), Cairns (103.1), Sunshine Coast (100.6) and Townsville (65.0). A comparison to previous research showed that the Gold Coast performs well against international cities such as London (151.9) and Paris (149.8). However, the results also highlight a number of key areas for improvement. While the Gold Coast performed well on fares and ticketing, it could do more to improve special tourist services. While Townsville could improve on information access, there is much room to improve public transport service levels in all Queensland cities. This is in part due to the relatively large spread of tourist attractions, thereby increasing the scale of the transport task for tourism purposes.

The results of this research help to identify areas of good performance and gaps in how public transport meets the needs of international tourists in Queensland cities. Future research could refine the approach by incorporating user-based surveys of international tourists.

Key words: Public transport, international tourism, performance measurement, Queensland.

1. Introduction

The tourism experience always incorporates a component of travel. If tourists are unable to access their desired destinations due to inefficiencies in the transport system, they may seek alternative destinations (Prideaux 2000). The importance of an effective transport system in supporting tourism is well supported by previous research (Mammadov 2012; Prideaux 2000; Thompson & Schofield 2007). In urban areas in particular, public transport plays a key role in providing access to tourist attractions and is now viewed as an essential element of sustainable tourism development (Le-Klähn & Hall 2015; Le-Klähn et al. 2014). The provision of high quality public transport is particularly relevant for international tourists given they are less likely to have ready access to a private car than domestic tourists (Le-Klähn & Hall 2015).

While the link between public transport and international tourism has been established, there is little understanding of how public transport is perceived by international tourists. Previous research undertaken by Yang et al. (2015) sought to develop a framework for assessing the quality of urban public transport from the perspective of international tourists. However, this framework has only been applied to a limited number of international cities comprising Melbourne, London, Paris and Singapore.

The aim of the research underlying this paper is to build upon the work by Yang et al. (2015) through benchmarking the quality of public transport across a number of cities in the Australian state of Queensland. The selected cities are Brisbane, Gold Coast, Sunshine Coast, Cairns and Townsville. These cities were chosen on the basis of their significance as key destinations for tourism in Australia. In applying the framework to the selected Queensland cities, this paper makes a number of comparisons to the international cities previously assessed by Yang et al. (2015) and identifies key reasons for differences in their performance. In addition, this paper seeks to explore the relationship between the scale of the cities assessed and their public transport performance.

Queensland is located in the north east corner of the Australian mainland and is home to over four million people (Australian Bureau of Statistics 2015a). The state is regarded as Australia's leading tourism destination attracting more than 20 million domestic overnight visitors and 2.3 million international visitors in 2015 alone (Tourism and Events Queensland 2015a, 2015b). The importance of public transport in supporting access to tourist destinations throughout Queensland is underpinned by the current development of the Queensland Tourism and Transport Strategy (Queensland Government 2015).

The remainder of this paper is structured as follows. Section 2 provides context for the research through a description of the selected Queensland cities and a literature review of public transport elements of importance to international tourists. Section 3 presents the framework used for benchmarking public transport and describes how this was applied to each of the Queensland cities. Section 4 provides a summary of the results, with their implications discussed in Section 5. Concluding remarks are provided in Section 6.

2. Research context

This section provides a brief description of the selected Queensland cities in terms of their location, population and tourism characteristics. This is followed by a literature review outlining public transport elements that are of importance to international tourists.

2.1 Description of selected Queensland cities

Figure 1 shows the location of the five Queensland cities selected for this research. Brisbane is the capital city of Queensland, located in the south east. The Gold Coast and Sunshine Coast are located approximately 80 kilometres south and north of Brisbane respectively, while Cairns and Townsville are located further north.

Figure 1: Location of Queensland cities in Australia

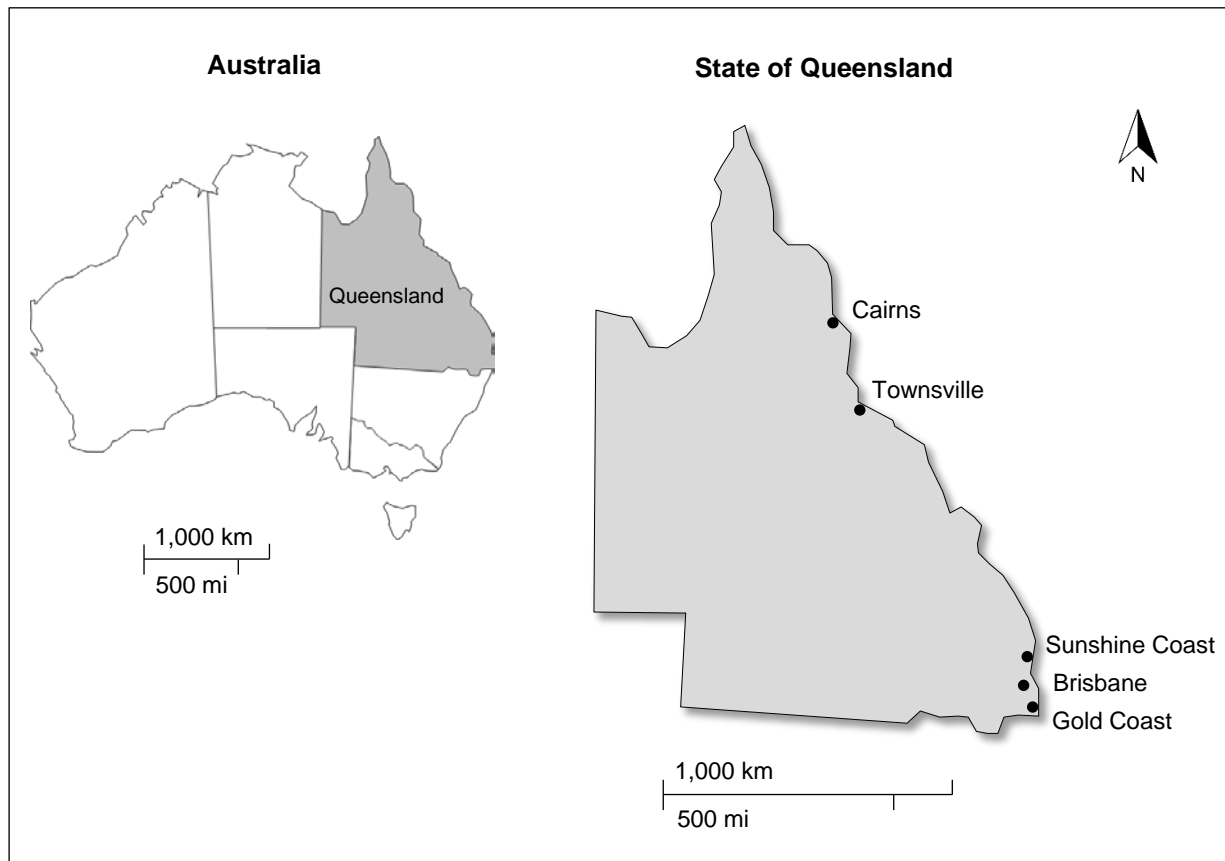


Table 1 details the resident population, visitation and tourism expenditure in each of the Queensland cities in 2015. As the state’s destination gateway, Brisbane has the largest annual overnight visitation with 5.5 million domestic tourists and 1.1 million international tourists. This is followed by the Gold Coast with 3.5 million domestic tourists and 872,000 international tourists. Almost 50% of international visitation to the Gold Coast is from Asia, of which China is the largest source market (Tourism and Events Queensland 2015c). Key attractions in the Gold Coast include beaches, theme parks and the hinterland region.

Table 1: Population, visitation and tourism expenditure in selected Queensland cities in 2015

City	Resident population* ('000s)	Domestic tourists [^]		International tourists [^]	
		Overnight visitors ('000s)	Expenditure (AU \$m)	Overnight visitors ('000s)	Expenditure (AU \$m)
Brisbane	2,309	5,523	3,529	1,079	1,854
Gold Coast	570	3,527	2,820	872	1,110
Sunshine Coast	341	2,857	1,799	256	184
Cairns (and surrounds)	244	2,023	2,107	756	986
Townsville	238	1,017	780	122	87

Source: Australian Bureau of Statistics (2015b); Tourism and Events Queensland (2015c)

* Estimated resident population at 30 June 2015

[^] Tourist visitation and expenditure figures are for the year ending September 2015

The Sunshine Coast attracts a much higher share of domestic tourists (2.9 million visitors) than international tourists (256,000 visitors). Key attractions are centred on lifestyle and health. Despite a resident population of only 244,000 people, Cairns (and its surrounds) attracts a relatively large number of tourists as the gateway to far north Queensland and the Great Barrier Reef, with over 2 million domestic overnight visitors and 756,000 international visitors.

Townsville attracts the lowest number of international tourists (around 120,000) out of the five cities but still has over 1 million domestic visitors per year. Key attractions in Townsville include tropical history and heritage, and natural resources.

As shown in Table 1, expenditure by international tourists in each city generally exceeds that of domestic tourists on a per person basis. It is also worth noting that international visitation to the Gold Coast and Cairns exceeded the resident population of those cities in 2015.

2.2 Public transport elements of importance to international tourists

The following public transport elements have been identified by the research literature as being important to international tourists:

- **Information access:** covering aspects such as availability and reliability of information
- **Cost and ticketing:** including ticket cost, ease of use and special tourist ticket options
- **Service level:** service frequency, waiting time and travel time
- **Special tourist services:** access to airports and bespoke tourist services
- **Other elements:** covering aspects such as service reliability, comfort and safety.

Information access has been identified as a key element in supporting international tourists with using public transport (Andereck & Caldwell 1994; Garín-Muñoz & Pérez-Amaral 2011). Various studies have confirmed the importance of advanced traveller information to reduce uncertainty and enable tourists to seek the best possible travel experience (Grotenhuisa et al. 2007). A lack of public transport information may deter tourists from travelling and constrain their selection of possible destinations (Edwards & Griffin 2012).

The **cost of tickets** has also been identified as a key criterion for tourists using public transport (Cossu et al. 2010). Public transport use among tourists may be discouraged where it is considered too expensive (Griffin et al. 2012). **Ticket options** are also considered important, particularly in terms of their ease of use and the ability for tourists to purchase combined transport/event tickets (Gronau & Kagermeier 2007).

Public transport **service level** – in terms of frequency, waiting time, travel time and access to stops – has been identified as an important element for supporting the use of public transport by tourists (Gronau & Kagermeier 2007). Well-planned schedules with high frequency services provide tourists with greater flexibility in reaching their desired destinations (Guiver et al. 2007).

Special tourist services such as those linking international access points (e.g. airports) and other bespoke tourist services (e.g. free city circle services) can further support the tourism experience (Dubey 2011). These services provide an opportunity for public transport to gain more revenue while catering to the specific needs of tourists (Yang et al. 2015).

There are also a number of **other elements** identified by the literature that are considered important to international tourists in using public transport. This includes service reliability (Aquino 2008), comfort (Anable & Gatersleben 2005) and personal safety (Victorian Tourism Industry Council & Victorian Industry Events Council 2010).

3. Research method

This section describes the framework developed by Yang et al. (2015) for benchmarking public transport and how this was applied to each Queensland city.

A summary of the framework is provided in Table 2. This is generally consistent with the public transport elements identified in Section 2.2.

Benchmarking public transport for international tourists in Queensland cities

Table 2: Framework used for benchmarking public transport for international tourists

Criterion	Scoring method	Weight	Max score
INFORMATION ACCESS (maximum of 45 points)			
A1	General information about the whole PT service 0 = not available, through to 5 = detailed information available	0.5	2.5
A2	Fare information on PT websites 0 = not available, through to 5 = detailed information available	1	5
A3	Journey planner performance 0 = no timetable information, through to 5 = good journey planner or Google transit available	2	10
A4	Tourism information on PT providers' websites 0 = no tourism information, through to 5 = tourist guide page, including tourism map, etc.	1	5
A5	PT information on attraction websites For each website: 0 = no PT information, through to 5 = PT information with links to PT website	0.5	2.5
A6	PT information on accommodation websites For each website: 0 = no PT information, through to 5 = PT information with links to PT website	0.5	2.5
A7	PT information on airports & train station websites 0 = no PT information, through to 5 = PT information with links to PT website	0.5	2.5
A8	Mobile PT information service 0 = no mobile service, through to 5 = telephone service with free mobile phone app	1	5
A9	Last update time/date of UPT providers' website 0 = more than 2 months or no statement, through to 5 = real time information	0.5	2.5
A10	Language selection of PT websites 0 = no English, through to 5 = English and four more languages	1	5
A11	Language selection of PT mobile phone app 0 = no English, through to 5 = English and four more languages	0.5	2.5
COST & TICKETING (maximum of 40 points)			
B1	Ease of buying and reloading tickets 0 = less than 5 locations, through to 5 = every station, some stops, online and via phone	1	5
B2	Ease of using tickets 0 = paper tickets only, each mode has different ticketing 5 = universal smart card for all PT service	1	5
B3	Special tourist tickets 0 = no special tickets, through to 5 = special ticket, which is a universal smart card	1	5
B4	Tourist/general ticket discounts 0 = special tickets more expensive, through to 5 = additional discounts to tourists at attractions	2	10
B5	Refund availability 0 = not refundable 5 = refundable	1	5
B6	Fare price/value 0 = more than AUD \$18 per day, through to 5 = less than AUD \$10 per day	2	10
SERVICE LEVEL (maximum of 95 points)			
C1	Service frequency during daytime on weekdays 0 = 15 mins or more, 1 = 13-15 mins, 2 = 11-12 mins, 3 = 9-10 mins, 4 = 6-8 mins, 5 = 5 mins or less	3	15
C2	Service frequency during daytime on weekends 0 = 15 mins or more, 1 = 13-15 mins, 2 = 11-12 mins, 3 = 9-10 mins, 4 = 6-8 mins, 5 = 5 mins or less	3	15
C3	Waiting time during daytime on weekdays 0 = 15 mins or more, 1 = 13-15 mins, 2 = 11-12 mins, 3 = 9-10 mins, 4 = 6-8 mins, 5 = 5 mins or less	3	15
C4	Waiting time during daytime on weekends 0 = 15 mins or more, 1 = 13-15 mins, 2 = 11-12 mins, 3 = 9-10 mins, 4 = 6-8 mins, 5 = 5 mins or less	3	15
C5	Travel time during daytime on weekdays 0 = 85 mins or more, 1 = 71-85 mins, 2 = 56-70 mins, 3 = 41-55 mins, 4 = 26-40 mins, 5 = 25 mins or less	2	10
C6	Travel time during daytime on weekends 0 = 85 mins or more, 1 = 71-85 mins, 2 = 56-70 mins, 3 = 41-55 mins, 4 = 26-40 mins, 5 = 25 mins or less	2	10
C7	Average walking time 0 = 25 mins or more, 1 = 21-25 mins, 2 = 16-20 mins, 3 = 11-15 mins, 4 = 5-10 mins, 5 = 5 mins or less	3	15
SPECIAL TOURIST SERVICES (maximum of 20 points)			
D1	Transport services linked with airports 0 = no PT service to airports, through to 5 = express & direct rail link from airports to city	2	10
D2	Special tourist services and recreational routes 0 = no special PT service or routes, through to 5 = free PT service for tourists	2	10
Maximum possible score			200

Source: adapted from Yang et al. (2015)

The framework contains a total of 26 criteria split across the following four categories:

- Information Access
- Cost & Ticketing
- Service Level
- Special Tourist Services.

Information Access contains a total of 11 criteria focusing on the availability (type of information), reliability (accuracy) and 'understandability' (use of different languages) of public transport information. Cost & Ticketing contains six criteria related to the ease of purchasing and using tickets, availability of special tourist tickets and discounts, refunds and fare price. Service Level contains seven criteria which focus on service frequency, waiting time, travel time and access time. The last category, Special Tourist Services, has two criteria related to airport links and bespoke services designed specifically for tourists. Other elements identified by the literature that are of importance to international tourists – such as reliability, comfort and safety – could not be included in the framework due to a lack of readily available data. Despite this, the framework is considered to capture public transport elements of greatest importance.

As can be seen from Table 2, each city is given a score between 0 and 5 depending on how well it meets each criteria. Further detail on the scoring system is provided in Yang et al. (2015). Each assigned score is then weighted by a pre-defined value, ranging from 0.5 to 3, based on its relative importance as supported by the research literature. For example, a higher weight is given to service frequency (weight of 3) than travel time (weight of 2) given the evidence that waiting time is valued higher than in-vehicle time (Currie & Wallis 2008). A maximum score of 200 points is possible, from which 45 points (23%) are allocated to Information Access, 40 points (20%) to Cost & Ticketing, 95 points (48%) to Service Level, and 20 points (10%) to Special Tourist Services. The weightings between categories are also supported by the research literature. For example, Hough and Hassanien (2010) found that the value of public transport information for international visitors in Scotland was similar to that for cost and ticketing, but around half of that for service levels. A similar result was also found by Thompson (2004) in the context of international visitors to Greater Manchester.

Online information is used as the basis for assessing each city against the criteria contained within the framework. This provides an inexpensive method over field observations and allows for comparisons across cities to be easily made. However, it may create methodological concerns where cities have limited internet access or where online information about public transport and tourism is a poor reflection of the actual tourist experience (Yang et al. 2015). This limitation could be of concern for some developing countries and is therefore not applicable to the cities included in this study.

To assign scores for the Service Level criteria, the top 10 tourist origins (most popular accommodation sites) and top 10 tourist destinations (most popular tourist attractions) were first identified for each city, based on ratings available from TripAdvisor. Trips between the origins and destinations (total of 100 trips per city) were then assessed for each city for weekdays (10am) and weekends (Sunday, 10am). While the TripAdvisor ratings are not representative of all tourism travel, they do allow a simple approach to be taken that can be applied consistently across each city. However, cities with more centralised accommodation and attraction sites are likely to score better on Service Level criteria due to lower travel times involved. This may therefore bias the Service Level results towards smaller, compact cities or cities where tourist attractions and accommodation sites may be close together, as might be the case in a city with a contiguous tourist/entertainment district. In addition, given the high correlation between waiting time and service frequency, Service Level scores are likely to be biased towards service frequency. However, this is supported by previous research which has found that frequency is usually of most importance for users (Gronau & Kagermeier 2007).

Following the application of the framework to each of the Queensland cities, the results were assessed to identify relative strengths and areas for improvement in each city. The results

were also compared against the international cities (Melbourne, London, Paris and Singapore) previously assessed by Yang et al. (2015).

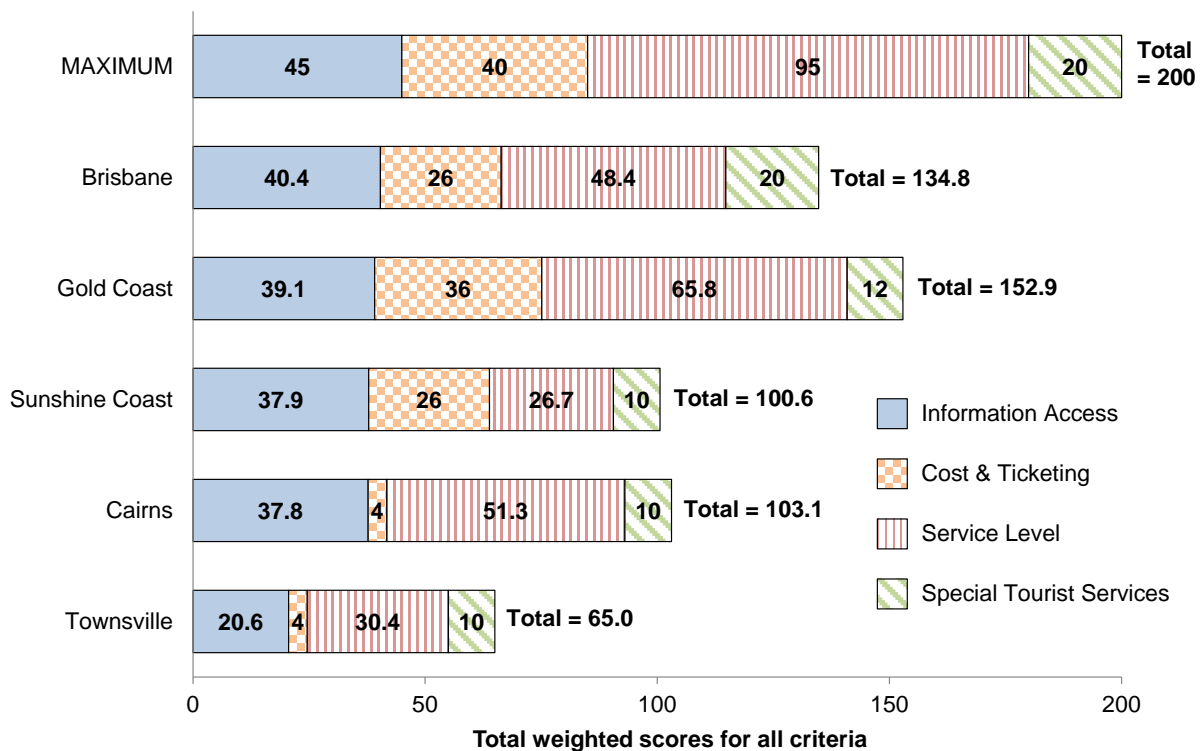
4. Results

This section provides a summary of the benchmarking results for the Queensland cities, highlighting their relative strengths and potential areas for improvement. A comparison against the international cities (Melbourne, London, Paris and Singapore) is also provided.

4.1 Queensland cities

Figure 2 presents the benchmarking results for each of the Queensland cities, grouped by assessment category. This shows that the Gold Coast has the highest aggregate score (152.9 out of 200, or 76% of the maximum possible score), followed by Brisbane (score of 134.8 = 67%), Cairns (score of 103.1 = 52%) Sunshine Coast (score of 100.6 = 50%) and Townsville (score of 65.0 = 33%). While the Gold Coast has the highest performance of the Queensland cities, it is still 24% below the maximum possible score suggesting further room for improvement. The results for each of the assessment categories is discussed further below, with the full set of benchmarking results provided in Table 3.

Figure 2: Total weighted scores by assessment category for Queensland cities



Benchmarking public transport for international tourists in Queensland cities

Table 3: Full benchmarking results for Queensland cities

Criterion	Weighted scores					Max score	
	Brisbane	Gold Coast	Sunshine Coast	Cairns	Townsville		
INFORMATION ACCESS (maximum of 45 points)							
A1	General information about the whole PT service	2	2	1.5	1.5	0.5	2.5
A2	Fare information on PT websites	5	5	5	5	3	5
A3	Journey planner performance	10	10	10	10	10	10
A4	Tourism information on PT providers' websites	5	5	5	5	1	5
A5	PT information on attraction websites	2.1	0.6	1	1	0.6	2.5
A6	PT information on accommodation websites	0.8	1	0.4	0.5	0.5	2.5
A7	PT information on airports & train station websites	2.5	2.5	2	1.5	1	2.5
A8	Mobile PT information service	5	5	5	5	2	5
A9	Last update time/date of UPT providers' website	2.5	2.5	2.5	2.5	0.5	2.5
A10	Language selection of PT websites	5	5	5	5	1	5
A11	Language selection of PT mobile phone app	0.5	0.5	0.5	0.5	0.5	2.5
<i>Sub-total</i>		40.4	39.1	37.9	37.8	20.6	45
% maximum possible score		90%	87%	84%	84%	46%	100%
COST & TICKETING (maximum of 40 points)							
B1	Ease of buying and reloading tickets	5	5	5	2	2	5
B2	Ease of using tickets	5	5	5	0	0	5
B3	Special tourist tickets	5	5	5	0	0	5
B4	Tourist/general ticket discounts	6	6	6	2	2	10
B5	Refund availability	5	5	5	0	0	5
B6	Fare price/value	0	10	0	0	0	10
<i>Sub-total</i>		26	36	26	4	4	40
% maximum possible score		65%	90%	65%	10%	10%	100%
SERVICE LEVEL (maximum of 95 points)							
C1	Service frequency during daytime on weekdays	4.5	8.7	2.1	6	3.3	15
C2	Service frequency during daytime on weekends	2.7	7.2	0.9	7.2	2.1	15
C3	Waiting time during daytime on weekdays	8.1	13.5	3.3	7.2	3.9	15
C4	Waiting time during daytime on weekends	6.3	13.5	3.3	7.2	0.9	15
C5	Travel time during daytime on weekdays	8	6.4	3.8	7.2	6.4	10
C6	Travel time during daytime on weekends	8	6.6	4	7.2	6	10
C7	Average walking time	10.8	9.9	9.3	9.3	7.8	15
<i>Sub-total</i>		48.4	65.8	26.7	51.3	30.4	95
% maximum possible score		51%	69%	28%	54%	32%	100%
SPECIAL TOURIST SERVICES (maximum of 20 points)							
D1	Transport services linked with airports	10	6	4	4	4	10
D2	Special tourist services and recreational routes	10	6	6	6	6	10
<i>Sub-total</i>		20	12	10	10	10	20
% maximum possible score		100%	60%	50%	50%	50%	100%
TOTAL (maximum of 200 points)							
Grand total		134.8	152.9	100.6	103.1	65.0	200
% maximum possible score		67%	76%	50%	52%	33%	100%

With the exception of Townsville, each of the Queensland cities performed similarly well on Information Access. Brisbane achieved 90% of the maximum possible score, closely followed by the Gold Coast (87%), Sunshine Coast (84%) and Cairns (84%). Townsville achieved only 46% of the maximum possible score. The main reason for Townsville's lower score was due to its lack of integration with the TransLink website which provides comprehensive public transport information for all of the other cities. However, the availability of Google Transit for Townsville did help to boost its score for journey planning (criterion A3). The TransLink website contains information in English plus 11 other languages. This is in contrast to the various public transport provider websites for Townsville which only contain information in English. Each of the cities have a mobile phone information service (mobile 'app') but these are currently only available in English. Another area for improvement across all cities is the provision of public transport information on key accommodation and tourist attraction websites.

Scores for Cost & Ticketing varied considerably across the Queensland cities. Brisbane, Gold Coast and Sunshine Coast all use the same integrated smartcard ticketing system (*go card*) and also provide a specific ticket option for tourists. However, the tourist ticket for the Gold Coast (*go explore card*) is capped at only \$10/day, compared to that offered in Brisbane and Sunshine Coast (*seeQ card*) which works out to around \$25/day. The lower fare price for the Gold Coast therefore helps to boost its score, achieving 90% of the maximum possible score. This compares with Brisbane and the Sunshine Coast which achieved only 65% of their maximum possible score. Cairns and Townsville performed poorly on Cost & Ticketing due to the lack of any universal smart card ticketing system (only paper tickets are used in these cities), special tourist tickets or ticket refund options. In addition, the fare price in these cities is considerably higher due to the need to travel by ferry to access key tourist attractions.

In terms of Service Level, the Gold Coast scored highest (69% of the maximum possible score), followed by Cairns (54%), Brisbane (51%), Townsville (32%) and Sunshine Coast (28%). As highlighted earlier in Section 3 (Research Method), cities with more centralised accommodation and attraction sites are likely to score better on Service Level criteria due to the lower travel times involved. Shorter trip distances also mean that walking between accommodation sites and tourist attractions is more feasible, thereby eliminating waiting time at public transport stops. The Gold Coast performed better than the other Queensland cities on Service Level criteria given its linear concentration of sites and relatively high public transport service frequencies. This is supported by the Gold Coast light rail service (G:link) which operates with a 7.5 minute headway between 7am and 7pm on weekdays, serving many of the top accommodation and attraction sites along its route. While Brisbane has relatively good travel times between accommodation and attraction sites (around 30 minutes), public transport service frequencies are relatively poor, averaging 30-40 minutes. Cairns is similar to Brisbane, but has a greater clustering of sites meaning that walking to destinations is more feasible. Townsville and the Sunshine Coast performed relatively poor on Service Level due to services running on average only every 45-50 minutes, resulting in long waiting times.

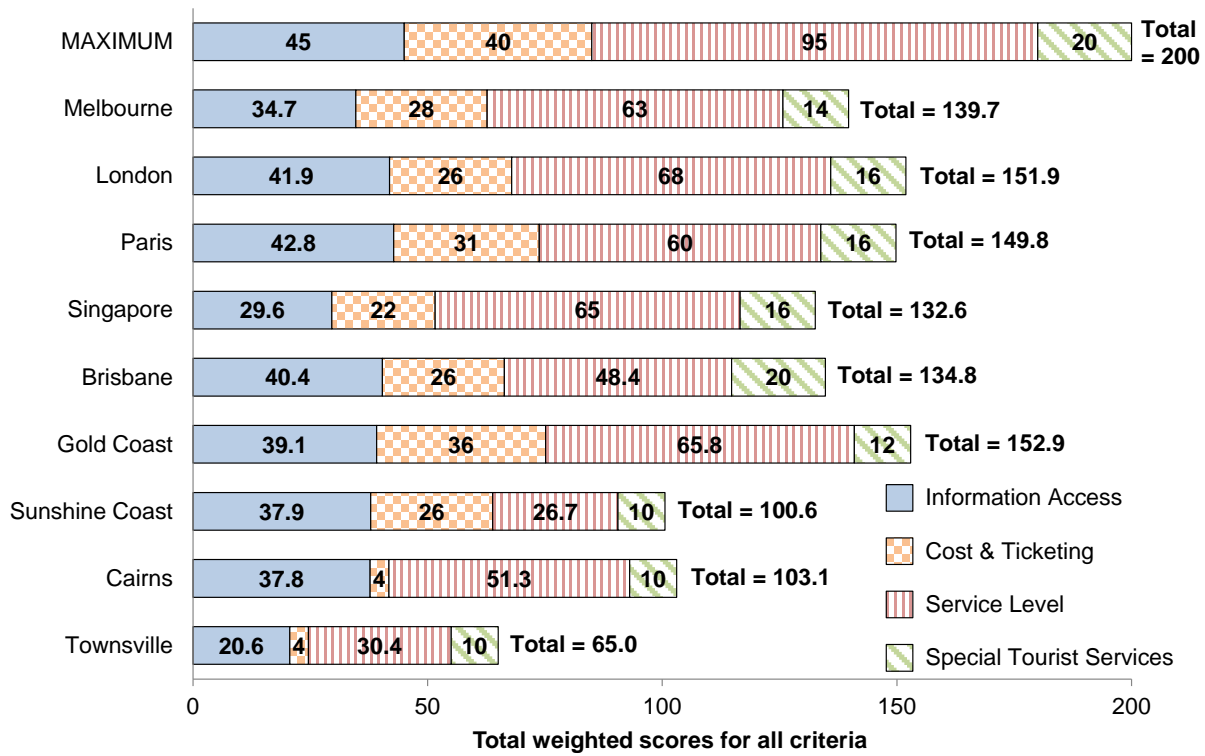
Brisbane is the only city to achieve a perfect score (20 out of 20) for Special Tourist Services. This is due to the presence of an airport rail service and free CBD loop bus. The Gold Coast has a premium bus service (high frequency and limited stops) to the airport, but no rail service. It also has a tourist shuttle available but this is not free. As a result, the Gold Coast only achieved 60% of the maximum possible score. The remaining cities (Sunshine Coast, Cairns and Townsville) achieved only 50% of their maximum possible score due to the availability of conventional or commercial shuttle bus services to airports, and tour buses which are not free.

4.2 Comparisons to international cities

Figure 3 shows the benchmarking results for all of the Queensland and international cities. The full set of benchmarking results for the international cities is provided in the Appendix. The results show that the Gold Coast has the highest performance of all cities (total score of 152.9), although this is followed closely by London (151.9) and Paris (149.8). Brisbane (134.8) scored

similarly to Melbourne (139.7) and Singapore (132.6), however the remaining Queensland cities (Sunshine Coast, Cairns and Townsville) performed lower in comparison (scores ranging from 65.0 to 103.1).

Figure 3: Total weighted scores by category for all cities



Key performance differences across cities include:

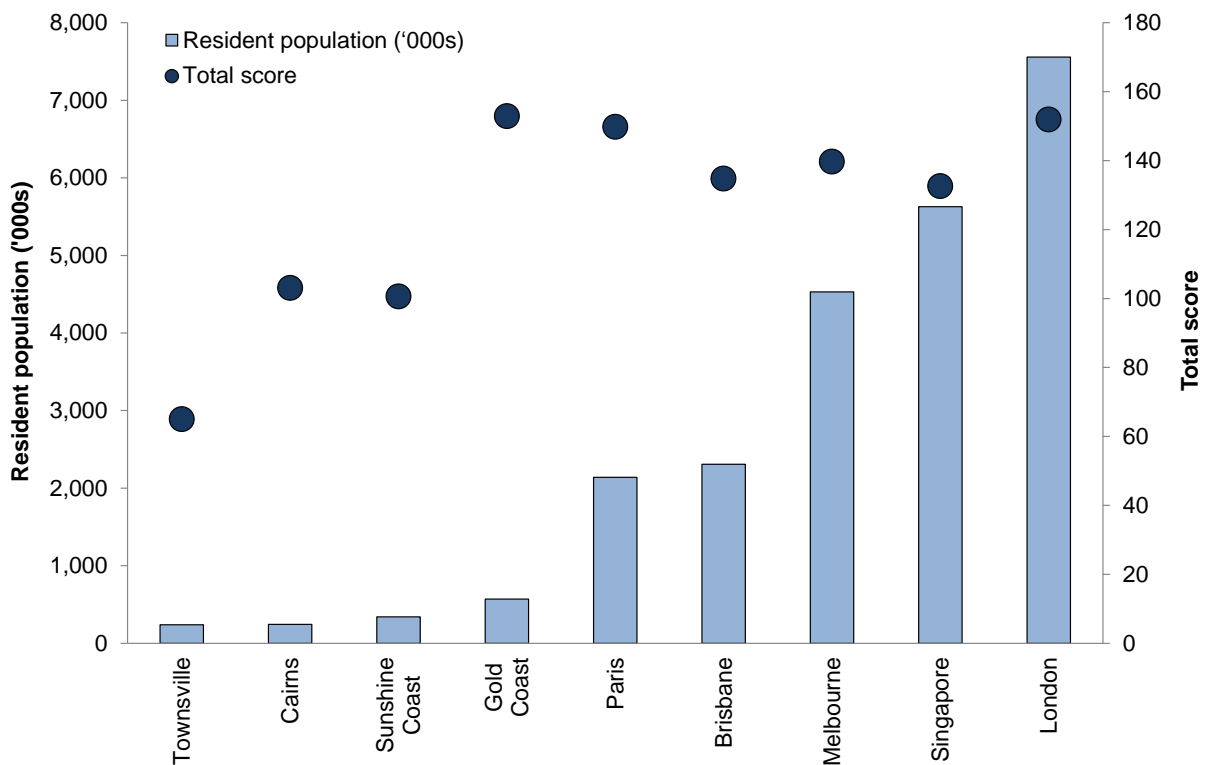
- **Information Access:** Townsville, Singapore and to some degree Melbourne, performed relatively low on criteria related to Information Access. The public transport websites for these cities have no languages available other than English, while the website for Singapore in particular has no information about tourism venues.
- **Cost & Ticketing:** The Gold Coast outperformed all international cities on this category, mainly due to the relatively low price of its special tourist ticket. However, Paris and Melbourne still performed relatively well given their joint discounted tourist venue/travel ticket options. Cairns and Townsville performed much lower than other cities on Cost & Ticketing due to the lack of any smartcard ticketing system.
- **Service Level:** Sunshine Coast, Townsville, and to some degree Brisbane and Cairns performed relatively low on Service Level criteria. Low service frequencies, combined with long travel times and a large geographical spread of sites contributed to these low scores. However, it is interesting to note that the Gold Coast came second only to London on Service Level criteria due to its clustering of sites in areas with high public transport frequencies.
- **Special Tourist Services:** Brisbane was the only city to achieve a perfect score on Special Tourist Services. However, London, Paris and Singapore still performed relatively well (achieving 80% of the maximum score) due to rail services to airports in these cities.

5. Discussion

This study has benchmarked public transport for international tourists in five Queensland cities. Results have been compared between cities, including with Melbourne and three international cities, to provide an understanding of their relative strengths and areas for improvement.

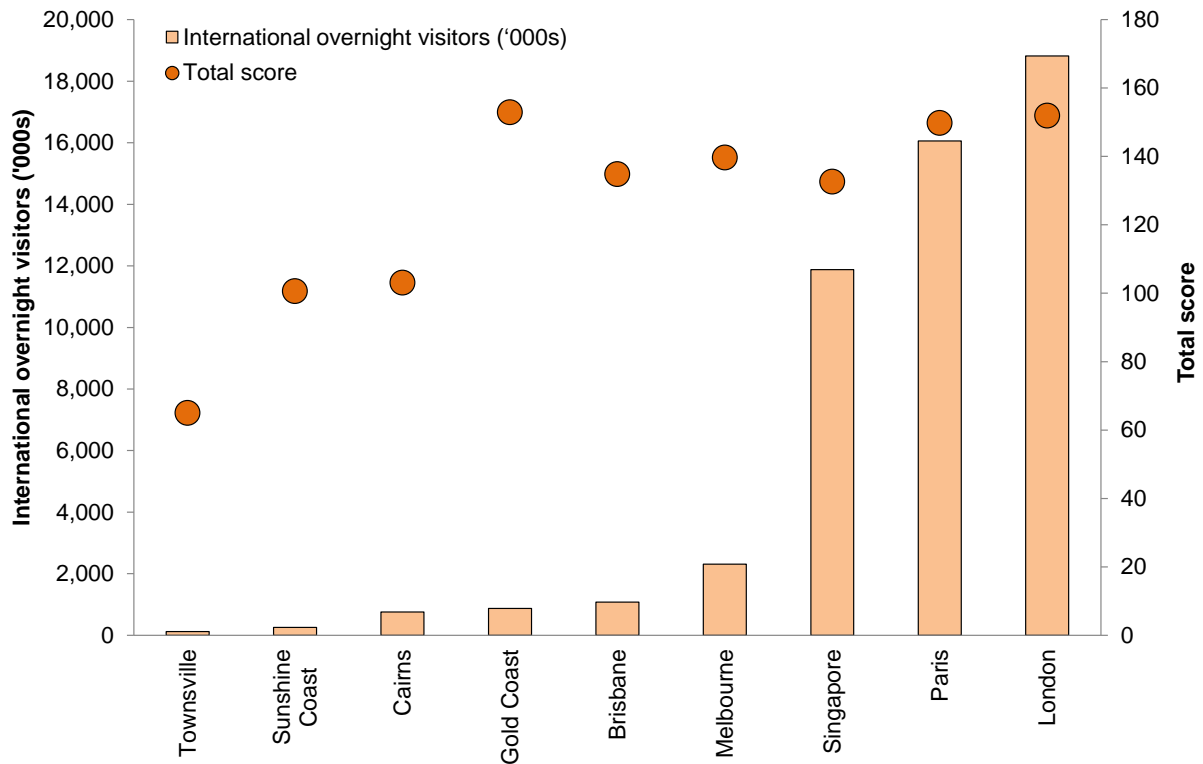
A key area for discussion is the potential relationship that exists between the scale of the cities assessed and their public transport performance. For example, is it fair to compare the score for Townsville, which has a resident population of 244,000 people and only 122,000 international tourists per year, to that for London which has 7.6 million residents and more than 18 million international tourists per year? To explore this further, the total score for each city is shown against the resident population in Figure 4 and international overnight visitation in Figure 5. These figures show that the larger cities generally have higher scores and therefore better public transport performance. While the smaller cities, particularly Sunshine Coast, Cairns and Townsville, achieved relatively low scores by international standards, their performance is actually very good when considered in the context of their relatively small resident population and international visitation. A key exception to this is the Gold Coast which has the highest score of all cities yet a relatively low resident population and international visitation level. The implication here is that city scale may be a predictor of public transport performance in some, but not all cities.

Figure 4: Total score and resident population ('000s) for each city



Source of resident population data: Australian Bureau of Statistics (2015b); World Population Review (2016)

Figure 5: Total score and international overnight visitation ('000s) for each city



Source of international overnight visitation data: Hedrick-Wong and Choong (2015); Tourism and Events Queensland (2015c); Tourism Victoria (2016)

The results of this research also have a number of other implications. Firstly, the findings can be used by public transport operators and relevant government agencies to target specific improvements in each city that can improve the satisfaction of international tourists and promote a shift towards public transport. Secondly, continued application of the benchmarking tool will provide a simple method to monitor the quality of public transport for international tourists in each city over time.

While the framework has many uses, there are a number of limitations that should be addressed in future research:

- The selection of criteria and weightings are based purely on the research literature, yet no comprehensive study has been conducted specifically with international tourists to identify and measure all public transport elements of importance to this market; related to this is the lack of any location-specific weightings, particularly for Queensland cities which tend to be more regional in nature than the international cities
- TripAdvisor is used to select the top 10 accommodation and attraction sites, yet these reflect ratings made by *all* tourists and are therefore not specific to international tourists
- The scale of the transport task for tourism purposes can vary considerably between cities depending on the geographical spread of accommodation and attraction sites; this can bias 'Service Level' scores towards those cities with more compact land use patterns
- Cities may perform poorly in terms of their benchmarking score but this may be in the context of relatively low international visitation; comparisons against high performing cities in these cases may therefore be misleading.

6. Conclusion

The aim of the research underlying this paper was to benchmark the quality of public transport for international tourists in Queensland cities (Brisbane, Gold Coast, Sunshine Coast, Cairns and Townsville) and to compare the findings to a number of international cities assessed by previous research (Melbourne, London, Paris and Singapore). The framework developed by Yang et al. (2015) was used as a basis for undertaking the assessment.

Key results showed that the Gold Coast was the highest performer of all cities, closely followed by London and Paris. Brisbane performed similarly to Melbourne and Singapore, however the remaining Queensland cities (Sunshine Coast, Cairns and Townsville) performed lower in comparison. Despite the result for the Gold Coast, this city still scored 24% below its maximum potential. Based on the findings of this study, specific recommendations for improving public transport for international tourists in the Queensland cities include:

- Providing public transport information for Townsville on the TransLink website
- Adding languages other than English to the mobile 'apps' for each city
- Providing public transport information on accommodation/attraction websites in each city
- Introducing a smart card ticketing system in Cairns and Townsville
- Increasing service frequencies to key tourist attractions in Sunshine Coast and Townsville
- Enhancing special tourist services in the Gold Coast, Sunshine Coast, Cairns and Townsville.

In responding to the limitations of this study, areas for future research could include:

- Refining the assessment framework to incorporate location-specific weightings based on user surveys of international tourists
- Testing the impact of including accommodation and attraction sites in the assessment that are specific to international tourists
- Developing an approach to reflect the scale of the transport task in each city so that cities with dispersed land use patterns are not unfairly disadvantaged in the assessment
- Developing a method that takes into account international visitation levels so that cities with low visitation rates can be compared appropriately against higher performing cities.

In closing, this research provides an important contribution to the field of transport and tourism by identifying the relative strengths and areas for improvement in the provision of public transport for international tourists in Queensland cities. It also sheds light on the potential relationship between the scale of cities and their public transport performance. The results of this study can be used by practitioners to make targeted improvements to enhance the public transport user experience for international tourists in Queensland cities.

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Appendix – Full benchmarking results for international cities

Criterion	Weighted scores				Max score	
	Melbourne	London	Paris	Singapore		
INFORMATION ACCESS (maximum of 45 points)						
A1	General information about the whole PT service	1.5	2.5	2.5	0.5	2.5
A2	Fare information on PT websites	5	5	5	5	5
A3	Journey planner performance	10	10	10	10	10
A4	Tourism information on PT providers' websites	5	5	5	0	5
A5	PT information on attraction websites	2	2.3	1.5	1.6	2.5
A6	PT information on accommodation websites	1.4	1.6	1.3	1	2.5
A7	PT information on airports & train station websites	1.3	2.5	2.5	2.5	2.5
A8	Mobile PT information service	5	5	5	5	5
A9	Last update time/date of UPT providers' website	2	2.5	2.5	2.5	2.5
A10	Language selection of PT websites	1	5	5	1	5
A11	Language selection of PT mobile phone app	0.5	0.5	2.5	0.5	2.5
<i>Sub-total</i>		34.7	41.9	42.8	29.6	45
% maximum possible score		77%	93%	95%	66%	100%
COST & TICKETING (maximum of 40 points)						
B1	Ease of buying and reloading tickets	5	5	5	1	5
B2	Ease of using tickets	5	5	5	5	5
B3	Special tourist tickets	4	5	4	4	5
B4	Tourist/general ticket discounts	10	2	10	2	10
B5	Refund availability	0	5	5	5	5
B6	Fare price/value	4	4	2	5	10
<i>Sub-total</i>		28	26	31	22	40
% maximum possible score		70%	65%	78%	55%	100%
SERVICE LEVEL (maximum of 95 points)						
C1	Service frequency during daytime on weekdays	12	15	12	12	15
C2	Service frequency during daytime on weekends	6	15	9	12	15
C3	Waiting time during daytime on weekdays	12	15	9	12	15
C4	Waiting time during daytime on weekends	12	12	6	12	15
C5	Travel time during daytime on weekdays	6	4	6	4	10
C6	Travel time during daytime on weekends	6	4	6	4	10
C7	Average walking time	9	3	12	9	15
<i>Sub-total</i>		63	68	60	65	95
% maximum possible score		66%	72%	63%	68%	100%
SPECIAL TOURIST SERVICES (maximum of 20 points)						
D1	Transport services linked with airports	4	10	10	10	10
D2	Special tourist services and recreational routes	10	6	6	6	10
<i>Sub-total</i>		14	16	16	16	20
% maximum possible score		70%	80%	80%	80%	100%
TOTAL (maximum of 200 points)						
<i>Grand total</i>		139.7	151.9	149.8	132.6	200
% maximum possible score		70%	76%	75%	66%	100%

Source: adapted from Yang et al. (2015)