**ABSTRACT**

This workshop continued the long tradition of reviewing developments in the contracting-out of public transport services in this Conference series. Drawing on 12 research papers and presentations and the ensuing lively discussion, three main contributions were made. Firstly, key issues in the contracting cycle were identified and critical success factors identified for different public markets, distinguished by different levels of maturity and multi-modality. Secondly, a matrix that maps contract incentives/enablers against stakeholders was developed. Thirdly, the implications of new technology were considered and the role of regulatory sandboxes highlighted.

**1. Introduction**

This Workshop had the following three aims:

1. Determine the critical success factors in contracting-out, with respect to contract design, risk allocation and incentives for both mature and less mature markets.
2. Assess how the contracting model could be better designed to maximise technology transfer in the light of big data.
3. Examine the potential for collaboration between operators, municipalities, passenger transport authorities, and other public sector bodies.

Overall, the Workshop intended to review the latest international evidence and assess its robustness, building on previous Thredbo workshops, most recently that reported by Merkert et al. (2018). Our starting point was to consider some concepts which would frame our discussion. The first was the classification of models of competition and ownership established by Hensher and Brewer (2001) and illustrated by Figure 1 (see also Currie, 2016). Our focus is on the contracts and franchises in the centre of the diagram, whilst recognising the path dependencies with the extremes of private deregulated and public regulated systems.

**Figure 1: Models of Ownership and Competition in Public Transport**



Source: Hensher and Brewer 2001.

The second was the contracting cycle that has been posited at Thredbo Conferences passim (Preston and Shaw, 2000) and is illustrated by Figure 2. The number of times a regime has been around this cycle will reflect market maturity and might be linked with the concept of regulatory cycles (to be discussed later).

**Figure 2: Stages in the Contracting-out Cycle**.



Source: Preston and Shaw, 2000.

The third, and final, introductory concept to frame our discussions was the use of assessment frameworks to examine contracting-out options. An example, based on a study of possible interventions in the public transport market in Great Britain outside London, developed by KPMG (2016), is shown by Figure 3. This included ten assessment criteria: fares, ticketing, network coverage, integration, reliability, fleet quality, service quality, innovation, marketing and operating efficiency. Interventions assessed included net cost and gross cost tenders, franchising and partnerships. These are interventions that are covered by the presentations and papers of the workshop and the ensuing discussion.

**Figure 3: A Possible Assessment Framework**



Source: KPMG, 2016.

In the next section we will discuss the 12 resource papers that provided the raw material for our discussions. We will then consider some key findings with respect to contract design, incentives and market dynamics. Finally, we will make some policy recommendations and future research priorities, some of which we hope will be taken up before Thredbo 17 in Japan in 2021.

**2. Resource Papers**

We considered the evidence under four broad headings: overviews, bus contracts, public transport contracts and rail contracts. These will be reviewed in turn.

2.1 Overviews

We began with three overview papers. Zheng Li and David Hensher provided an analysis of Bus Rapid Transit (BRT) standards and an analysis of the gold, silver, bronze and basic designations developed by ITDP (Institute for Transport and Development Policy). Using ordered logit, key explanatory factors were found to be related to service specifications and fares and ticketing arrangements. The Workshop considered alternative approaches including customer surveys, financial appraisal and cost-benefit analysis and whether similar standards could be provided for contracting-out.

Qiang Meng (in a paper with Dian Sheng) provided a bibliometric review of bus contracting, based on 125 relevant papers from 1990 to 2019, mostly in transportation and economics journals. Three main clusters emerged from the literature: the promotion of negotiated performance based contracts; measuring service quality; and assessing performance. Discussion focussed around the Singapore Bus Contract Model (BCM) which was planned between 2008 and 2014 and implemented from 2014 onwards. The Singapore BCM was based on 14 area packages of which, to date, only four have been let by competitive tender. The remaining packages are negotiated contracts with the two incumbent bus operators. This mix of competitive and negotiated tenders in the first cycle was adopted to ensure a smooth and seamless transition from the existing net-cost licensing model to gross-cost BCM, premised on four main considerations – price discovery, workforce readiness, no service disruption to commuters, and bus assets procurement/transfers. Key features were the quality incentive scheme based around Excess Wait Time for high frequency buses or On-Time Adherence for low frequency buses, and public provisions of depots, interchanges, buses, and common systems such as fleet management and ticketing. There was also some discussions of the extent to which operations research methods could be used to determine the optimal number and size of contracting-out packages of services.

Ian Wallis reviewed recent evidence in New Zealand. In Auckland and Wellington, around a half and a third of services respectively were provided commercially. Under a new regime, these services would be provided through negotiated contracts on a like-for like basis, following competitive tenders for the social services. However, this seemed to stimulate some strategic behaviour. There seemed to be an incentive to bid high in competitive tenders in order to justify high costs (and hence high returns from the negotiated contracts). The up-shot is that negotiated contract unit costs seem to be 37% higher than competitive tender unit costs in Wellington and 16% higher in Auckland. Although some of these differences may be due to selection bias, given competitive tenders are more prevalent in outer areas and negotiated contracts are more prevalent in inner areas, this was only thought to account for around five percentage points (on average) of the difference. The overall findings are broadly consistent with earlier evidence from Australia where negotiated contracts kept costs constant, whilst competitive tenders led to cost savings (Wallis and Bray, 2014). However, the peculiarities of the like-for-like constraint in New Zealand may have exacerbated the differences.

2.2 Bus Contracts

Our second group of papers examined the role of bus contracts. Patricia Galilea (in a paper with Alejandra Chaparro, Juan Muñoz and Joaquín Poblete) examined the situation in Santiago, Chile, where in 2016 there was a 7% deficit in the number of drivers which could rise to 20% by 2026. This in turn has led to problems with service quality as operators are reluctant to discipline drivers when, for example, they leave customers at stops even when there is capacity available. The scope for incentivising drivers to deliver service quality through revenue sharing was examined but this may lead to adverse selection in instances where the agent (the driver) has better information than the principal (manager), although this is reduced through automated fares collection such as the Bip card system in Santiago. Nonetheless, the Workshop was concerned that this may be an instance of whack-a-mole in that when one problem is solved, another one emerges - such as racing to stops and other curious old driving practices that were evident at the birth of the bus industry (Foster and Golay, 1986), although again technology (such as automatic vehicle location) might be able to limit this.

Roger Pyddoke examined penalties as quality incentives for bus services in Skane and Stockholm (Sweden), including consideration of delays, cancelled departures and customer satisfaction. However, in part due to the number of excusable performance incidents, the aggregate penalties were small compared to total revenue and hence judged to be relatively ineffective. There were no positive trends for either delivered or punctual departures, but there were positive and statistically significant trends for customer satisfaction for bus services in the two regions but these trends could not easily be attributed to the penalty regime.

Jackie Walters reviewed the difficulties of letting a contract for the Mamelodi township, on the outskirts of Pretoria, South Africa. Up to 1997, services in South Africa were provided on the basis of indefinite (grandfather) rights, although there were some experiments with tendering, including Mamelodi. Interim contracts were implemented in 1997, with contracting-out to be completed by 2000. However, progress was slow. A moratorium was placed on new tendered contracts in 2001 due to funding issues. To date in South Africa, there are about 66 tendered contracts, 10 negotiated contracts with the remainder (39) being interim contracts concluded as far back as 1997. The first tender since then, for 77 bus shifts, was in Mamelodi in 2018. However, despite there being eight bidders, the contract was not let due to unaffordability of the bids. Problems included an emphasis on net costs, the inadequacy of the cost escalator, difficulties in meeting the sub-contracting requirements, contract design problems, competition from the minibus industry and lack of reliable information (with a lack of trip data for 24 of the 77 shifts).

John Preston (in a paper with Evangelos Darivakis) briefly traced the history of Quality Bus Partnerships (QBPs) in Great Britain outside London and contrasted them with the comprehensive tendering (or franchising) model in London. London was shown to be an anomaly with an extra 220 bus trips per capita per annum than the average for Great Britain but this is due to many factors in addition to the organisation of the industry. Analysis then focused on the 2017 Bus Services Act and the role of Advanced Quality Partnerships (AQPs) and Enhanced Quality Partnership (EQPs). It was found than having an AQP was associated with 40% to 43% higher demand per capita whilst not having a QBP at all was associated with demand per capita 17% to 38% lower, depending on the type of area. Although such correlation does not imply causation, there is some evidence that QBPs can lead to uplifts in demand (or, alternatively, places with good bus markets tend to take up QBPs), but there are barriers related to the risks being borne by the Authority and the rewards by the Operators and the extant knowledge and capabilities of Authorities.

2.3 Public Transport Contracts

Our third group of papers looked at more general developments in public transport contracts. Wijnand Veeneman (in a paper with Gerald Hoekstra, Niels van Oort and Rob Goverde) examined three recent contracts in the Netherlands. In Groningen, separate bus and train contracts were let. In Fryslan (Friesland), a public transport partnership between bus and train operators was developed. In Limburg, a combined bus and train contract was let. An assessment based on network coverage, schedules, information, fares and vehicle management suggested that multi-modal contracts had some advantages, although this would depend on the extent to which interchange is penalized.

Wijnand Veeneman then went on to provide the fifth in a series of reviews of the 13 Transport Authorities in the Netherlands, originating with Veeneman, 2010. Two of these had negotiated contracts, the rest used competitive tendering. A number of trends were observed. Contracts were getting larger (including multi-modal contracts as above) and moving from net to gross cost. Alternatives to conventional public transport were being explored through mobility concessions covering demand responsive transport, Mobility as a Service, shared bikes and autonomous vehicles. Parallels with Singapore’s development of a Sandbox regulatory approach and the US Federal Transit Administration’s mobility on demand Sandbox program[[1]](#footnote-1) were drawn. These schemes typically involve some financial support for innovative services, along with some dispensations from regulations that are perceived to limit these innovations. The relationship between authorities and operators was changing, with more strategic assets in the hands of the former, particularly stimulated by the move to low emission vehicles, as it is believed you can’t leave all the risks to the operator. Lastly, contracts were being simplified with a move away from incentives, greater use of longer contracts (up to 15 years) due to investments in zero emission vehicles, more repeat tenders and a tendency for network simplification, including the straightening of services. Where there are centrally owned bus assets such as in the Singapore’s BCM, the need for such longer contract duration was seen as being less crucial.

Building on the work of Gwilliam (2008), Andrei Dementiev (in a paper with Hyen Jin Han) reinterpreted regulatory cycles and showed how they are affected by three exogenous variables: technological, fiscal constraints and institutional capacity. A key contribution was the development of an inner cycle by which competition for and in the market can evolve into negotiated contracts (see Figure 4).

**Figure 4: Regulatory Cycles**



Source: Dementiev, 2019.

2.4 Rail Contracts

The final two papers looked at rail contracts. Christian Desmaris (in a paper with Guillaume Monchambert) examined 20 regional railways in France that traditionally have been based on cost-plus compensation, but will be contracted-out from December 2019. These are services with low cost recovery, with an average farebox coverage of 29%, and increasing subsidy – up 82% between 2002 and 2016. Econometric modelling indicated large variations in terms of technical efficiency (with an average inefficiency of 15%) and in costs per train km and the expected negative correlation between the two. Two contractual design features are found to be correlated with technical efficiency. Where an additional operator compensation is offered, this is associated with an increase in technical inefficiency. Where a contract is very detailed (in terms of the number of pages), this is associated with a decrease in technical efficiency – but this may just be reflective of problematic operations.

John Preston (in paper with Charles Bickel) provided an update on rail franchising in Great Britain. The current period of franchising started in 2014 and 11 franchises were re-let by mid-2019. There were six more to be re-let. Overall ridership (in terms of passenger kilometres) increased by 118%since the beginning of franchising (1995/6) but by only 16% since 2012/13. It was found that in recent years it could be argued that franchising was welfare enhancing but was not financially sustainable in that there appeared to be a number of zombie franchises that were loss making for the private operator. A comparison of the East Coast franchise when it was under public ownership with South West Trains indicated better social performance, with respect to better punctuality and reliability and customer satisfaction, but weaker commercial performance, particularly in terms of increasing revenue yield.

**3. Key Findings**

The discussions concentrated on our first objective, which was related to critical success factors, with only brief discussions related to the second and third objectives concerning technology and governance respectively. Discussions involved 18 participants from 13 different countries and thus had a strong international dimension.

3.1 Critical Success Factors

With respect to contract design, discussions revolved around three case studies based loosely on the Mamelodi contract in South Africa, the Dutch multi-modal contracts and a franchise for an inter-urban rail service in Great Britain. The main conclusions are given by Table 1.

**Table 1: Keys Issue in the Contracting Cycle.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Setting up the competition** | **Contract specification** | **Contract Award** | **Contract Review and Enforcement** |
| Less mature urban market- Unimodal (bus)(after Walters) | CfEoI.Briefing.RfP.Clear commitment.Sufficient time.Sufficient & accurate data. Funding. | Institutional maturity Keep it simple.Small batches, up to depot scale.Market development.Elements of environmental specifications. | Gross costs with unreliability penalties. | Cost escalators.Demand & Supply data. |
| Mature urban market- Multimodal(bus and rail)(after van Oort et al.) | More advanced.Depot scale (100 buses).Environmental specifications. | Gross costs with quality incentives. |
| Mature inter-urban market- Unimodal (rail)(after Preston) | Route scale. | Net subsidy with quality incentives. | Cost escalators.Revenue modifiers.Demand & Supply data. |

For definitions see text below.

Our first finding is that setting up the competition is vital. Institutional maturity of the contracting body plays a large role in managing the contracting process. This involves issuing a Call for Expressions of Interest (CfEoI) and detailed briefings to stimulate bidder interest before beginning the procurement by issuing the Request for Proposals (RfP). There needs to be clear commitment from the contracting body that it will do what it says it is going to do. Sufficient and accurate data should be provided to all prospective bidders. These findings are particularly important for less mature markets where contracting-out is not well established but is also important in more mature markets where the bidding pool will require replenishing from time to time. The contracting body needs to have sufficient time and funding for these essential preparatory works, including dealing with issues related to transition, as well as the ongoing funding for the duration of the contract.

In terms of contract specification, our advice would be to keep contracts simple for less mature markets and hence small (depot scale and below). For more mature markets, large contracts are feasible (at the depot level and above) and the contracts can be (and often are) more advanced, for example in terms of environmental specifications for vehicles.

In terms of contract award mechanisms, our preference is for gross costs for urban contracts, with penalties for poor performance in less mature markets and bonuses for improved quality in more mature markets. For commercial inter-urban routes, net cost is more appropriate, although quality incentives may still be required where there is some market power.

In terms of contract review and enforcement, in all markets the collation of relevant demand and supply data is vital. This should take into account appropriate risk sharing between the authority and the operator. The well-known adage is that the party that can best manage a risk ought to carry it. In both less and more mature markets, it was accepted that the operator is best placed to manage the cost risks (provided there are adequate cost escalators – see below). For urban markets, the view was that the authority should be best placed to manage the revenue risk in both less and more mature markets, but for different reasons, related to the immaturity of operators in the former and the maturity of authorities in the latter. However, it was recognized that in some immature markets there may not be a fully functioning authority and the operators will need to bear the revenue risk. In urban and inter-urban markets, the computation and application of appropriate costs escalators is needed - they are critical in all contracts, especially when the duration exceeds a year. In inter-urban markets, revenue modifiers may also be needed. We note that public transport contracting-out is an example of recurrent procurement and there are dangers of incumbency advantage related to learning effects, sunk costs of entry and switching costs for the procurer (Iossa and Waterson, 2019). Experience of mature markets such as London suggest these effects are modest but may still necessitate a market refresh exercise from time to time.

Our other main contribution, as shown by Table 2, was to develop a matrix of contract incentives/enablers and stakeholders, which we believe will help determine key performance indicators and the relevant parties who can affect them.

**Table 2: Matrix of Contract Incentives/Enablers**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Authority –** **Managers** | **Operators –****Managers** | **Operators –****Staff** | **Third Parties** | **Customers/****Citizens** |
| Pax/Revenue/Occupancy |  |  |  |  |  |
| Profit |  |  |  |  |  |
| Excess waiting time (EWT)/ On time arrivals (OTA) |  |  |  |  |  |
| Customer satisfaction surveys (CSS) |  |  |  |  |  |
| Complaints |  |  |  |  |  |
| Adjustment mechanisms |  |  |  |  |  |
| Capital |  |  |  |  |  |
| Demand data |  |  |  |  |  |
| Supply data |  |  |  |  |  |

Dark shading indicates incentive/enabler can be affected by stakeholder.

Normally, contracting (and its related theory) focuses on the relationship between the managers of the contracting body and the contracted partner, in essence between the responsible authority and the transport operators. However, our schema shows there is a role for other parties, including operating staff, third parties and citizens in general. For an example, an important aspect of contracting-out is the transfer arrangements for operating staff.

In terms of incentives, patronage (for authority managers) and revenue (for operator managers) are key drivers, but these could also be drivers (excuse the pun) for operational staff. For managers, ultimately profit is the key incentive. For supply side incentives, excess waiting time (EWT) has become dominant for frequent services (including London and Singapore), whilst on-time arrivals (OTA) are more the norm for less frequent services. Incentive schemes based on these metrics can be delivered by third parties. Customer satisfaction surveys (CSS) and formalised complaints can be the basis of incentive and compensation schemes of the delay-repay type.

As indicated above, adjustment mechanisms on both the demand and supply side can be important facilitators to successful tendering, along with the provision of capital (no least for the purchase of new vehicles) and data on demand and supply factors.

3.2 Technology and Governance Issues

With respect to technology, GPS offers the prospects for rich real-time information on the supply side, whilst Smartcards (particularly if they are swipe on and off) and similar products offers similar prospects on the demand side. Mobile network data (and similar) allow the matching of demand and supply at the vehicle level. These data sets in combination provide rich material for contract design, as they allow a much better matching of vehicle capacity and demand by time and place. Regulatory sandboxes (in order to test new technology and regulations) of the type pioneered in Singapore pave the way for contractual offerings that go beyond conventional public transport (scheduled bus and rail and intermediates such bus rapid transit and light rapid transit). Potential new offerings include micro-mobility (e.g., e-scooters), demand responsive transit and ride sharing and sourcing. Smartphone apps, based around the Mobility as a Service concept, provide the basis for integration platforms.

With respect to governance, we might expect devolution, regionalism and localism to continue to impact on public transport provision, with new forms of combined authorities emerging. We might also expect the boundaries between competitive and negotiated contracts to be more blurred and continued experimentation with hybrid contractual arrangements. Our assessment is that in effective mature markets the balance between operators and authorities is finely tensioned. In less effective, less mature markets, authorities are often ineffectual and inconsistent. In some mature markets, there are dangers of cartelisation, where the dominant operators have effectively captured the authority.

**4. Conclusions**

In our final section we shall provide some policy recommendations and research priorities. We will then suggest a workshop session for the next Thredbo conference in Kyoto, Japan, 2021.

4.1 Policy Recommendations

Workforce incentives have a role to play in contracting-out and could be considered as an award criteria. The availability of (big) demand and revenue data can help open up markets and this can be facilitated by national (and international) standards for data formats and the like.

We see that gross cost contracts are becoming the default in many markets, whilst asset ownership (depots, clean vehicles) by public bodies is increasing in importance. Although there is a global move away from incentives, at the network level incentives to enhance integration should be pursued. This might involve formal partnerships between operators and authorities, as are being putatively developed in Great Britain

Contracts may be expected to evolve in the light of market dynamics for both less and more mature markets. Knowledge compendia about these pathways should be developed, building on earlier work and case studies. Past Thredbo conferences, the web site[[2]](#footnote-2) and the published papers, latterly in Research in Transportation Economics, provide an immensely detailed source of information. For an example see the review of 20 years of bus contracting by Hensher and Stanley (2010) - a 30 years review is now due. These resources may be complemented by guidance provided by global bodies such as the International Transport Forum, the International Union of Public Transport and compendia provided by not for profit bodies such as the Transit Center and Eno Center for Transportation (2017). National and supranational guidance documents have been produced (e.g. Department for Transport, 2013, van de Velde et al. 2008) and there may be merit in collating and comparing such documents.

4.2 Research Priorities

Some quick wins might be gained by extending regional railway comparisons from France to other countries with experience of contracting-out passenger rail services including Germany, the Netherlands, Russia and the UK.

We see some important issues in examining the interfaces between network design and contract design. This might involve operations research approaches to determine optimal package numbers and size (depot, interchange based). For contract design, risk allocation remains a key issue. Similarly, we see a link between electric/hybrid buses and supporting (depot) infrastructure becoming stronger as the authority will become more involved. The impact this will this have on industry structure and management has yet to be determined.

Given the paucity of evidence, ex-post evaluations of incentive schemes are needed which would examine the relationships between incentives and Key Performance Indicators and highlight the dangers of perverse outcomes. This would include more work on the relative costs of competitive tendering and negotiated contracts (including transactions). Further work on mixed contract environments, transition issues related to workforce readiness and skills upgrading, and, following on from Singapore, the development of Sandbox regulatory approaches to test new mobility concepts, effectiveness and community acceptance is needed. There is scope for more experimental trials and demonstration projects that are carefully monitored and evaluated.

4.3 Recommendations for Thredbo 17.

We very much hope that some of the research suggested above will report back to Thredbo 17. Contracting-out will remain the flagstone topic of this conference. We believe that future directions will be driven by big data, emerging technologies, new business models and evolving governance arrangements. We see a key role as being the continued documentation and dissemination of best practice in this application domain.

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Workshop Papers (in the order presented)

Overviews (presenters in bold)

|  |  |
| --- | --- |
| **Zheng Li**Dian Sheng and **Qiang Meng****Ian Wallis** | Performance Contributors of Bus Rapid Transit Systems within the ITDP BRT Standard: An Ordered Choice ApproachPublic Bus Service Contracting: A critical review and future research opportunitiesValue for Money in Procurement of Urban Bus Services -- Competitive Tendering versus Negotiated Contracts: Recent New Zealand Experience |

Bus Contracts and Incentives

|  |  |
| --- | --- |
| Alejandra Chaparro, **Patricia Galilea**, Juan Muñoz and Joaquín Poblete**Roger Pyddoke****Jackie Walters****John Preston** and Evangelos Darivakis | Application of incentives for Transantiago drivers to achieve an improvement in the quality of service.Penalties as incentives for punctuality and regularity in tendered Swedish public transportUnderstanding bidder behaviour: The case of the Mamelodi contract.Can Bus Quality Partnerships or Contracts Make a Difference? |

Public Transport Contracting and Regulation

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| --- | --- |
| Gerald Hoekstra, **Wijnand Veeneman**, Nils van Oort and Rob Goverde.**Wijnand Veeneman****Andrei Dementiev** and Hyen Jin Han | The potential of multimodal concessions for service improvements; three cases from the NetherlandsDevelopments in Public Transport Governance in the Netherlands; Even More Recent DevelopmentsA theory of regulatory cycles in public transport |

Railway Contracts

|  |  |
| --- | --- |
| **Christian Desmaris** and Guillaume Monchambert**John Preston** and Charles Bickel | Regional passenger rail transport Efficiency: a test of measurement and explanation in the case of FranceAnd the Beat Goes On. The continued trials and tribulations of passenger rail franchising in Great Britain |

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1. <https://www.transit.dot.gov/research-innovation/mobility-demand-mod-sandbox-program> [↑](#footnote-ref-1)
2. https://thredbo-conference-series.org/ [↑](#footnote-ref-2)