

Valuing public transport customer experience infrastructure: An International Expert Delphi Study of methods & application

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Abstract

A worldwide trend in public transport has been a shift to enhance customer experience for users aboard public transport in addition to provide the fundamentals of planning and operations. This effort relies on the work of transport economists who develop 'willingness to pay' methodologies that quantify the qualitative experiences of customers and provide value for various amenities. Although a considerable amount of research effort has been put towards determining the value that public transport users place on different amenity types, there is little understanding of current practice of amenity valuation as a whole. This paper presents results from a Delphi survey of international expert researchers and practitioners involved in customer amenity valuation, with the aim of determining what experts see as problems and issues in measurement, and best practices in approach to measurement. The major findings show that experts prefer stated preference methods due to the flexibility and range of variables possible, but stress the use of mixed methods approaches in best practice (e.g., a mixed stated and revealed preference method). In addition to good survey design, 78% of experts believed that Post Implementation Reviews should be conducted to check accuracy of amenity values, but reported on average that only 3.6% of values are check with Post Implementation Reviews.

1. Introduction

Customer experience on public transport can be affected by a variety of factors that are typically classified into 'hard' factors (e.g. mode, service frequency, right of way, operating hours, and fares) and 'soft' factors (Fearnley et al., 2015). Soft factors, commonly referred to as 'customer amenities', are a range of ancillary improvements to public transport that do not directly relate to quantitative operations or service, but improve the passenger experience quality (Currie et al., 2013). For example, customer amenities can be information provisions, passenger facilities, station/stop quality, and personal security measures. A classification of public transport customer amenities is provided in Figure 1.

Although many studies have been undertaken to determine the value that public transport passengers place on different types of customer amenities (Douglas, 2016, Outwater et al., 2014, Robson, 2009, Steer Davies Gleave, 2000), with selected values available in published guidelines (Transport and Infrastructure Council, 2017, Transport for London, 2014), there is a very limited understanding of current practice across public transport agencies in the use of customer amenity valuations. In particular, the extent to which agencies estimate and apply customer amenity values

when appraising and evaluating different types of public transport projects is not well understood. A better understanding of current practice can help to establish the relative importance of customer amenity valuations for project appraisal purposes and to determine the extent to which customer amenities are considered across different types of public transport projects. Through benchmarking, it can also help to identify areas of advanced practice across agencies, which can then guide the choice of methods adopted elsewhere.

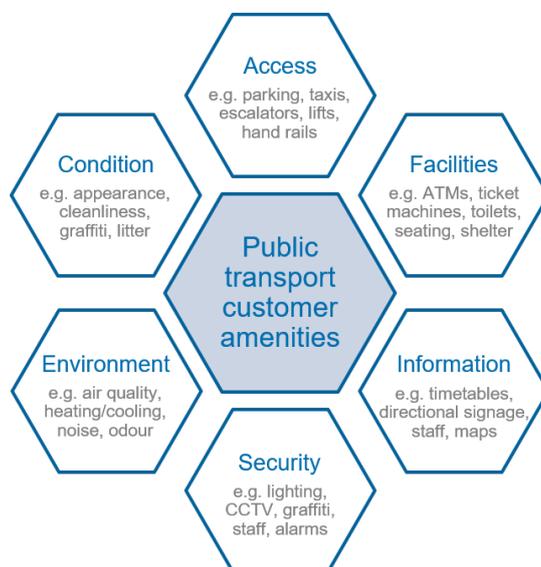


Figure 1: Classification of public transport customer amenities
 Source: Public Transport Research Group (2017)

This paper presents the findings of an international expert Delphi survey to establish the views of leading Australian and international practitioners who undertake and apply valuation methods on what is best practice in the field. It is part of a wider research program exploring best practices in customer amenity valuation¹. Key objectives of the research are:

- What methods do they commonly adopt?
- What do they consider the pros and cons of each method?
- What customer experience investments can and cannot be covered using these methods?
- What do they consider are best practice approaches in the industry?

¹ 'Best Practice Approaches to Public Transport Amenity/Soft Factor Valuation' undertaken by the Public Transport Research Group at Monash University for Transport for Victoria. This paper reports the third phase of the study: International Practitioner Delphi Survey. The first phase of the study was a review of the literature and a collation of valuation evidence and is reported in De Gruyter, C., Currie, G., Truong, L. T. & Naznin, F. 2018. A meta-analysis and synthesis of public transport customer amenity valuation research. *Transport Reviews*, 1-23. The second phase of the study was Review of World Transit Industry Practice and is reported in De Gruyter, C. & Currie, G. Valuing public transport customer amenities: A survey of practice across Australasian and international transit agencies. *Australasian Transport Research Forum Incorporated*, 2018 Darwin, Australia., and in De Gruyter, C. & Currie, G. 2019. Valuing Public Transport Customer Amenities: International Transit Agency Practice. *Transportation Research Board 98th Annual Meeting*. Washington, DC, United States.

The remainder of this paper is structured as follows. Section 2 provides an overview of the literature as it relates to public transport customer amenity valuation. Section 3 then outlines the Delphi method used to survey world experts in estimating and applying public transport customer amenity valuations. Section 4 details the results of the survey, with Section 5 providing some concluding remarks and a discussion of implications.

2. Literature review

This section provides a brief overview of the literature relevant to public transport customer amenity valuation. Specifically, it covers valuation methods typically used in the field, issues associated with customer amenity valuation, and a high-level summary of reported values.

Based on the published research literature, it is clear that stated preference has been the dominant method used to estimate the value of public transport customer amenities, although customer ratings have also been relatively common (De Gruyter et al., 2018). However, a variety of other methods exist and are commonly used, such as the priority evaluator method, revealed preference, and maximum difference (or best-worst) scaling. It is also possible in some cases to utilize multiple methods in combination, such as combining stated preference with customer ratings so that different amenities relative, as rated by customers, can be applied to willingness to pay estimates (Douglas Economics and Sweeney Research, 2014). The advantages of revealed preference surveys, compared to stated preference surveys, is the inherent realism afforded by direct observation of behaviour rather than a stated response. However, despite this advantage, relatively few studies have adopted the revealed preference method given the difficulty in controlling for external factors that may additionally influence the customer experience (Robson, 2009, Wardman and Whelan, 2001).

Published literature suggests there are a range of issues with the valuation of public transport customer amenities. A key issue in amenity valuation is the high variability of values, making transferability between services or cities difficult (Booz Allen & Hamilton, 2000). Value variation can occur due to differences in socioeconomic and psychological characteristics in the population, but can also be affected by trip purpose, frequency, length and time of day (Fearnley et al., 2015, Phanikumar and Maitra, 2007). Other key issues include changes in customer expectations and the relevance of amenities over time. For example, minimum standards of quality may increase and technological advances render some amenities obsolete, such as the replacement of printed information with digital media (Outwater et al., 2014). As noted by Robson (2009), the value ascribed by customers can shift and the quality of customer amenities may need to continually evolve and improve to keep up with expectations. Another issue is inflated valuations due to biases of respondents in stated preference surveys (Bristow et al., 1991). Survey respondents may intentionally overstate their valuations or preferences in an attempt to influence policy, but would not actually make those choices in reality (Robson, 2009).

A high-level summary of public transport customer amenity values in 'in-vehicle' time minutes terms, is provided in Table 1. These results are collated values assembled as

part of a wider research program, of which this paper is part². The wide ranges of values are evidence of the highly variable nature of amenity valuations. The median values are all equivalent to less than one minute of in-vehicle time. The implication is that while customer amenities are of clear value to passengers, their value is generally small compared to overall travel time (typically 30-60 minutes of actual in-vehicle time). Relatively small differences in median values are found between amenity types, although ‘access’ based amenities tend to be valued less for train/metro and tram/light rail than most other amenity types. In addition, ‘information’ and ‘environment’ based amenities tend to have higher median values for train/metro and bus than other amenity types. While tram/light rail-based amenities tend to be valued lower than train/metro or bus, these are based on a much smaller sample of valuations.

Table 1: High-level summary of public transport customer amenity values, by type and mode

Amenity type	Median value (range in brackets): in-vehicle minutes		
	Train/metro	Tram/light rail	Bus
Access	0.22 (0.01 – 4.39)	0.24*	0.64 (0.05 – 5.59)
Facilities	0.30 (0.00 – 9.40)	0.50 (0.32 – 0.55)	0.49 (0.02 – 13.78)
Information	0.70 (0.03 – 12.01)	0.30 (0.09 – 0.65)	0.61 (0.02 – 11.35)
Security	0.50 (0.02 – 13.99)	0.22 (0.09 – 1.21)	0.55 (0.02 – 9.81)
Environment	0.73 (0.03 – 6.79)	0.45 (0.22 – 0.50)	0.62 (0.00 – 13.43)
Condition	0.40 (0.00 – 13.99)	0.48 (0.32 – 0.55)	0.53 (0.02 – 13.78)

Source: adapted from De Gruyter et al. (2018)

* Only one value was available so no range can be presented.

3. Research method

To achieve the aims and objectives of this research, an expert Delphi method survey method was adopted targeting leading Australian and international practitioners who undertake and apply valuation methods. Many of these experts were sourced during the work conducted in previous phases of the project, literature review and world transit industry practice review (De Gruyter et al., 2018, Public Transport Research Group, 2017).

The Delphi method is a structured surveying technique which relies upon a panel of experts in an iterative survey process consisting of two or more rounds (Norman and Olaf, 1963). The experts are asked to answer questions and to justify their answers. After each round the experts are provided a summary of anonymised responses, potentially prompting the experts to revise their answers. The fundamental features of the Delphi method are to minimise personal bias, reduce the “band wagoning” effect that may occur in an unstructured group (e.g., following the responses of a more prominent expert), and to promote admission of error by eliminating fear of criticism in an anonymous setting.

² Some 556 separate customer amenity values were identified relating to 97 separate amenity types. All values are collated into a database available to assist practitioners in this field. The database and research reports are available for free download at: <http://publictransportresearchgroup.info/portfolio-item/best-practice-approaches-to-public-transport-customer-amenity-valuation/> (last accessed 14 June 2018)

The aim of this Delphi survey is to understand methods and best practices relating to the valuation of public transport customer amenities. The valuation methods identified include:

- Stated Preference (SP)
- Revealed Preference (RP)
- Customer Ratings (CR)
- Priority Evaluator (PE)
- Maximum Difference Scaling (MaxDiff)
- Benefit/value transfer (BVT)

The Delphi survey consisted of two rounds with a twenty-question survey covering the following topics of amenity value measurement:

- What are the **advantages/disadvantages** of the measurement methods?
- Which methods are **more suitable** for estimating PT amenity values?
- Is amenity valuation **worthwhile** and if yes why?
- How important are common measurement **issues/problems**? How often do they occur?
- How good is current practice?
- What are **best practices** in the field?
- Are there amenities that cannot be valued?
- Post-Implementation Reviews (PIR) of Values:
 - what **share of values are checked**?
 - **How close are PIR** values to estimates?
 - Should **more PIR valuations** be undertaken?
- Leading Companies, Experts, Authorities, **what share adopt amenity valuations**, and reasons not adopted more
- Other Comments

The first round sought the experts' views on methods and best practices for valuing public transport customer amenities. The second round provided experts with a summary of results from the first round and asked about the extent to which they agreed with these findings. A total of 28 experts were contacted, 18 responded in the first round, and 6 experts responded in the second round. All experts had over 10 years of experience in amenity valuation and mainly come from university and consulting professions.

Table 2 Experts who responded to round 1 of Delphi survey

NO.	NAME	ORGANISATION	COUNTRY
1	Robin Barlow	NineSquared	Australia
2	David Hensher	University of Sydney	Australia
3	John Segal	Independent Consultant	United Kingdom
4	John Rose	University of Technology Sydney	Australia
5	Neil Douglas	Douglas Economics	New Zealand
6	Nils Fearnley	Institute of Transport Economics	Norway
7	Eric Kroes	Significance Quantitative Research	The Netherlands
8	John Bates	John Bates Services	United Kingdom
9	Abigail Bristow	University of Surrey	United Kingdom
10	Toby Cuthbertson	SYSTRA	United Kingdom
11	James Laird	University of Leeds	United Kingdom
12	Roger Mackett	University College London (UCL)	United Kingdom
13	John Preston	University of Southampton	United Kingdom
14	Jeremy Shires	University of Leeds	United Kingdom
15	Stephen Stradling	Edinburgh Napier University	United Kingdom
16	Ryan Taylor	Transport for London	United Kingdom
17	Mark van Hagen	NS Rail	The Netherlands
18	Responded but preferred not to be named		

* All experts identified agreed to have their names identified in the research outputs

4. Results

This section details the results of the Delphi survey of expert practitioners in public transport amenity valuation and implementation. It is structured in-line with the objectives of the study by focusing and organizing around the following subjects:

- Method Advantages/Disadvantages:
- Method Suitability
- Valuation worthwhileness of amenity valuation
- Measurement Issues
- Overall Rating of Practice
- Best Practices
- Problematic Amenities
- Post-Implementation Reviews (PIR) of Values
- Leading Practitioners
- Other Comments

4.1. Method advantages/disadvantages:

Experts were first asked what they believed to be key advantages and disadvantages of each amenity valuation method. Summary tables for key advantages and disadvantages highlighted by experts are presented in Table 3 and Table 4, respectively. Overall, revealed preference and stated preference methods tended to garner most advantageous comments, but benefit/value transfer method attracted considerable attention as well. Experts stated that the benefit/value transfer method provides an affordable, quick, and practical solution; but is contextually limited in transferability. Experts also noted that customer rating method is cheap and easy, but is indirect, vague, and subjective.

**Table 3 Key advantages of methods
(comments made and number of experts making comments)**

Stated preference (SP)		Revealed preference (RP)		Customer ratings (CR)		Priority evaluator (PE)		Maximum difference scaling (MDS)		Benefit/value transfer (BVT)	
Comment	No.	Comment	No.	Comment	No.	Comment	No.	Comment	No.	Comment	No.
Enables full control of a range of variables	6	Based on real observed actual behaviour	12	Can collate lots of info cheaply/simple	4	Forces users to make trade-offs	3	Captures negative as well as positives in experience	2	Cheap/quick/practical to use	8
Flexible - can measure new unobserved variables/ hard to value amenities	4	Avoids market research weaknesses	1	Provides relativities/ preferences/ rankings very easily	4	Cheap/easy to collect	2	Cheaper/simpler (than SP)	2	Easier to explain to client	1
Flexible - can measure new contexts/concepts	2	Free from bias	1	Easy for respondents to complete	3	More realistic/ closer to money value	2	Enables relative importance found	1	No fieldwork needed	1
Has long history (accepted, valid, understood method)	2	Enables use and non-use valuation	1	Perceptions can be included	1	Easy for respondents to complete	1	Easy for respondents to complete	1	Leverages wider studies rather than a single local study	1
Can measure many types of customer amenities	1	Easy to use	1	Can be applied to a broader set of attributes	1			Allows non-market valuation	1	Enables local conditions to be considered	1
Allows measurement of non-market values	1	Useful for package effects	1	Good when Important/ Performance combined	1						
Enables use and non-use valuation	1	full control of choices	1								
Can achieve representative samples	1										
Enables comparison of quality levels	1										
Has data/statistical efficiency	1										
Gives appearance of precision	1										
Keeps academics busy on methods no one understands	1										

* Table ranked in order by number of responses.

**Table 4 Key disadvantages of methods
(comments made and number of experts making comments)**

Stated preference (SP)		Revealed preference (RP)		Customer ratings (CR)		Priority evaluator (PE)		Maximum difference scaling (MDS)		Benefit/value transfer (BVT)	
Comment	No.	Comment	No.	Comment	No.	Comment	No.	Comment	No.	Comment	No.
Too much bias/ 'Bonkers' results via bias/scaling problems	8	Causal factors unclear/ no attribute control	7	Indirect value estimation biased	4	Too complex for respondents	4	Only measures outliers not central measures	3	Loses local context/ limits on transferability to context	9
Too hypothetical/ unreal study; unconstrained respondent budgets/ user view	4	Poor data/ data quality/ errors	3	Too subjective	3	Difficult to set budget	3	Gives no valuation	1	Only as good as studies adopted	2
Often too complex for users to understand	3	Can't measure many amenity types	3	Vague/too general for respondents	2	Valuation issues over time/ currencies	2	Best/worst often not symmetrical	1		
Results insensitive to local user decisions	1	Multi-collinearity	1	Too much respondent bias	1			Experimental design limits	1		
Cannot value 'transformational' change	1	Poor 'non-use' values	1	Lack of trade off testing	1						
Too expensive relative to other methods	1	Much measurement error	1								
Internet panels – users tick any boxes	1	Can't observe behaviour of interest	1								
Uncalibrated results used too often	1										
Doesn't measure complex/ psychological decision factors	1										

* Table ranked in order by number of responses.

Experts believed that stated preference have the advantage of flexibility to measure a wide range of unobservable or difficult to measure variables. However, experts also remarked stated preference surveys can be too hypothetical, too complex for respondents, and too easily biased by respondents' views/budgets. This directly contrasts with revealed preference surveys, which experts felt has the advantage of being firmly rooted in realism by using actual observed behaviour, but cannot measure many amenity types and causal factors are unclear. Overall appropriate methods are clearly a balance of factors; Also, there are differences in views between experts in the field.

4.2. Method suitability

Experts were asked to rank the methods from least to most suitable for estimating transport customer amenity values. A summary of this is presented in Figure 2, displaying the proportion of the experts' rankings by method.

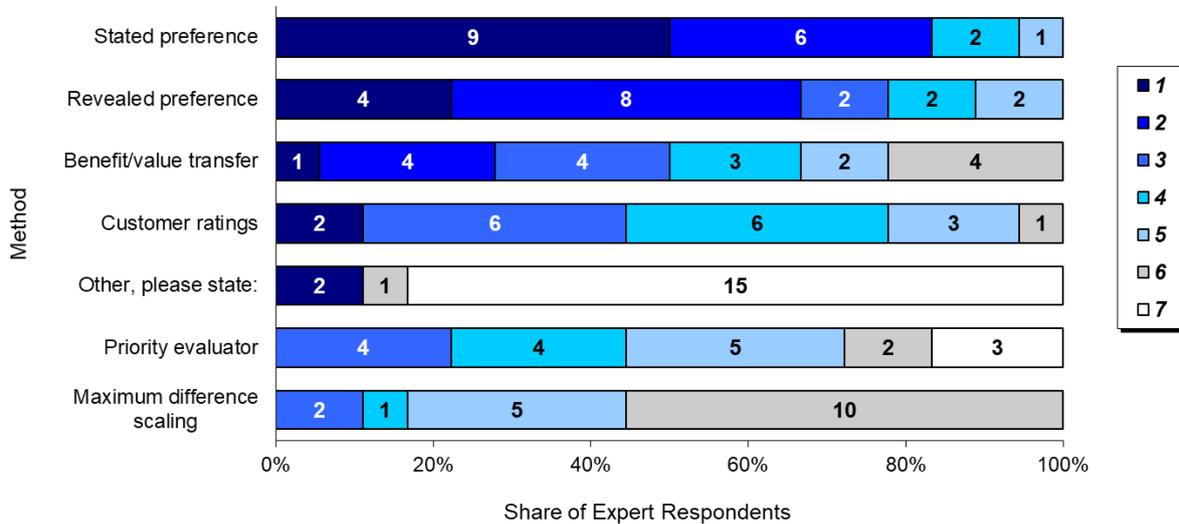


Figure 2 Expert ranking of method suitability

Stated preference and revealed preference were top ranked methods overall by the experts with experts ranking stated preference revealed preference first 50% and 22% of the time, respectively. Stated preference and revealed preference were then ranked second 22% and 44% of the time by experts, respectively. Benefit/value transfer and customer rating methods only garnered a few votes.

4.3. How worthwhile is amenity valuation?

Experts were asked the simple question “do you believe that the valuation of public transport customer amenities is worthwhile?” 100% of responding experts agreed that amenity valuation is worthwhile. Although it is no surprise that experts in amenity valuation agree in its worth, selected comments quoted below clearly highlight the importance in policy and investment decisions, but also in assisting transit compete with other modes.

“understanding the valuation of amenities is important to ensure that scarce government funds are allocated to things that are most highly valued in order to maximise (or at least optimise) community outcomes. If this doesn't happen, the we are reducing overall welfare.”

“Even if total valuation is relatively modest (compared to impact of fares or journey time, for example) there can be potential for real gains at low cost. Also consider competition; cars continually add to customer amenities - try buying a car without air conditioning now.”

4.4. Measurement issues

A range of amenity value measurement concerns or issues were identified in previous phases of this study. The survey explored in these with the experts and their feedback is outlined in Table 5.

Table 5 Amenity value measurement issues/problems

Measurement Issue	Description
Values Context Specific	<ul style="list-style-type: none"> High variability makes it difficult to estimate values that are transferrable to other services/cities Differences in values may be observed by age, gender, income, location and trip characteristics
Application of ‘average’ values for benefit transfer	<ul style="list-style-type: none"> Average values may be skewed towards higher/extreme values Generally, not appropriate where proposals are targeted at specific groups (e.g. mobility impaired)
Absence of natural and/or meaningful units	<ul style="list-style-type: none"> Lack of natural/meaningful units limits the transferability of valuations Metric scales are often not meaningful to respondents (e.g. decibels for noise)
Packaging effect	<ul style="list-style-type: none"> Where values for individual amenities sum to more than the value of a package of improvements Valuations for individual amenities are typically scaled down to deal with the problem
Interaction and ‘halo’ effects	<ul style="list-style-type: none"> Where improving one amenity can change the perceived value of other amenities Example is mobile phone-based information which may reduce the value of information displays
Changes in customer expectations	<ul style="list-style-type: none"> Willingness to pay for particular amenities may change over time as minimum standards increase Quality of customer amenities may need to continually evolve in order to stand still
Survey response bias	<ul style="list-style-type: none"> Strategic response bias – respondents overstate their valuations to influence policy Non-commitment bias – respondents lose nothing by indicating value for certain amenities
Respondents’ understanding of amenities & levels of provision	<ul style="list-style-type: none"> Unfamiliarity with amenities can affect respondents’ valuations Use of focus groups beforehand can help to ensure amenities are framed appropriately

Experts were asked to rate these issues in two questions. In the first question, experts were asked how often they think the issues occur and if they believed they are important. Results are shown in Figures 3 and 4. In general, experts felt that all issues are a frequent problem, with no definitively greater problem standing out.

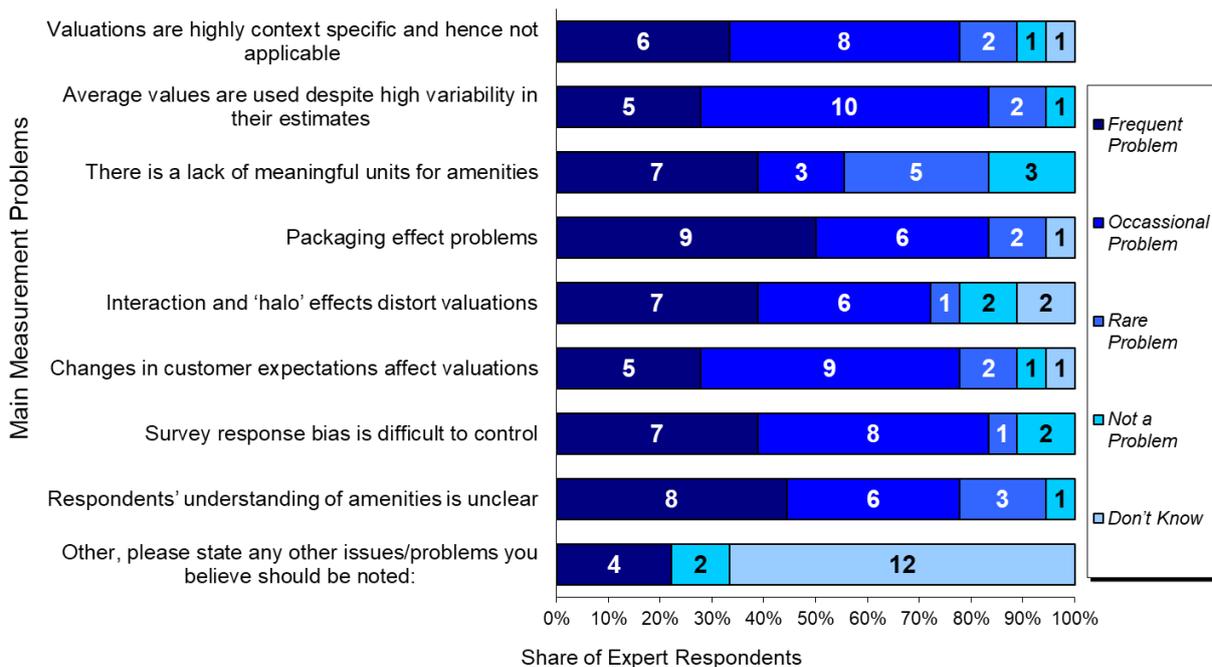


Figure 3 How often do issues/problems with measurement methods occur?

In the second question, experts were then asked to rank the problems by priority in limiting current practice from worst to least (1 being worst and 9 being least), shown in Figure 4. Experts felt that the greatest problems are ‘packaging effects’³, ‘use of averaged values’, and ‘values are highly context specific’.

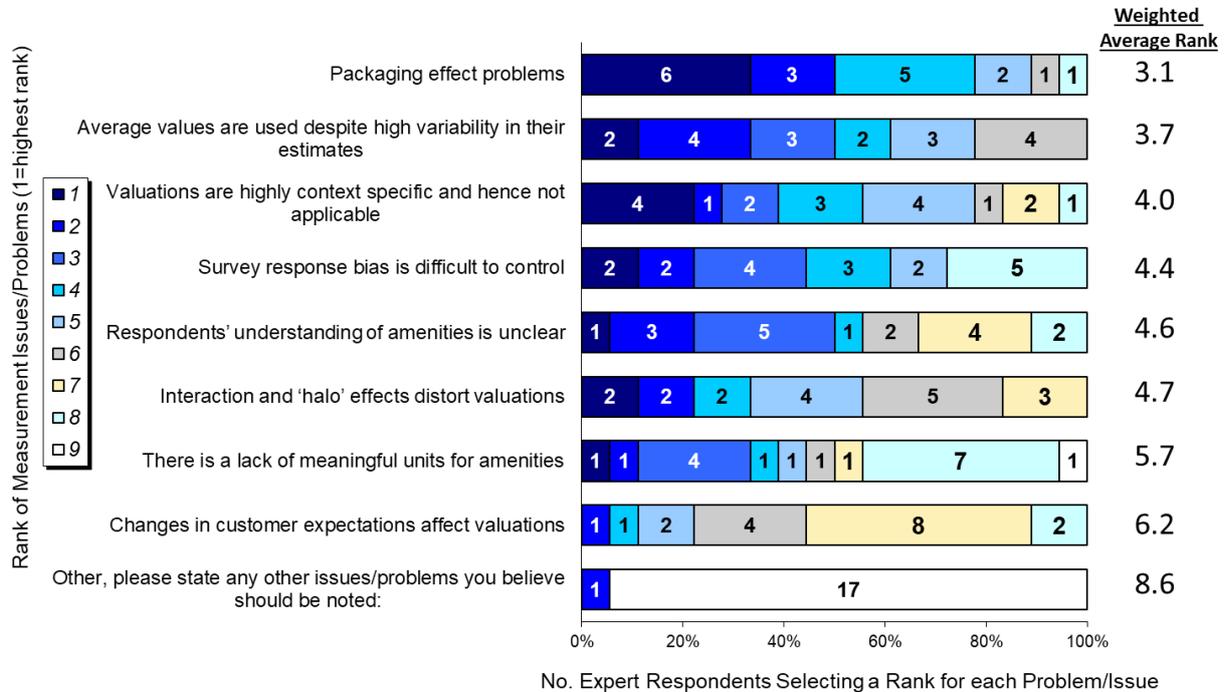


Figure 4 Rank of issues/problems with measurement methods

4.5. Overall rating of practice

Experts were asked whether they believe the state of current practice is “very good”, “good”, “fair”, “poor”, or “very poor”. Overall, the majority of experts (61%) believe that current practice of amenity valuation is “fair”. The remaining opinions were more divided as either “good” or “very poor” at 28% and 11% of the experts, respectively.

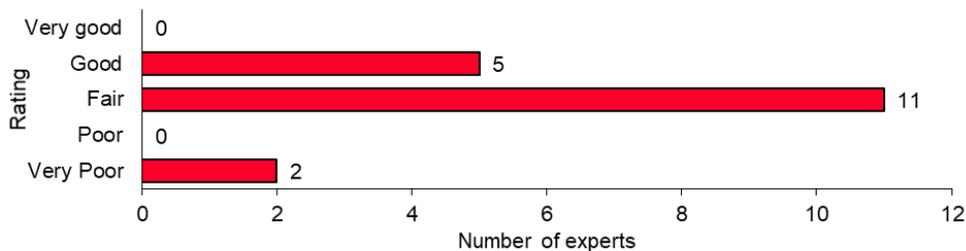


Figure 5 Overall rating of current practice

³ The ‘packaging effect’ refers to when independently derived values for individual amenities sum to an amount that is greater than the value that a respondent would ascribe to the package of improvements as a whole (Swanson et al., 1997, Robson, 2009).

4.6. Best practices

Experts were asked to suggest and explain what “best practices” they would recommend for valuing amenities in public transport. A diverse range of “best practices” were suggested, which can be grouped into three general categories: *Mixed Methods*, *Survey Design*, and *Specific Methods*.

Most experts made comments emphasizing a **mixed methods** approach using methods with complementary strengths. This importance is highlighted in the selected quotes below:

“Probably in the area of combining methods in an efficient manner; making sure that attributes like time are included where there may be outside evidence to cross check; making sure that concepts like reliability are explained to respondent (see work by Hollander)”

“A combination of approaches - e.g., SP/RP and possibly with appropriate modelling (the modelling has been done very poorly in the past). Don't just rely on one method!”

Experts also commented on the importance of **survey design** to ensure biases are minimized, values are reasonable, and also that survey costs are low; as shown in the select quotes below:

“Ensure biases, when surveying, are minimized”

“Use Maxdiff to cheapen survey, better to do more cheaply than not do because it is too expensive.”

“Very careful survey design, cognitive testing, piloting Sense checking of responses against revealed preference (RP) data - this includes where a study gives high values, which if real would have been detected by RP, but was not supported by RP Comparison of results with those found in other studies and provide plausible explanation (can be qualitative) of differences”

More fundamentally, one expert simply suggested that basic “realism checks” are important to the quality of results suggested in the quote:

Realism checks, is new seat fabric really worth 10% off journey time etc.

Experts also emphasised **specific methodologies** they believe should be used as part of best practices. The use of revealed preference surveys was mentioned by three experts, but less common methodologies, such as “Evidence Based Design” and “Multimodal Willingness to Pay” were suggested by experts.

Several experts highlighted particularly promising frameworks and methods for providing standardized measurements, such as the Station Experience Monitor (SEM) method and the Customer Service Quality Index (CSQI). Where most amenity valuations are location specific, CSQI provides a normalized measure of service quality by scaling the utilities of different operators (Hensher, 2015). Such a measure offers a powerful tool for decision makers regarding public transport operator contracts. SEM is a tool developed as part of a European research project set an evaluation standard to use in an iterative appraisal/improvement process (Van Hagen, 2015, Van Hagen and Sauren, 2014). SEM provides a standardized survey method that addresses a variety of aspects, such as functional aspects (safety, cleanliness, and station flow), experiential aspects (odor, lighting, comfort, colour, and overall appeal), and customer opinion of station overall (i.e., packaged response).

4.7. Amenities that are difficult to value

The experts were asked whether they believe there are amenities that cannot be valued. The response was nearly unanimous that anything can be valued:

“No, anything can be measured if the right tools are used.”

The only dissenting opinions were that some amenities are more difficult to measure than others, such as ride quality and contextually specific amenities:

*“**Ride quality** (and the related comfort factors) has proved surprisingly difficult to value.”*

*“Some are very **context-specific** – e.g. information may often be unnecessary but critical in the context of incidents. Also comfort variables are likely to have a (travel) time-dependent value component.”*

Experts also noted that the frequency, impact, scale, and the number of amenities improved at once can have confounding effects on measurement:

*“**Transformational effects** where a lot of improvements are made and the value becomes greater than the sum of the parts. Difficult for people to comprehend and value and difficult for us to explain to get people to value. Difficult for people to value **high impact but low frequency events** - i.e. getting splashed by roadside puddles. People systematically value them too highly because of the large negative impact. But it is a rare almost never sort of event. Yes, people would be willing to pay £5 to avoid being soaked by a passing vehicle but not every single day.”*

*“Where there is **no established measurement scale** of the amenity in question, you can only provide study-specific valuations. In general, there are lots of problems with qualitative improvements.”*

Other factors are difficult to measure and may be better addressed by other means, such as amenities that benefit a small minority of the rider population as noted in the following comments:

*“Those that relate to amenities that are only valued by a **small minority of passengers** - many amenities for disabled passengers fall into this category.”*

*“I suspect things like **wheelchair access** are difficult and better to handle through rules/laws.”*

*“Facilities to improve **accessibility** for disabled people are not usually given values because improvements are usually introduced because of equality legislation rather than as part of a rational decision-making process.”*

4.8. Post-implementation reviews (PIR) of values

The experts were asked three questions regarding the PIR of values. In the first and second questions, experts were asked what percentage of valuations are checked by PIR and how close the values of the PIR are to the amenity valuation?

Results for these PIR questions are shown in Figure 6. On average the experts believe that approximately 3.6% of amenity valuations are checked by PIR, with most experts having never seen any PIR. Of the PIRs seen, most experts said the accuracy is generally low.

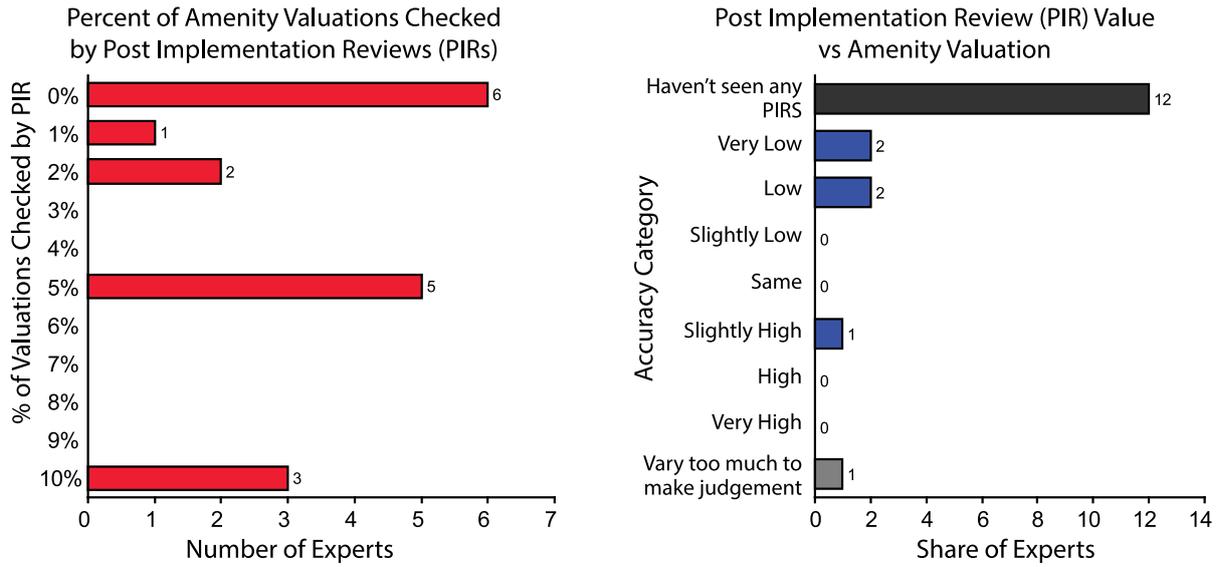


Figure 6 Number and accuracy of post implementation reviews

In the third question, experts were asked whether more PIRs should be undertaken? A large majority of 14 of 18 experts (78%) agreed, with the remaining four experts responding “don’t know”.

4.9. Leading practitioners

The experts were asked to identify leading organisations and/or individuals in the field of public transport amenity valuation. The number of repeat nominations were then collated to highlight nominations of particular prominence. The results of this are shown for organisations and individuals in Figure 7.

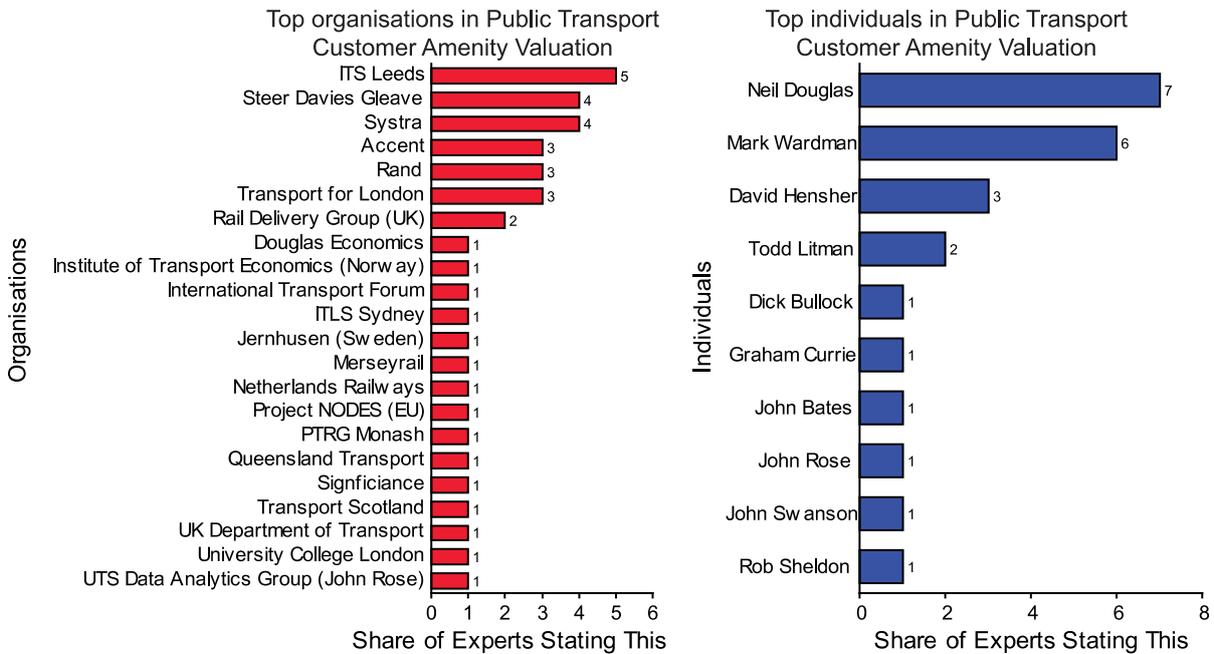


Figure 7 Seven top organisations and individuals in public transport customer amenity valuation

Other than Institute of Transport Studies Leeds and Transport for London, the majority of top organisations identified are consulting firms (e.g., Steer Davies Gleave, Systra, Accent, and the RAND corporation). The top three leading individuals nominated all hold PhDs (i.e., Neil Douglas, Mark Wardman, and David Hensher), but two of the three are also consultants in some capacity (i.e., Neil Douglas and Mark Wardman). Although the Delphi experts were international, it was noted that most experts were “British commonwealth” focused, with a high share of representation from the UK, Canada, and Australasia.

4.10. Other comments

In two final questions, experts were first asked approximately what proportion of the transport agencies they dealt (within the last two years) adopt public transport amenity valuations? In the second part they were asked, “*why don’t some transport agencies adopt public transport customer amenities?*”

Answering the first part, shown in Figure 8, experts tended to fall into three distinct groups of 0%, 50%, and 100%. Overall, the experts reported that an average of about half (51.4%) of public transport organisations adopt amenity valuations.

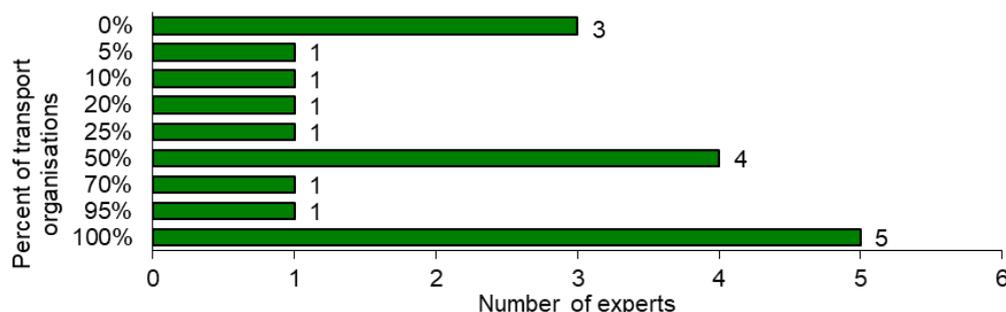


Figure 8 Share of transport organisations adopting public transport amenity valuations

Answering the second part of the question, experts provided multiple reasons why agencies do not adopt amenity valuations. In general, experts believed that amenity valuation is **too complex** and that agencies do not fully understand it, as highlighted in the selected quotes:

“Too complicated, don’t believe the results”

“Don’t understand the value or too difficult to explain for a perceived small benefit. (e.g. it doesn’t help them in their discussions with central agencies for funding so why do it?)”

In addition to this lack of understanding, experts also believed that agency practitioners are pragmatic and may fail to see the benefit of research. As a result, there is a **lack of formal appraisal in industry** for public transport amenities, as highlighted in the quotes:

“These kinds of improvements are rarely subject to formal appraisal and budgets are prioritised according to benefit/cost. More often, amenities are specified as given requirements, e.g. in bus tender contracts and are not subject to cost-benefit consideration.”

“Some are too pragmatic, too little research oriented.”

In connection with these two themes, experts believed that amenity **valuation is expensive** and resource intensive. Without a dedicated department, it is difficult for agencies to oversee and allocate funds for amenity valuation.

*“Too much effort. **No dedicated department** to specify/oversee.”*

*“Lack of knowledge, **constrained investment**.”*

Potentially as a result of the constrained resources of agencies, they tend to outsource the task to market research firms that are ill-suited for the specific task of amenity valuation, as highlighted in the quote:

*“Never make the effort to properly value them and typically use outmodes customer satisfaction measures on a **Likert scale that are quite useless**. Sadly, they use **traditional market research firms** and most only know this type of metric method.”*

Moreover, experts also believed that transport agencies tend to default to past practice, are subject to high staff turnover, and conscious of public relations.

“History impetus, change in staff, afraid of bad press.”

This means that agencies may be slow to adopt innovative valuations, lack institutional knowledge to do so, and lack the political willpower.

5. Conclusion

The aim of this paper is to determine the problems, issues, and best practices that exist in public amenity valuation measurement methods. This paper builds on our previous efforts in literature review and practitioner surveys by utilizing a Delphi survey of experts involved in measuring values of customer experience infrastructure. The Delphi survey was a two-round survey where experts are provided an anonymised summary of responses after the first round of answers. This iterative survey encourages consensus building by allowing experts to revise their responses based on the group’s response. A total of 28 experts were contacted from a variety of academic, consulting, and government backgrounds. 18 responded in the first round and 6 experts responded in the second round.

Key findings of this study show that all experts believed amenity valuation is highly important to policy and investment decisions. However, they only rated the state of current practice as “fair” on average. Moreover, while 78% of experts believed that Post Implementation Reviews (PIRs) should be conducted, they also reported that an average of only 3.6% of values are check with PIRs. There is clearly a disconnect between what experts stated as good practice and what experts see in current practice. A possible reason is that experts believed amenity valuation is seen as too complex and/or too expensive, and as a result there is an overall lack of formal appraisal in the industry of amenities, let alone PIRs.

Aside from this institutional apathy towards appraisals, experts did not reach a consensus for what are the greatest methodological issues/problems identified (listed in subsection 4.4). Meaning that either no single issue is substantially more frequent, or that the experts simply do not agree which is most common. However, experts did tend to find that the “packaging effect” (e.g., the sum of individual amenities is greater than the whole), usage of averaged values, and the transferability of valuations are particularly important issue facing amenity valuation.

In addition to methodological issues, experts reported that there are some amenities are particularly problematic in measurement. For example, context-specific factors, high impact but low frequency events (e.g., splashed by roadside puddles), transformational effects (e.g., multiple improvements are made), comfort factors (e.g., ride quality), and where no measurement scale is established. In addition, multiple experts specifically mentioned disabled passenger accessibility, which are problematic amenities to measure because they are only valued by a small minority of passengers.

As best practices, experts also stressed the importance of good survey design in order to minimise biases and costs. Experts tended to favour stated preference and revealed preference surveys, but stressed the importance of a mixed-methods approach to leverage the complementary strengths/weaknesses of each method. Experts also highlighted the potential of less common methods, such as the Station Experience Monitoring for before/after testing and the Service Quality Index measure for benchmarking across different locations/operators.

This research has provided an in-depth understanding of the views of leading Australian and world practitioners who undertake and apply valuation methods on what is best practice. Overall experts stress the importance for conducting amenity valuations in appraisals in order to adequately quantify investments in customer experience infrastructure. Future work is needed to develop best practice standards for amenity valuation as well as to incorporate advanced techniques (e.g., SEM and SQI) into these best practices. The review also highlights areas for new research investigating the problems of 'packaging effects' and highly variable estimates to possibly determine practices and methods to mitigate these problems.

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