

Thredbo at Thirty: Review of Past Papers and Reflections

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ABSTRACT

Thredbo 15 is the fifteenth biennial conference of the International Conference on Competition and Ownership in Land Passenger Transport. In the 30 years since its inception, 620 completed workshop and other papers presented at the conference have been published in proceedings, books, journals and on the website of the University of Sydney's Institute of Transport and Logistics Studies. A review of features of the papers, how they have changed over time, and the extent to which they have influenced the broader research community finds that: (i) there is a substantial body of evidence that tracks the evolution of concerns and practice over the period; (ii) the extensive citation of published Thredbo papers indicates that have been useful to a wider audience; (iii) there are positive trends such as the increased use of quantitative methods; (iv) there is extensive evidence from Europe, Australia, New Zealand, South Africa and South America, but rather less from North America and Asia; (v) there has been reduced involvement of government and industry authors over time; (vi) with regard to contracting of public transport, less work has been undertaken on procurement of contractors than the design of contracts, and even less on the management of contracts; and (vii) there has been a shift in the focus of papers away from the original core interest of the conference series.

1. A History of the Thredbo Series

1.1 Origins and objectives

The first conference in this series was an idea in 1987 of Michael Beesley and David Hensher and was subsequently held in Thredbo, New South Wales, Australia in May 1989. It was intended to be a one-off conference, motivated by the 1986-87 reforms implemented by the government of the British Prime Minister Margaret Thatcher, where we saw competitive tendering of bus services at the route level in London (competition-for-the-market), and economic deregulation of bus services outside London (competition-in-the-market), with a compensating minimum-subsidy tender where commercial registration did not deliver

services deemed essential. The major themes that emerged from the conference were the need to break the nexus between services and subsidy, the assessment of cost savings associated with different forms of market arbitration, the role of the minibus as a major technological enhancement, the role of competitive contracting and the need for an open book approach, the importance of travel cards and other intermodal ticketing, and the role of performance and productivity measurement.

The success of the first conference in bringing together researchers, government officials, government and private sector public transport operators and consultants to discuss matters of mutual interest led to a second and then a continuing series of biennial conferences that became known as the Thredbo series. For notation purposes, the conferences are described here as Thredbo 1 or T1, Thredbo 2 or T2, etc. Features of past conferences are summarised in Table 1.

In line with the focus of the first conference, the ongoing objective of the series is to provide an international forum to examine land passenger transport competition and ownership issues, reporting on recent research and experience and developing conclusions on key issues. The focus is on determining the effects of different forms of competition, ownership and organisation for land-based passenger transport on operators, users, governments/funders and society as a whole. The conference series is directed towards a broad audience of policy makers, planners, decision makers on infrastructure and service operators, consultants, researchers, academics and students, and is recognised as one of the most important international forums for analysis and debate of competition and ownership issues in land passenger transport.

A number of structural features of the first conference defined the ongoing series, especially the workshop format (see the next section for more detail) and the maintenance of key themes through the series with emerging themes introduced where needed. By keeping the themes refreshed, while also continuing to monitor the latest developments in the initial Thredbo themes aligned to contracting and performance measurement and assessment, the series has etched out a significant market position to claim its global status as one of the most important forums on public transport reform and progress. Many repeat attendees have coined phrases such as 'Thredbo dependent', 'The biannual intellectual injection', and 'the conference where you really do learn something'. In some countries we can trace the influence of the series right through to government legislation and on the ground reform initiatives.

1.2 Conference approach and structure

Each Thredbo conference has featured a limited number of plenary sessions over four days, with the remainder of the time allocated to workshops. Each workshop has addressed some particular theme, with conference participants being required to remain in a single workshop for the entire conference. An attempt has also been made to ensure a mix of participants from academia, government, consultancy and public transport service providers in workshops.

Table 1. Past conference locations, attendance and workshops

	Thredbo 1	Thredbo 2	Thredbo 3	Thredbo 4	Thredbo 5	Thredbo 6	Thredbo 7
Location	Thredbo, Australia	Tampere, Finland	Toronto, Canada	Rotorua, New Zealand	Leeds, United Kingdom	Cape Town, South Africa	Molde, Norway
Year	1989	1991	1993	1995	1997	1999	2001
Title	Competition and Ownership of Bus and Coach services	Privatisation and Deregulation in Passenger Transportation	Competition and Ownership in Surface Passenger Transport	Competition and Ownership in Land Passenger Transport	Competition and Ownership in Land Passenger Transport	Competition and Ownership in Land Passenger Transport	Competition and Ownership in Land Passenger Transport
Workshop 1	Experience from Different countries	Experience with Competitive Tendering	Competition Policy	Competitive Models and Impacts	Ownership and Organisation	Tendering and Competition in Public Transport	Competitive Tendering of Public Transport
Workshop 2	The Issues	Understanding Competition and Anti-Trust Behaviour	Competitive Tendering Experience	User Requirements	Competition Policy: A New Era	Funding of Public Transport and Infrastructure	Competitive Tendering of Public Transport
Workshop 3	The Bidding Process	Externalities: Public Interest and Private Gain	Infrastructure Policy for Roads and Railways	Rail Sector Issues	Franchising and Tendering	User needs and Impacts on Public Transport Systems	Ownership & Organisation of PT & Infrastructure
Workshop 4	Operator and Organisational Issues	Management, Institutional structures, the TPP and the Future of PT	Planning and Analysis	Regulatory Reform and Transport Policy development	Passenger Transport Infrastructure Pricing and Investment Strategies	Management of Public Transport Systems	Funding of Public Transport and Infrastructure
Workshop 5	Costing, Scheduling and Demand	Road Pricing and Private Financing	-	International Experience in Competitive Operations	Competition, Ownership and Wider Transport Policy Issues	Ownership and Organisation of Public Transport and Infrastructure	Management of Public Transport Systems
Workshop 6	Productivity and performance	Corporatisation Deregulation and Privatisation	-	-	-	-	-
No. of papers	35	39	31	48	39	73	42
No. of countries represented	9	13	10	15	15	20	22

Table 1: cont.

	Thredbo 8	Thredbo 9	Thredbo 10	Thredbo 11	Thredbo 12	Thredbo 13	Thredbo 14
Location	Rio de Janeiro, Brazil	Lisbon, Portugal	Hamilton Island, Australia	Delft, The Netherlands	Durban, South Africa	Oxford, United Kingdom	Santiago, Chile
Year	2003	2005	2007	2009	2011	2013	2015
Title	Competition and Ownership in Land Passenger Transport	Competition and Ownership in Land Passenger Transport	Competition and Ownership in Land Passenger Transport	Competition and Ownership in Land Passenger Transport	Competition and Ownership in Land Passenger Transport	Competition and Ownership in Land Passenger Transport	Competition and Ownership in Land Passenger Transport
Workshop 1	Performance Based Contracts	Design and Innovation of Competitive PT to foster patronage	Growing patronage - Challenges and what has been found to work	Benchmarking the Outcome of Competitive Tendering	Performance measurement and compliance	Developing an Effective Performance Regime	Innovations in service delivery and performance management
Workshop 2	Competition and Regulation	Contract design and implementation issues - Creating and maintaining trusting partnerships	Nations and regions in transition	A successful contractual setting	Bus Rapid Transit (as part of enhanced service provision)	Bus Rapid Transit (BRT)	Effective institutional relationships, regulatory frameworks and contract transition strategies
Workshop 3	Regulatory and Planning Tools	Key performance indicators and data for monitoring and auditing	Risk and Reward	Beyond competitive tendering	Governance, contracting, ownership and competition issues in public transport: Lessons that can be learnt from developed and developing economies	Institutional and Operational Reforms within Different Socio-economic and Cultural Contexts	Sustainable funding sources, and related cost/benefit measurements, for public transport
Workshop 4	Institutional Frameworks	Competition, Regulatory Change and Ownership	Social Exclusion	System Development	Designing Contracts/concessions: what has worked and what has not and why?	Governance, Ownership and Competition in Deregulated Public Transport Markets	Developing inter-modal transport systems

Workshop 5	Service Quality and Pricing	Institutional configuration and framework as a driver for system performance	Analytical and institutional methods and frameworks	Social Inclusion	Network and System Planning: how best to deliver this under alternate contract regimes in order to grow patronage and service levels	The Roles and Responsibilities of Government and Operators	Harnessing big data
Workshop 6	Performance Measurement and Data	Policy Evolution and decision making process	-	Public policy and transport	The Public Agenda: what is working and what is missing? (including social inclusion)	Delivering Sustainable Public Transport	Reassessing public operations
Workshop 7	-	-	-	PT markets in development	-	Innovative Finance for Innovative Public Transport	Market initiative: regulatory design, implementation and performance
Workshop 8	-	-	-	-	-	-	The wider economic, social and environmental impacts of public transport investment
No. of papers	68	93	94	86	89	104	122
No. of countries represented	17	25	23	21	25	21	20

The workshops have involved presentation of papers prepared by participants and, drawing on these and on keynote papers presented at plenary sessions, discussion and determination of findings and conclusions regarding the workshop theme. An initial workshop report has been presented at a plenary session at the end of each conference. Following the conferences, workshop reports have been developed into formal papers that summarise workshop discussions with a focus on findings and conclusions regarding policy lessons learned and issues in need of further investigation.

The themes of the workshops for all the previous conferences are described in Table 1. The evolution of the themes reflects not only the desire to investigate the main Thredbo topics in more detail (especially those linked to contracting and performance), but to recognise that contracts must be positioned within the broader setting of public transport provision.

Papers have not been peer-reviewed prior to the conference, and have involved both informal and formal types of papers and presentations that provide a range of international perspectives. A majority of the papers, after refereeing, have been variously published over time in books, journals and proceedings together with the workshop reports. Papers that have not been formally published are available online at <http://www.thredbo-conference-series.org>.

1.3 Past Reviews

Four previous papers have reviewed progress in the Thredbo series. Preston and Nash (1998) provided context for T5 by summarising the themes of previous conferences, setting out an agenda for T5 and subsequent conferences, and expressing the “fervent hope that this Conference [T5] will be a success and that the series will continue into the future” (p.8). Walters (2000) continued this previous review as background to T6, concluding that “the Thredbo series of conferences serves as the ideal vehicle to achieve this [to reflect on ways to achieve higher levels of efficiency and effectiveness of public transport systems and to share experiences with each other] as it is focussed and entirely relevant in today’s ever-changing transport environment” (p.322).

Subsequently, Preston (2005, p.23) continued the theme of these papers in preparation for T8, noting that “the conference series appears to be in rude health”, had “followed a broadly expansionary path, with bigger, more international conferences ... than at the start of the series”, and “has had some impact on the policy debate, particularly in Australasia, the European Union and the United States”. Finally, Hensher (2014, p.673) summarised the history of the Thredbo series and observed that “the series has established itself as the premier international forum dedicated to the analysis and debate on competition and ownership issues in land passenger transport. The series has attracted high-quality participation and delivered a large portfolio of impressive material synthesising developments not only from developed economies but increasingly from developing economies”.

The current paper builds on these previous reviews as the Thredbo series embarks on its 15th conference. A complimentary paper by Wong and Hensher (2017) provide a review of the developments in contract design and implementation over the last 30 years.

2. Review Objectives and Methodology

The current review has two objectives: (i) to examine the features and foci of papers over the history of the Thredbo series; and (ii) to identify the extent to which published papers appear to have had an influence on others working in fields addressed by the papers.

To address these objectives, past papers have been identified and their features established. The focus has been on papers formally published in books, journals and proceedings (with one exception described below). Table 2 sets out the papers that have been considered. Papers such as forewords, prefaces and postscripts have not been considered. Three matters account for differences in the number of papers between Tables 1 and 2. Firstly, workshop reports are not recorded in Table 1. Next, not all papers shown in Table 1 have been subsequently formally published. Finally, in the case of T4-T7, only workshop reports were formally published (with one additional paper published in the case of T4). Other completed papers for T4-T7 have therefore been included to provide a more complete representation of the papers considered at them – however, these papers have not been included in the assessment of the number of citations because they have not been published in the same manner as for other published papers. The total of 620 completed papers shown in Table 2 represents a very substantial body of literature that has informed thinking and debate on the subjects covered.

To address the first objective set out above, a set of standard criteria that reveal the features of papers, their authors and their content and approach were identified, and then tested for a selection of papers and refined as needed. The adopted criteria are set out in Table 3. With regard to the technical matters addressed in papers, only the principal topics were identified, i.e., those considered in some detail rather than being only briefly addressed. The set of identified technical topics address those linked to the conference focus on competition and ownership in land passenger transport in more detail than other topics.

Each of the 620 papers identified in Table 2 has been reviewed and their features with regard to the criteria set out in Table 3 recorded based on a qualitative assessment. The work was mostly undertaken by a single researcher to ensure consistency in the recording of data, with a limited set of assessments made by a second researcher reviewed by the principal researcher.

The categorisation sought to secure the greatest level of detail while avoiding replication. Thus, for example, if a paper related to a specific indicated European country, only that country was recorded. In the case of the mode of public transport being considered and the location of the transport matter addressed, the research did not seek to interpret the work, but rather relied on papers' authors being clear about the subject matter. This approach was taken as it may have been implicit to an author that they were addressing, for example, urban transport in their particular location but, in an international context, readers cannot be expected to fully understand specific features of local situations in the large number of cities and countries addressed in papers. Similarly, where the author indicated they addressed say bus and rail public transport, these modes were recorded, but where the general term public transport was used throughout a paper, *Public Transport: General* was used even if local knowledge may have indicated that the public transport system involved say buses alone.

Table 2. Conference Papers Reviewed

No.	Publication ⁽¹⁾	Year Published	Formally published papers ⁽²⁾		Other Papers	Total
			Workshop Reports	Other Papers		
1	Competition Ownership of Bus and Coach Services. <i>Transportation Planning and Technology</i> , 15(2-4), 85-414.	1991	6	17	-	23
2	Privatization and Deregulation in Passenger Transportation. <i>Selected Proceedings of the 2nd International Conference</i> , Tampere, Finland.	1992	6	20	-	26
3	<i>Proceedings of the Third International Conference on Competition and Ownership in Surface Passenger Transport</i> . Ontario Motor Coach Association. Toronto.	1994	4	28	-	32
4	Competition and ownership in land passenger transport: the fourth international conference. <i>Transport Reviews</i> , 16(3), 183-212, & 16(4), 277-299.	1996	5	1	46	52
5	Competition and ownership in land passenger transport: the fifth international conference. <i>Transport Reviews</i> , 18(4), 321-351	1998	5	-	45	50
6	Competition and Ownership in Land Passenger Transport: The Sixth International Conference Cape Town, South Africa. <i>Transport Reviews</i> , 20(3), 317-346 & 20(4), 469-492.	1999	5	-	61	66
7	Competition and ownership in land passenger transport: The 7 th International Conference. <i>Transport Reviews</i> , 22(3), 335-370.	2002	5	-	39	44
8	<i>Competition and Ownership in Land Passenger Transport Selected Papers from the 8th International Conference</i> . Elsevier.	2003	6	36	-	42
9	<i>Competition and Ownership in Land Passenger Transport Selected Papers from the 9th International Conference</i> , 1-968. Elsevier.	2006	6	43	-	49
10	Reforms in Public Transport. <i>Research in Transportation Economics</i> , 22(1), 1-194.	2008	8	40	-	48
11	Reforming Public Transport throughout the World. <i>Research in Transportation Economics</i> , 29(1), 1-410.	2010	7	42	-	49
12	THREDBO 12: Recent developments in the reform of land passenger transport. <i>Research in Transportation Economics</i> , 39(1), 1-308.	2013	7	30	-	37
13	Competition and Ownership in Land Passenger Transport (selected papers from the Thredbo 13 conference). <i>Research in Transportation Economics</i> , 48, 1-434.	2014	7	44	-	51
14	Competition and Ownership in Land Passenger Transport (selected papers from the Thredbo 14 conference). <i>Research in Transportation Economics</i> , Volume 59, 1-462.	2016	8	43	-	51
Total			85	344	191	620

(1) Principal publication for workshop reports. See the Bibliography for a fuller of papers.

(2) Workshop reports and other published papers are in the indicated publication. *Other Papers* are located at <http://www.thredbo-conference-series.org> (accessed 8 June 2017).

Table 3. Categorisation Criteria for Papers

Feature	Description
1. Author	
Academic	Author from an academic institution or a non-commercial institute
Government	Author from a government agency
Consultant/Institute	Author is a consultant or a commercial institute not a part of a university or government agency
Operator/Industry	Author is a public transport operator or otherwise associated with industry
2. Modes addressed	
Bus	Formal public bus transport
Rail	Formal public railway transport, covering all fixed rail systems, e.g., LRT, metro, heavy rail
PT: General	Formal public transport
Taxi/Hire car	Formal single hire services
Car	Private car
Other	Includes informal public transport, paratransit and freight, where no specific mode is relevant and where it covers the entire transport sector
3. Location of work topic	
Specific countries	UK; Netherlands; Germany; France; Scandinavia
Other Europe	Some other European country
Europe in general	Where applies to Europe in general
Other specific regions	Australasia; South/Central America; North America; Africa; Developed Asia (i.e. Hong Kong, Japan, Korea, Macao, Singapore & Taiwan.); Developing Asia (other Asian countries)
Other	Includes Russia, central Asian republics, Middle East
International or Non-specific	Other
4. Location of transport	Urban; Non-urban; or Combined/Non-specific
5. Market for service provision	
Deregulated markets	Market that is largely deregulated (e.g. with limited or no controls on entry and tariffs and without subsidy other than community service obligations)
Contracted markets	A market where a service provider operates under a contract with an authority or some other agent (thus, for example, including railway markets with vertical separation)
Government provision	Where a government-owned agency provides services
Other (not specific or relevant)	Where none of the above apply, including where it covers public transport in general
6. Principal technical topics addressed in papers	
a. Context	
Institutional	Organisational arrangements; respective roles of client and contractors; and vertical/horizontal separation in transport systems
Regulatory structure	Structure and content of government regulation of transport infrastructure and services
b. Contracts	
Asset ownership	Provision and ownership of fixed and mobile physical assets—includes vertical separation in railways
Contract design	Design of contracts for the supply of transport services, including the structure and content of contracts

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Feature	Description
Contracting	Process used to select and contract a supplier of transport services and/or infrastructure
Contract management	Management of contracts
c. Performance	
Measuring performance	Identification and/or application of performance indicators
Analysis of performance	Analysis of the performance of transport infrastructure and services, including with regard to efficiency and effectiveness
Review	Cross-sectional and longitudinal reviews of various matters
d. Other technical subjects	
Infrastructure & service development	Development of new infrastructure and/or related services
Service planning & design	Planning and design of transport services, e.g. location, frequency, service type, vehicle type
Transport operations	Operation of transport services
Pricing & charging	Price for use of transport infrastructure and/or services, and charging systems
Financing	Means for financing public transport
Promoting public transport use	Initiatives to increase public transport use, e.g. marketing, promotion, travel demand management, subsidies
Social	Identifying, analysing and meeting social needs
Environment	Environmental effects of transport infrastructure and/or services
Transport policy	Matters related to public policy related to transport
Other	Any other topic
7. Analytical method	
Complex analysis	Complex quantitative analysis, e.g. with statistical indicators
Simple analysis	Simple quantitative analysis, e.g. derivation of unit costs and other ratios, but excluding simple presentation of data
8. Relevance to core Thredbo topic	
Core	Technical topic is directly related to competition and ownership in land passenger transport—includes where paper includes topics under the technical categories of: <i>Deregulated</i> or <i>Contracted</i> markets together with <i>Context</i> , <i>Contracts</i> or <i>Performance</i> ; <i>Government</i> market together with <i>Performance</i> ; or <i>Context</i> together with <i>Contracts</i> or <i>Performance</i> .
Related	Technical topic is relevant, though not directly related, to competition and ownership in land passenger transport—instances where paper does not meet the Core criteria, but still includes topics under the technical categories of <i>Context</i> , <i>Contracts</i> or <i>Performance</i> combined with the subjects of <i>Service planning & design</i> and <i>Transport operations</i> .
Other	Other topics

With regard to the technical topics covered by papers, an average of 2.8 topics were identified per paper. Additional statistical analysis was then conducted to group these topics into underlying themes and track this change temporally over the Thredbo conference period.

The second objective for the research was addressed by identifying the number of times each of the 429 formally published papers identified in Table 1 were cited by others, separately identifying references made by other Thredbo papers and other sources. In this manner, it is possible to identify the extent to which the Thredbo conference appears to have

influenced the broader community with an interest in its subject matter. The number of citations has been measured using two research measures, *Scopus* and *Google Scholar*. The first of these has a narrower focus on citations in formally published literature, whilst the second considers the broader set of references available on the internet. The assessment has only been undertaken for formally published papers to avoid inconsistencies that may result from the different publication channels. Even so, as will be discussed later, there remains a differential effect due to the dissimilar levels of accessibility of proceedings, books and journals in which papers have been published. The number of citations was recorded during three days (28-30 June 2017) to minimise any differentials that could be attributed to newly published citations.

The results of the research have been recorded for each publication, with the results aggregated for the three categories as relevant, viz Workshop Reports, Published Papers and Other Papers. The results are described in the next section.

3. Results

3.1 Dataset

The dataset is considerable and is summarised in Appendix A. The full database is available at <http://www.thredbo-conference-series.org>.

3.2 Features of Papers

Data on the features of the full set of 620 papers is summarised in Figures 1-7. These are discussed in turn in following sub-sections.

3.2.1 Paper Authors

Overall, 70% of authors have come from academic institutions (see Figure 1). While government-based authors played significant roles in T3-T6 in particular, their representation has since declined, as has the representation of consultants though to a lesser extent¹. Conversely, the role played by academic authors has risen, accounting for three-quarters of authors in the period T10-T14. The 620 completed papers considered in this review have a total of 1,134 authors (i.e. 1.8 authors per paper). The number of authors per paper averaged 2.2 over the period T10-T14, which is substantially higher than the 1.6 average for the preceding conferences, suggesting a more collegial form of research.

3.2.2 Modes Addressed

As indicated in Figure 2, the modes addressed in papers has varied between conferences. The large presence of the *Other* category in T2 reflects in part papers that related to the land transport sector as a whole (for example road pricing and market entry conditions) and to

¹ The trend away from government and industry does not mean they did not write papers that were available at the conferences; rather they were not accepted for the subsequent refereed proceedings despite often being valuable papers in workshops.

practices in other transport sectors (for example the airline industry). More emphasis has been given to informal transport in developing countries in T6 and T12.

Figure 1. Affiliations of Authors

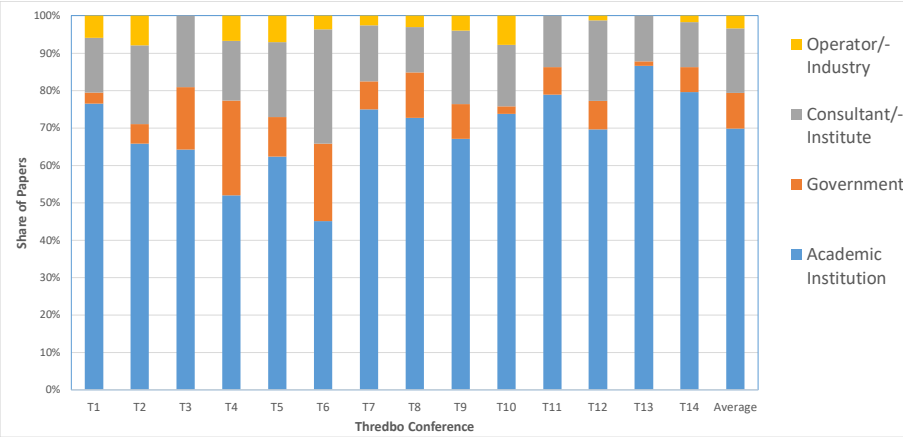


Figure 2. Mode of Transport Addressed

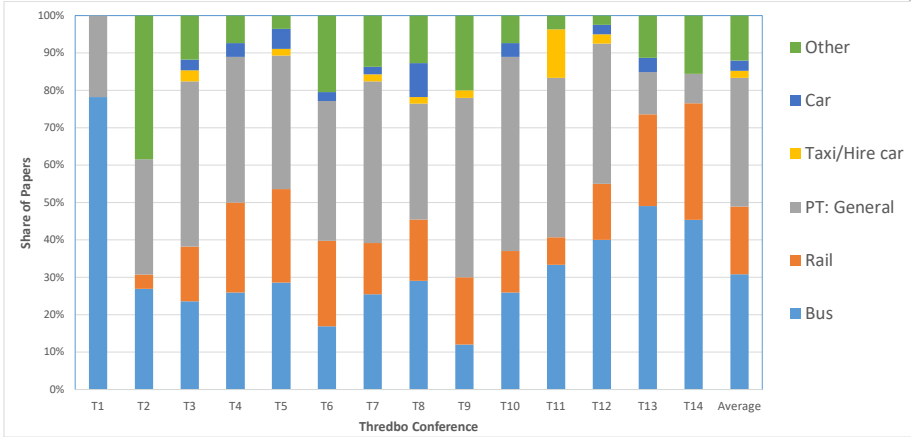


Figure 3. Location of Paper Topic

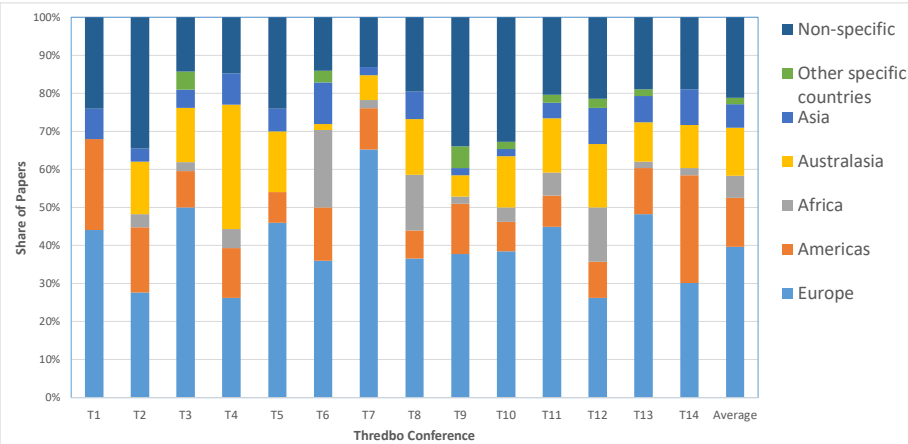


Figure 4. Market for Service Provision

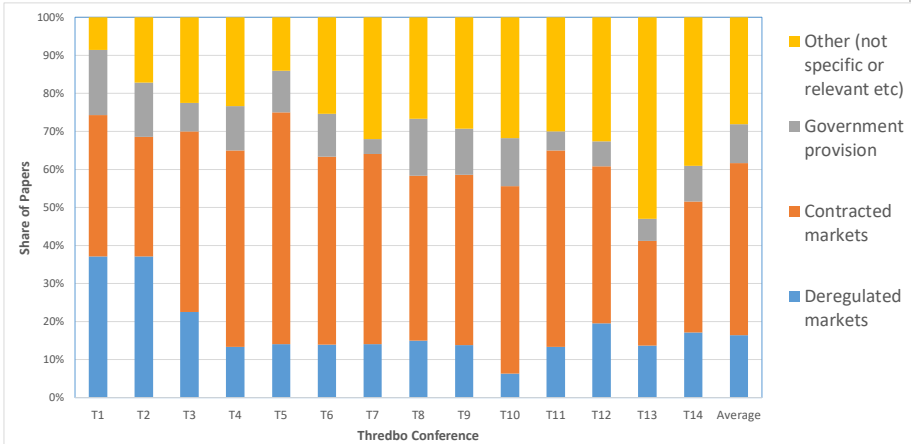


Figure 5. Technical Topic

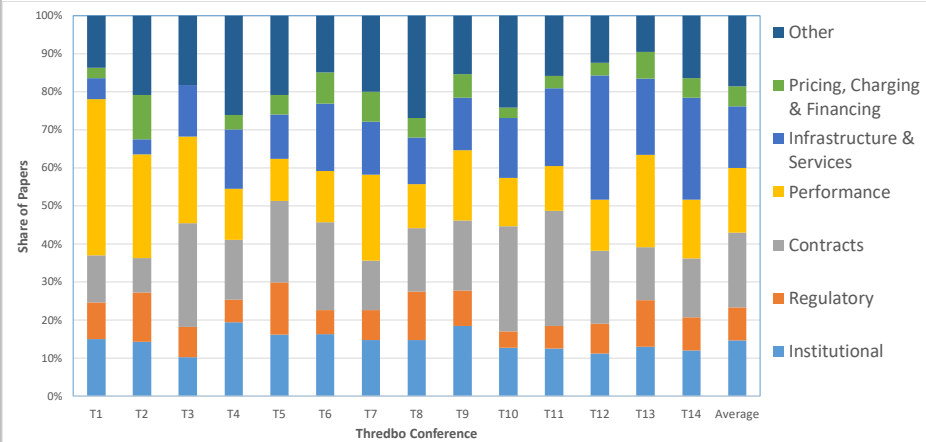


Figure 6. Analytical Method

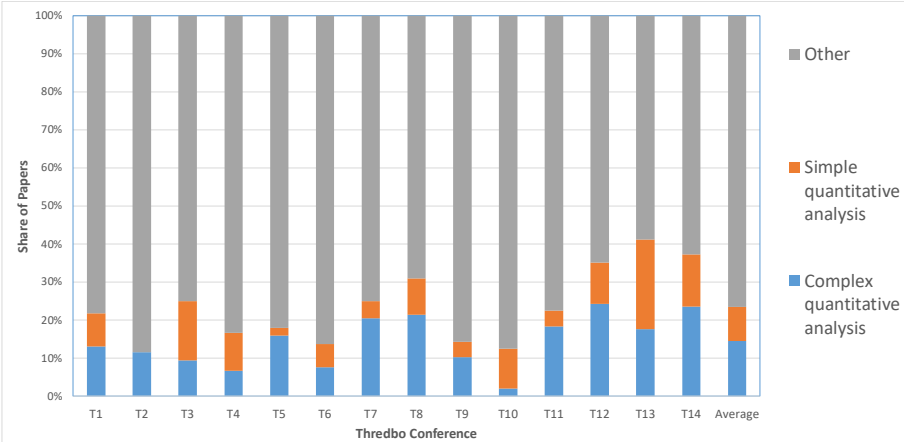
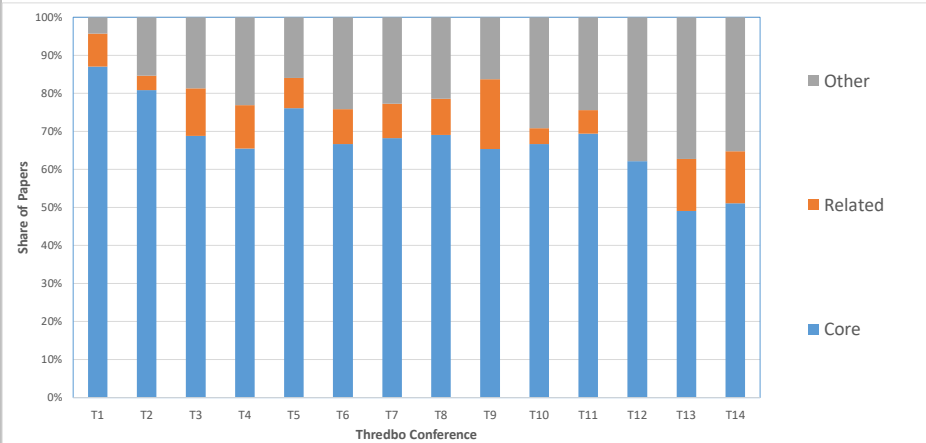


Figure 7. Relevance to Thredbo Focus



The large presence of the category of public transport in general reflects in part common use of the general term public transport by authors without explicit reference to a particular mode, even when it seems likely that a particular mode, most likely bus, has been the sole focus of the paper. It is notable that taxis and hire cars have generally received little attention despite the historic highly regulated nature of the sector and the emergence of transportation network companies providing ridesharing and micro/para-transit in recent years.

3.2.3 Geographic Location of Research

Papers related to European experience have been the largest single source of papers (40% of all papers), with the UK and Scandinavian accounting for 35% and 28% respectively of these, and France, Germany and the Netherlands each accounting for around a further 5% each of the papers. Another major source of experience has been the Americas, with 56% of the papers over the Thredbo series relating to South America (primarily Brazil and Chile) and the remainder addressing the USA and Canada. However, the North American experience was considered more in the early conferences and accounted for less than one-fifth of the papers for the Americas over the period T10-T14. Indeed, only 6 papers addressed North American experience during the period T7-T13. The other major source of experience has been Australia and New Zealand, which together accounted for 13% of the papers over the Thredbo series. The number of papers addressing developments in Africa and Asia has fluctuated over time, peaking at T3, each with an average of only 6% of papers.

3.2.4 Transport Locality

Over the Thredbo series, almost half (46%) of the experience was explicitly related to urban transport, and a further 13% for non-urban. These proportions have not changed substantially over the series. Some of the remaining papers did not address transport in a particular locality, for example when addressing transport policy. However, as with the modes addressed, authors of other remaining papers were not explicit about whether the transport matters they were addressing related to urban or non-urban though it seems they were often primarily addressing one or the other.

3.2.5 Service Provision Market

Early conferences considered deregulated markets, reflecting the early moves in the UK and New Zealand to deregulate commercial services from those that needed subsidies to be financially viable. Over time, though, the largest area of interest has been markets that have involved the provision of infrastructure or services through contracts, which has typically averaged 45% of the cases considered through the Thredbo series (see Figure 4). The high share of papers in T13 that were not related to a specific market condition reflects the large number of papers at that conference that were related to more general transport matters, including infrastructure development and transport service planning.

3.2.6 Technical Topic

While papers for T1-T3 were focused on institutional, regulatory, contract and performance matters, these have accounted for a lesser proportion of papers in later conferences (see

Figure 5). While performance has continued to be addressed to a considerable degree in recent conferences, particularly T13, relatively greater attention has been given to analysis of the performance of infrastructure and other matters compared with competition and ownership issues. Even so, an average of a little over half of the papers that addressed the *Performance* category involved time-series or cross-sectional reviews of changes in transport sector activities, with a total of 155 papers involved such reviews, together with 100 papers that analysed changes in the cost and/or quality of services. These papers provide a substantial and invaluable resource that can inform choices and decision-making for current practitioners.

The categories of *Infrastructure & Services* and *Pricing, Charging & Financing* are generally less directly related to competition and ownership in land passenger transport, especially when not addressed together with institutional, regulatory, contract and performance matters. In total, the share of papers that have addressed the two above categories have risen from 12% of papers in T1-T3 to 31% in T12-T14. The *Other* category has been relatively stable, though with the matters addressed changing away from matters more related to ownership and competition such as competition policy and market entry to more general transport subjects such as big data, project appraisal and sustainable transport.

Within the category of *Contracts*, 13% were related to the ownership of assets, 48% to the design of contracts, 29% to securing contracts and the remaining 10% to the management of contracts. The lesser interest in the second and third of these matters is perhaps surprising given the essential roles of securing the best contractor and of ongoing management of contracts if the intentions of contracting are to be met.

3.2.7 Analytical Method

The extent to which quantitative analysis has been undertaken has risen in recent conferences, doubling from 19% for T1-T3 to 38% for T12-T14 (see Figure 6). This is a beneficial change that brings a more evidence-based approach to the research that has been undertaken. Around 60% of the quantitative analysis over the Thredbo series has been complex.

3.2.8 Relevance to Conference Focus

Based on the categorisation set out in Table 3, there has been a decline in the share of papers that are directly relevant to the core subjects of competition and ownership, declining from 78% of papers in T1-T3 to 53% for T12-T14 (see Figure 7). The share of papers for these periods that address a related matter barely changed (rising from 9% to 10% respectively). The net effect is that the share of papers that were neither core nor related rising from 14% for T1-T3 to 37% for T12-T14.

3.3 Underlying Themes amongst Papers

Factor analysis was conducted to elucidate underlying variables and weightings which explain the variance/covariance between the set of observed topics. The 19 technical topics were condensed to three factors, being Governance, Contracts and Service—named

according to the loadings of different attributes (see Table 4). These three themes account for 27.5% of the variance in topics. The underlying theme, Governance, consisted of institutional, regulatory and ownership topics, and were likely cross-sectional or longitudinal reviews of data. The Contracts theme was strongly linked to contract design, contracting and contract management, whilst negatively associated with financing and pricing topics. Finally, the underlying theme of Service brought together service planning and other topics, but comprised of a few performance analysis papers. These mentioned topics have the greatest causal effect on each theme as drivers, to date, of the Thredbo series.

Table 4. Rotated component matrix⁽¹⁾

Principal technical topics	Component (Theme)		
	1 (Governance)	2 (Contracts)	3 (Service)
Institutional	0.738	-	-
Regulatory structure	0.642	-	-
Reviews	0.455	-	-
Asset ownership	0.435	-	-
Measuring performance	-	-	-
Social	-	-	-
Promoting public transport use	-	-	-
Transport policy	--	-	-
Environment	-	-	-
Contract design	-	0.620	-
Financing	-	-0.571	-
Contracting	-	0.553	-
Pricing & charging	-	-0.464	-
Contract management	-	0.411	-
Infrastructure & service development	-	-	-
Service planning & design	-	-	0.620
Analysis of performance	-	-	-0.608
Other	-	-	0.442

(1) Methodologies used include Extraction Method (Principal Component Analysis) and Rotation Method (Varimax with Kaiser Normalization). Rotation converged in 4 iterations. Only factor loadings above 0.4 are reported, demonstrating topics with the strongest association to each component (theme).

To chart the temporal evolution of Thredbo themes, the component score for each factor was tracked over time and presented in Figure 8. This offers a more nuanced indication of *topic* development in Figure 5. Three distinct periods are evident from this data: (i) the early years, where Governance papers dominated, with very few contributions on service planning and other topics; (ii) turn of the century, featuring a roughly equal mix of papers addressing Governance, Contracts and Service; and (iii) recent developments, which has seen a surge in papers related to Contracts, before levelling out.

Table 5 shows the relationship between the three underlying themes and the service provision (i.e., market arbitration) setting of each paper. The correlation matrix shows that the

Governance theme exhibits a positive correlation with all three types of market provision; and a strong negative relationship with non-specific/non-relevant market settings. There exists a strong positive correlation between the Contracts theme and contracted markets, as is to be expected. Finally, the theme of Service is negatively correlated with contracted markets but positively correlated with other market settings. All these mentioned results are statistically significant at the 99% level.

Figure 8. Change in topic emphasis over the Thredbo conference period

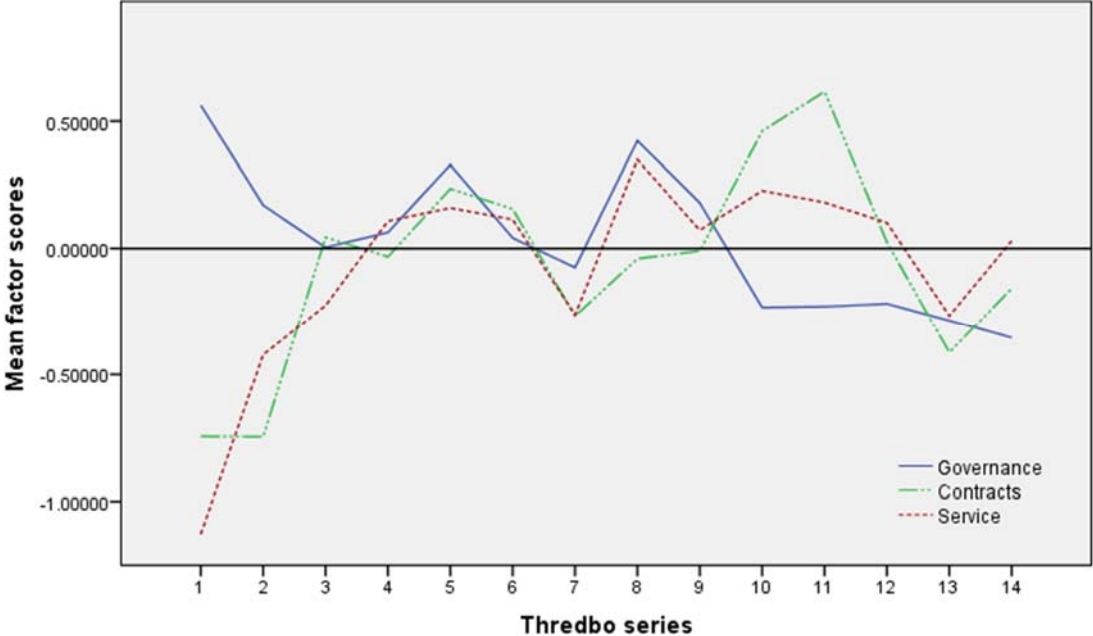


Table 5. Correlation coefficients between the market for service provision and topic theme

Component (Theme)	Deregulated markets	Contracted markets	Government provision	Other (not specific or relevant)
Governance	0.257**	0.351**	0.255**	-0.423**
Contracts	-0.014	0.397**	-0.026	-0.371**
Service	0.059	-0.306**	-0.020	0.280**

** Correlation is significant at the 0.01 level (2-tailed)
 * Correlation is significant at the 0.05 level (2-tailed)

Overall, the factor analysis results are in line with expectations and further reinforce findings in Section 3.2.6 in terms of a broadening of topics away from the initial competition and ownership focus as well as the move from deregulated to contracted markets (Figure 4).

3.4 Influence of Papers

The number of citations for the 429 formally published papers (see Table 6) indicates that the number of citations reported in Google Scholar is considerably larger than those reported in Scopus, and is arguably a better reflection of the extent to which Thredbo papers have influenced others. However, Google Scholar also sometimes includes citations in workshop reports of papers presented to the workshop, thus exaggerating the citation of the papers.

It is evident that the mode of publication has an influence on the number of citations, with papers in books and proceedings less likely to be cited than those in journals – this reflects the better accessibility of papers in journals. The limited number of papers published prior to T10 and the mode of publication has limited the extent to which they have been used by others. When allowing for the different durations since the publication of papers for each conference and the number of papers published, the rate of citation of papers for T10-T14 has averaged 1.5 Scopus and 3.1 Google Scholar citations per paper per year.

There is potential for authors of Thredbo papers to reference previous Thredbo papers more extensively than other authors because they will be more familiar with the papers. However, only 15% of the citations of Thredbo papers reported in Scopus are by papers published for subsequent Thredbo conferences, indicating that Thredbo authors have not simply been ‘talking with each other’, but rather have published papers that have been useful to others.

Finally, 65% of the papers for which citations were obtained were on the core issues of competition and ownership in land passenger transport and 20% on related matters. The number of citations in Google Scholar is broadly similar, with a slight bias to papers on other topics, but this skewness is more evident for citations recorded by Scopus. The extent of citation of the Other category of papers is particularly heavily influenced by the very considerable citation of papers relating to bus rapid transit (BRT), a theme that has been influential in the series.

Table 6. Citations of Thredbo Papers

Confer- enced	Pub- licat- ion	Year pub- lished	No. of pub- lished papers	Citations in Scopus		No. of citat- ions in Google Scholar	Share of citations by relevance to conference title					
				No. of citat- ions	% in non- Thredbo papers		Citations in Scopus			Citations in Google Scholar		
							Core	Relat-ed	Other	Core	Relat-ed	Other
T1	J	1991	23	11	64%	279	91%	9%	0%	93%	7%	0%
T2	P	1992	26	0	-	82	-	-	-	77%	6%	17%
T3	P	1994	32	0	-	108	-	-	-	81%	6%	12%
T4	JJ	1996	6	0	-	7	-	-	-	43%	14%	0%
T5	J	1998	5	0	-	0	-	-	-	-	-	-
T6	JJ	2000	5	0	-	0	-	-	-	-	-	-
T7	J	2002	5	0	-	35	-	-	-	100%	0%	0%
T8	B	2005	42	0	-	229	-	-	-	79%	1%	19%
T9	B	2006	49	0	-	268	-	-	-	81%	13%	6%
T10	JJJJJ	2008	48	750	88%	1,400	50%	2%	48%	54%	3%	44%
T11	J	2010	49	383	83%	805	56%	1%	43%	60%	2%	38%
T12	J	2013	37	263	84%	550	54%	0%	46%	49%	0%	51%
T13	J	2014	51	141	82%	300	61%	20%	19%	56%	20%	24%
T14	J	2016	51	4	100%	43	50%	50%	0%	26%	28%	47%
Total			429	1,552	85%	4,106	54%	3%	43%	62%	5%	34%

(1) B = book; J = journal; P = proceedings. Multiple letters indicate the number of publications, i.e. JJ indicates papers were published in either two journal issues or in two journals.

4. Discussion

A number of observations emerge from the review of published papers of the Thredbo series:

- **There is a large body of evidence.** The large number of papers that have been prepared over the course of fourteen conferences provides a body of evidence that is both very substantial and which tracks the evolution of research concerns and practice over the period. The papers provide a breadth and depth of research, both by subject, location, time and approach that should be invaluable to those approaching the subject for the first time and for institutions that are considering matters related to competition and ownership in land passenger transport and related matters.
- **Thredbo papers have been extensively drawn on by others.** Published Thredbo papers have been drawn on very extensively by people publishing in other journals, and even more extensively in the range of modes for which information is available on the internet. It is thus evident that the papers have been useful to a wider audience.
- **There are some positive trends.** In particular the rise in the use of quantitative methods rather than either simply drawing on available data or without using data is a welcome trend that should improve the quality and robustness of the research presented in Thredbo papers. Similarly, the number of cross-sectional and time-series reviews provide insights into the features and process of developments in various cities and countries.
- **Evidence from some key regions is under-represented.** The extent of change in the provision of public transport in Europe, Australia and New Zealand over the duration of the Thredbo conferences is reflected in the high share of papers from these mature economies. Similarly, the substantial and rising share of papers from South Africa and South America, where high levels of demand for public transport, the extensive use of informal and unsubsidised services and financial and institutional constraints impose challenges for governments and communities, is welcome. There is, however, only a limited number of papers that present evidence of the developments in other locations, in particular Asia given its large population and rate of economic development. Similarly, reporting of North American experience has been very limited for a number of conferences.
- **The Thredbo conference series faces some challenging trends.** Three trends away from the original focus of the Thredbo conference series are evident. The first is that a strength of the conference series has been its capacity to bring together the work of academics, government, consultants and industry. While the authorship of papers does not necessarily reflect attendance at conferences, the rising share of papers authored by academics (that are in the published books and journals in contrast to the papers on the Thredbo web which includes many paper presented by non-academics) and a corresponding decline by people from government and

industry reduces the extent of documented work that reflects the differing interests and approaches of these necessary partners. Next, while there has been considerable work on the design of contracts for the provision of public transport services, there has been less on matters related to how to procure contractors and even less on the management of contracts. Finally, there has been a shift in the focus of papers away from the original core interest of the conference series, as reflected in its title of “competition and ownership in land passenger transport”. This need not be a constraint in the sense that there are a range of matters related to public transport that are important. But it issues the challenge as to whether the conference should refocus on its original core interest or should be renamed and morph into a more general conference on public transport. The brand may have emerged as the Thredbo series and not the long official title!

There are also lessons to be learned for authors of future papers. Clarity in their work will be enhanced by more explicitly describing the scope of the transport matters being considered early in their papers. For example, rather than simply using the terms *public transport* or *transit*, to also describe the specific mode(s) being addressed. Similarly, describing the geographic location of the transport being tackled helps readers better understand the context for and detail of the paper. Additionally, all presenting authors could be asked to complete a compulsory form where they mark their paper against a devised list of topics and related features (such as that set out in Table 3). This can form an ongoing database used by the organising committee to continually stocktake conference direction and guide future development—including a more targeted call for topics/contributors where focus has been lacking.

5. Conclusions

A review of features of past papers of the Thredbo series indicating how they have changed over time and the extent to which they have influenced the broader research community finds that: (i) there is a substantial body of evidence that tracks the evolution of concerns and practice over the period; (ii) the extensive citation of published Thredbo papers indicates that they have been useful to a wider audience; (iii) there are positive trends such as the increased use of quantitative methods; (iv) there is extensive evidence from Europe, Australia, New Zealand, South Africa and South America, but rather less from North America and Asia; (v) there has been reduced involvement of government and industry authors over time (qualified by the contribution through papers that were presented at the conference but not published in the refereed proceedings); (vi) with regard to contracting of public transport, less work has been undertaken on procurement of contractors than the design of contracts, and even less on the management of contracts; and (vii) there has been a shift in the focus of papers away from the original core interest of the conference series.

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Appendix A

Summary of Data for All Completed Thredbo Papers

Criteria	No. of instances by Criteria and conference														Total
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	
Total Number of Papers	23	26	32	30	50	66	44	42	49	48	49	37	51	51	620
A. Author															
Academic Institution	26	25	27	39	53	50	60	48	51	76	86	55	107	90	793
Government	1	2	7	19	9	23	6	8	7	2	8	6	2	8	107
Consultant/-Institute	5	8	8	12	17	34	12	8	15	17	15	17	15	14	197
Operator/-Industry	2	3	0	5	6	4	2	2	3	8	0	1	0	2	38
Authors/Paper	1.5	1.5	1.3	1.4	1.7	1.7	1.8	1.6	1.6	2.1	2.2	2.1	2.4	2.2	1.8
B. Mode															
Bus	18	7	8	14	16	14	13	16	6	14	18	16	26	29	215
Rail	0	1	5	13	14	19	7	9	9	6	4	6	13	20	126
PT: General	5	8	15	21	20	31	22	17	24	28	23	15	6	5	240
Taxi/-Hire car	0	0	1	0	1	0	1	1	1	0	7	1	0	0	13
Car	0	0	1	2	3	2	1	5	0	2	0	1	2	0	19
Other	0	10	4	4	2	17	7	7	10	4	2	1	6	10	84
Total	23	26	34	54	56	83	51	55	50	54	54	40	53	64	697
C. Location of paper topic															
Europe	11	8	21	16	23	23	30	15	20	20	22	11	28	16	264
Americas	6	5	4	8	4	9	5	3	7	4	4	4	7	15	85
Africa	0	1	1	3	0	13	1	6	1	2	3	6	1	1	39
Australasia	0	4	6	20	8	1	3	6	3	7	7	7	6	6	84
Asia	2	1	2	5	3	7	1	3	1	1	2	4	4	5	41
Other countries	0	0	2	0	0	2	0	0	3	1	1	1	1	0	11
General/Non-specific	6	10	6	9	12	9	6	8	18	17	10	9	11	10	141
Total	25	29	42	61	50	64	46	41	53	52	49	42	58	53	665
D. Location of transport															
Urban	16	13	20	23	15	30	19	22	24	16	23	20	26	28	295
Non-urban	8	5	8	6	4	7	8	3	5	1	7	3	7	11	83
Non-specific	6	8	11	24	30	31	22	19	19	31	22	14	17	16	270
Total	30	26	39	53	49	68	49	44	48	48	52	37	50	55	648
E. Market for service provision															
Deregulated markets	13	13	9	8	9	11	7	9	8	4	8	9	7	11	126
Contracted markets	13	11	19	31	39	39	25	26	26	31	31	19	14	22	346
Government provision	6	5	3	7	7	9	2	9	7	8	3	3	3	6	78
Other (not specific or relevant etc)	3	6	9	14	9	20	16	16	17	20	18	15	27	25	215
Total	35	35	40	60	64	79	50	60	58	63	60	46	51	64	765

Thredbo at Thirty: Review of Papers and Reflections

Criteria	No. of instances by Criteria and conference														Total
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	
F. Principal technical topic															
Institutional	11	11	9	26	25	34	17	23	24	18	19	10	15	14	256
Regulatory	7	10	7	8	21	13	9	20	12	6	9	7	14	10	153
Contracts	9	7	24	21	33	48	15	26	24	39	46	17	16	18	343
Performance	30	21	20	18	17	28	26	18	24	18	18	12	28	18	296
Infrastructures, Services & Operations	4	3	12	21	18	37	16	19	18	22	31	29	23	31	284
Pricing, Charging & Financing	2	9	0	5	8	17	9	8	8	4	5	3	8	6	92
Other	10	16	16	35	32	31	23	42	20	34	24	11	11	19	324
Total	73	77	88	134	154	208	115	156	130	141	152	89	115	116	1,748
G. Analytical method															
Complex quantitative analysis	3	3	3	2	8	5	9	9	5	1	9	9	9	12	87
Simple quantitative analysis	2	0	5	3	1	4	2	4	2	5	2	4	12	7	53
Other	18	23	24	25	41	57	33	29	42	42	38	24	30	32	458
Total	23	26	32	30	50	66	44	42	49	48	49	37	51	51	620
H. Relevance to Conference title															
<u>C</u> ore	20	21	22	34	38	44	30	29	32	32	34	23	25	26	410
<u>R</u> elated	2	1	4	6	4	6	4	4	9	2	3	0	7	7	59
<u>O</u> ther	1	4	6	12	8	16	10	9	8	14	12	14	19	18	151
Total	23	26	32	52	50	66	44	42	49	48	49	37	51	51	620