# Delivering Value for Money in the Procurement of Public Sector Major Infrastructure: A New First-Order Decision

Making Model\*

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**Abstract:** The significant challenge faced by government in demonstrating value for money in the delivery of major infrastructure revolves around estimating costs and benefits of alternative modes of procurement. Faced with this challenge, one approach is to focus on a dominant performance outcome visible on the opening day of the asset, as the means to select the procurement approach. In this case, value for money becomes a largely nominal concept and determined by selected procurement mode delivering, or not delivering, the selected performance outcome, and notwithstanding possible under delivery on other desirable performance outcomes, as well as possibly incurring excessive transaction costs. This paper proposes a mind-set change in this particular practice, to an approach in which the analysis commences with the conditions pertaining to the project and proceeds to deploy transaction cost and production cost theory to indicate a procurement approach that can claim superior value for money relative to other competing model outlined in this paper. The model developed could be complementary to the Public Sector Comparator (PSC) in terms of cross validation and the model more readily lends itself to public dissemination. As a possible alternative to the PSC, the model could save time and money in preparation of project details to lesser extent than that required in the reference project and may send a stronger signal to the market that may encourage more innovation and competition.

Keywords: infrastructure, procurement, transaction and production cost theory, value-for-money.

#### **1. INTRODUCTION**

The UK National Audit Office (2004) defines procurement as, "the whole-life process of the acquisition of goods, services and works..., beginning when a potential requirement is identified and ending with the conclusion of service contract or ultimate disposal of an asset". The effective and efficient procurement of infrastructure is often translated as achieving value for money (VfM). HM Treasury (2008) defines VfM as, "securing the best mix of quality and effectiveness for the least outlay over the period of use of the goods or services bought. It is not about minimising upfront prices ... " The best mix can be interpreted as the best ratio between benefit (utility/return) and cost, or VfM = f(cost/benefit). HM Treasury (2008) adds that VfM is a relative concept and measured in comparison with other outcomes. Thus, Figure 1 illustrates from an initial position (a particular mix or ratio of cost to benefit that might be represented by say the Public Sector Comparator or traditional government funded approach to procurement) any relative and alternative position associated with ( sectors/or positions A, B, C, D, E (for example, represented by Public-Private Partnerships bids) would constitute an improvement in VfM.

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Figure 1 conveys the relative concept of VfM in simple terms, however, demonstrating VfM is a major challenge for all governments - not least of which due to the scale, urgency and complexity of infrastructure but more fundamentally due to the act of procuring of a piece of infrastructure that is a unique event and which, therefore, escapes a categorical *ex post* (post contract/project completion) comparative analysis. In seeking to demonstrate VfM then, the emphasis is on the *estimation* of costs and benefits associated with alternative procurement modes. This paper proceeds to outline the challenge involved in estimating these costs and benefits and, in doing so, highlight weaknesses in current research and practice that may focus on a dominant performance outcome visible on the opening day of the asset in selecting the procurement mode. The paper then briefly describes a schematic of a new-first-order procurement decision making model to address these weaknesses.



Figure 1: Value map and value improvement curve (Bridge 1999)

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### 2. THE VFM CHALLENGE

Estimating costs and benefits of alternative modes of procurement is challenging for a number of reasons. For example, costs are whole life costs and require predictions of future repairs and maintenance. Furthermore, beyond near term capital costs and whole life costs (production costs) there are much less observable and more difficult to estimate transaction costs that comprise internal transaction costs and external transaction costs. These internal and external transaction costs occur in activities that are both internalised by government and in activities that are externalised by government. Some of these transaction costs are shown in Table 1.

Market transaction costs generated in the engagement and administration of both internal resources and external private sector firms are rarely captured in full by government and elude accurate estimation. In terms of bureaucracy costs, recent benchmarking studies and notably the study by Raisbeck, Duffield and Xu (2010), are beginning to shed light on the relative performance of different procurement modes. In this study, the relative performance or certainty of outcomes from Public Private Partnerships (PPP) versus traditional procurement is measured in terms of percentage change in time and cost - in three time periods from formal approval to the point at which the asset is delivered and begins its operation. This kind of empirical work indicates the benefits of procurement modes that incorporate more single point responsibility (associated with less separability through less internalisation) across a greater service scope including design, construction and operations and maintenance. In turn, this creates greater incentive alignment that induces greater positive production investment in securing time and cost certainty and helps displace negative investment directed at meeting contractual obligations to the letter only or in justifying avoiding contractual obligations (quality/performance shading).

The phenomenon associated with the quasi-rents is commonly referred to as hold-up and is the threat of the contractor/consortium behaving in a negative opportunistic way upon the occurrence of a change or variation in the works. Variations might occur perhaps during construction and/or during operations and maintenance and might see the contractor/consortium seeking to appropriate better terms (time and/or monies) from one or more of these variations. Hold-up can be prevented or reduced in its severity by the procurement approach. If the procurement mode successfully addresses hold-up, then no such post-contract transaction costs are observable and yet it is the mere threat or likelihood of hold-up that may inform the procurement approach. On top of the difficulties in estimating production costs and transaction costs, the estimation of benefit outcomes from alternative procurement modes and which may incorporate different design proposals, are subjective by definition in terms of aesthetics and difficult to evaluate completely objectively in terms of environmental impact. Moreover, other benefits or performance outcomes, for example concerning absolute/minimum time to deliver the infrastructure may again attract different utility values from various stakeholders. In summary, difficulties in estimating production costs and transaction costs seriously undermine attempts to objectively assess outcomes from alternative procurement modes. On the limitations of VfM tests and the Public Sector Comparator (PSC), the House of Lords Select Committee on Economic Affairs (2010) recommends that, "...its (PSC) value is limited by shortage of relevant data and by the selective inclusion of optimism bias. Even if these deficiencies were addressed as recommended above, public authorities should not rely solely on PSCs when choosing a procurement route".

## 3. WEAKNESSES IN CURRENT RESEARCH AND PRACTICE

Chang and Ive (2002) note that since the 1970s there have been around 900 studies relating to procurement systems and these authors observe, with reference to Love, Skitmore and Earl (1998), that amongst these studies the multi-attribute utility approach (MAUA) is regarded as the foremost technique appropriate for examining the criteria of clients and the preferences of expert weightings for each method in the most objective way. Rather than attempt to estimate actual production costs and transaction costs, MAUA starts with subjective weightings, mindful of the client's requirements and the nature of the project, and which are applied to a range of attributes considered important - with a consensus emerging on eight attributes: speed (early completion), price or time certainty, flexibility (to change design), quality standard (aesthetics; compliance with specification), Complexity (of building), risk allocation (transfer of risk), price competition, and responsibility (single point).

The rationalised weightings are then multiplied by a utility factor method is being at defined as a subset, or effectively in the same as the desired outcomes of the procurement and is, therefore, representing the extent to which a procurement method satisfies each attribute and the most appropriate procurement method is taken to be the one with the highest score. A major problem that exists with MAUA is that the most appropriate procurement terms tautological. A tautology is a statement of a relationship that is true by logic as in Popper's (1959) p-q example. That is, if cause (read procurement mode) and effect (read outcomes from the asset/desired attributes) are defined in the same terms, or if cause or effect are defined as a subset of each other, then the relationship is circular and considered a truism that is not falsifiable. There is nothing inherently negative about tautologies and, in fact, the acceptance of a tautology can be useful. For example, take an extreme case in which a government agency is faced with satisfying a dominant or key project performance outcome/attribute, say earliest completion. Here, the government agency may proceed from this outcome (effect) upstream to the procurement mode (cause) that is selected on the basis that this procurement mode's substantial strength (based on ex post empirical studies) equates to the desired key outcome - for illustrative purposes then, say Management Contracting. The selected procurement mode may then proceed to deliver the desired key outcome but at the same time may deliver lower performance outcomes/benefits than that achievable by other procurement modes - given the outcome/performance trade-off that exists amongst different procurement modes (Ive and Chang 2007).

The selected procurement mode may well also represent an inferior approach to economising on the sum of production costs and transaction costs - given a lack of attention to production improvements resulting from incentive alignment and costs arising from incomplete contracting (Chang and Ive 2002, Sweeney and Duffield 2006). Despite this, as the procurement mode selected may succeed in terms of the key performance outcome, then this should render the selected procurement a success - as all other benefits beyond the key performance outcome should be set at zero. On the basis that the procurement mode selected is largely the only mode able to deliver the key outcome required, then all other procurement modes will result in value deterioration (value curve moving towards the right in Figure 1) relative to the cost/benefit position achieved by the selected procurement mode. Accepting a tautology is useful in this case, as the government agency responsible for delivery should be judged solely on whether or not the procurement mode's was successful in delivering the key outcome.

Table 1: Costs of Internalisation and Costs of Externalization (Bridge et al. 2010)					
4 a. 474	Costs of internalised activity	Costs of externalised activity			
Production costs External transaction costs	<ul> <li>Direct costs of resources (salaries and on-costs; capital costs of equipment, buildings; operating costs).</li> <li>Costs of mistakes caused by internalised activity/ reworking by internal resources and reworking by external firms.</li> <li>Market transaction costs incurred in obtaining internal resources (staff; capital equipment; working space; consumables etc).</li> <li>Market transaction costs involved in operating and managing internal resources e e cost of Human Resource Department in</li> </ul>	<ul> <li>Prices; service charges; patronage costs; contracts etc with external firms.</li> <li>Market transaction costs incurred in finding, bidding and negotiating prices with external firms; executing external contracts; contract management and administration.</li> <li>Costs associated with appropriation of better terms on the occurrence of a variation (hold-up) at any stage of the</li> </ul>			
	managing staff.	project's construction and/or operation.			
Internal	• Bureaucracy costs associated with separability and lack of	• Loss of in-house knowledge, capability and competence.			
transaction costs	compliance (lack of certainty) with contracted cost, quality and time performance requirements.				
00565	• Bureaucracy costs associated with ownership/costs of low				
	power incentives (incentive misalignment/lack of positive production investments and induced negative investment or quality/performance shading).				

That is, VfM in nominal terms. Thus, this agency should then be relieved of having to demonstrate VfM in relative terms as defined previously. Much of the practiced-based research in the field of infrastructure procurement similarly focuses on project performance outcomes that are more readily observable at the opening day of an asset - concerning time, cost and quality and in an ex post (postcontract) fashion. That is, the advantages and disadvantages or relative merits of different procurement approaches are recorded and established from ongoing and/or completed projects. In the same way as MAUA, the relative merits approach is restricted indicating VfM in nominal terms. This paper assumes the case that government is seeking to deliver VfM in relative terms and can consider a range of performance outcomes/benefits attainable by a wide range of alternative procurement modes. Hence, the prevailing procurement mode is the mode that most closely corresponds with a priori theoretical predictions that includes production and transaction costs to indicate the best cost/benefit ratio. This assumption is realistic in terms of major infrastructure, on the basis that it is common practice to allow time to develop a PPP case whilst maintaining the option to revert to traditional procurement if necessary.

In Australia, a recent benchmarking study into alliancing in the public sector, recommends that State Treasuries collaborate to develop a comprehensive procurement selection guide (Department of Treasury and Finance Victoria, Evans and Peck and The University of Melbourne 2009). In doing so, and in order to move past current weaknesses in research and practice, any such comprehensive guide needs to have as its focus the conditions surrounding the project as the starting point of analysis and not the project performance outcomes. That is, conditions concerning the technological and physical attributes of the project, as well as the capabilities and competencies of government versus the private sector relative to the project. The project conditions represent what is to be measured, whilst a priori theory guides how these conditions are measured and the manner by which resultant measurements informs procurement selection. The dominant microeconomic theory, Transaction Cost Economics (TCE) pertaining to governance and procurement and developed by Oliver Williamson (2009 Nobel Prize for Economics) has been substantially ignored in the field of infrastructure procurement. Also largely ignored, is the dominant strategic management theory concerning procurement, Resource-Based Theory (RBT). Much of RBT is attributable to Jay Barney and in certain applications, including the make-or-buy decision (internalisation or externalisation of activities) both Williamson and Barney point to the complementary strengths of TCE and RBT and their integration (Williamson 1999, Barney 2002). Recent literature in the field of infrastructure procurement shows some signs of the application of TCE to procurement of major infrastructure procurement. For example, Duffield (2009) affirms the potential for TCE to contribute to the discussion of the most appropriate procurement strategy. Moreover, Bridge and Tisdell (2004) and Bridge (2008) have successfully developed and empirically tested an integration of TCE and RBT concerning the firm's/government's internalisation or externalisation decision. Bridge (2008) has also successfully developed and empirically tested TCE on the nature of the exchange decision.

The next section of this paper briefly sets-out a schematic of a new first-order procurement decision making model for public sector major infrastructure and which comprises five analytical and sequential tasks. This *a* priori model draws mainly from TCE; RBT and related theoretical and empirical work by Bridge and Tisdell (2004) and Bridge (2008). The model articulates the manner by which the determinants of transaction costs and production costs and/or benefits, as well as the conditions under which these different costs and benefits are likely to be dominant, can be harnessed to inform a procurement approach and which can then carry a justifiable claim as delivering superior VfM in relative terms to competing procurement modes.

# 4. SCHEMATIC OF NEW FIRST-ORDER PROCUREMENT DECISION MAKING MODEL

#### 4.1 Activity Analysis

The infrastructure project is broken down into activities using transaction costs and production cost/benefit logic. That is, a transaction cost occurs when a good or service is transferred across a technologically separable interface (Williamson 1981) and which helps create a natural division of labour. The extent to which division of labour will occur though, is explained by classical theory of production as turning on the extent of the market demand that generates scale economies, including the accumulation of knowledge of learning curve and which in turn justifies investments made in special purpose technology. Deploying this logic, the piece of infrastructure can be broken down into activities that correspond with the highest level of market specialisation. Such that, if there exists market firms specialising in an activity that lies within the boundaries of the project, then an activity has been identified. For example, a road project may comprise a number of technologically separable major work packages or supply chains, including major and minor civil engineering works; building works; mechanical and electrical works; and a tolling

system. Alternatively a project may comprise only one work package/supply chain. Within each work package or supply chain, there may be market firms that specialise in some part or all of the management and/or design and/or construction and/or operations and maintenance associated with the work package. The extent to which the project is decomposed into activities depends in the first instance on the local market and requires some iterative analysis between project and market.

#### 4.2 Internalisation Versus Externalisation Analysis

The decision whether to locate an activity within or outside the firm is known as the make-or-buy decision and it is this decision that determines the extent to which the firm is vertically integrated. In the context of this paper, the firm equates to the government and, therefore, this decision determines the vertical boundaries between the public sector and private sector in infrastructure projects. More specifically, the make decision, or internalisation, is a mode of operation in which government is able to exert direct control over resources and is wholly responsible for an activity. As such, this definition would include a contract of employment and a government agency. Whereas, the buy decision, or externalisation, comprises all other modes of operation. From an economic viewpoint, the make-or-buy decision turns on a comparison of value created through internationalisation versus externalization (again, depicted by Figure 1). It is unlikely that government will either wholly internalise the delivery of a piece of infrastructure or entirely externalise the delivery of an infrastructure project. Each of the non-core production activities comprising management; design; construction and operations and maintenance involves different technology bases and requires different bundles of competencies. with different capabilities and resources Fundamentally, naturally occurring opportunities to develop learning curve economies and economies of scale across and within each key activity will favour either government or the private sector. This creates differences between government and private sector in terms of capabilities and competence with respect to each of these key activities and their sub-activities and differences between government and the private sector in terms of the ability to manage risks associated with each key activity/sub-activity. In turn, this explains different value positions achievable by the private sector relative to that achievable by government with regard to each activity/sub-activity. In pursuance of achieving a final value position closest to the vertical axis, the better overall alternative for the project becomes some combination of government and private provision and this explains why VFM is best achieved through government making and buying activities within a piece of infrastructure.

Bridge and Tisdell (2004) have developed an integration of TCE and RBT based on the concept of a capability and competence spectrum between the firm/government and market. At the extremes, the firm/government and market have capabilities beyond each other in terms of certain activities. Such that, a capability/competence (RBT) logic dominates and which reflects minimising production costs and maximising production benefits. On the other hand, the firm/government and market may display similar levels of capability and competence relative to an activity and this time a transaction cost (TCE) logic (including bureaucracy costs and hold-up) is dominant in terms of assigning the activity to either government or private sector to minimise transaction costs. Bridge (2008) has successfully tested this integration and developed patterns of the RBT and TCE measures summarised in Table 2.

RBT measures concern the relative capability and competence of government versus the private sector relative to the activity and

TCE measures concern physical and technological attributes of the project. By applying these measurements to each activity in the project an actual pattern for each activity is generated that is matched with the closest predicted pattern in Table 2 and which indicates whether the activity should be internalised and externalised to achieve greatest effectiveness and efficiency, including the most efficient allocation of risks. This approach to identifying the party best able to manage risks associated with an activity is a significant departure from current practice. That is, instead of seeking to identify and estimate risks at an early developmental stage of the project, the focus is on resources held by government versus private sector and relative to each project activity as a means to more fundamentally and more reliably anticipate which party is best placed to manage risks associated with each activity. Jin and Doloi (2008) have identified the application of RBT and TCE in risk allocation but have done so from a risk management process perceptive. In contrast, application of Bridge and Tisdell's (2004) integration framework is at the level of the activity and, therefore, can contribute toward identifying the procurement mode that is likely to deliver superior VfM.

#### 4.3 Market Analysis

A structure-conduct-performance analysis is undertaken to identify the market structure surrounding each activity assigned to one of the four predictive patterns concerning externalization (4b; 5; 6; and 7). Bridge and Tisdell (2004) explain that these patterns have been developed to correspond with particular market structures, from perfect competition (Pattern 5) with a high level of price competition to market structures with much less price competition, such as oligopoly/duopoly/monopoly (Pattern 7).

Hence, this task provides a check against the actual patterns developed using the RBT and TCE measurements and which are matched to the closest predicted pattern. That is, the actual market structure surrounding the activity should also correspond with the predicted market structure associated with the predicted pattern. This task also helps eliminate the bundling together of design, construction, operations and maintenance activity where this would create insufficient competition. That is, any design, construction, operation and maintenance activities within the same work package/supply chain identified as a Pattern 7 activity would not be bundled if this would further reduce competition – given Pattern 7 activities already represents limited price competition associated with Pattern 7 oligopoly market structure.

#### 4.4 Bundling Analysis

To be clear about what this task does not seek to achieve. The purpose of contemplating whether or not to bundle Design and Construction (DC) or Design and Construction and Operations and Maintenance (DCOM) in this task is not directly in pursuance of project outcomes such as minimum time to complete project; or minimum life cycle/capital cost; or maximum control over the quality/aesthetic attributes of the project. Whilst bundling does affect these project outcomes, returning to the assumption explained in Section 3, the model assumes that government is able to accept the particular profile of time, cost and quality outcome that is represented by the procurement approach derived from the application of transaction cost and production cost theory in pursuance of the superior VfM (defined as a relative concept). Therefore, the purpose of this current task is to determine the level of bundling of activities within a project in pursuance of minimising bureaucracy costs (and thereby maximising certainty or

Table 2:	Externalisation or Internalisation of Activities	;
· · · · · · · · · · · · · · · · · · ·	(Bridge and Tisdell 2004)	

Pattern of RBT and			
TCE measurements (six key measurements)	Theory	Logic	Make- or-buy
Pattern 1	RBT	Product/production capability	Internal
Pattern 2	RBT	Production competence	Internal
Pattern 3	RBT/trans- action costs	Organisation competence	Internal
Pattern 4a	TCE	Hold-up/ transactional competence	Internal
Pattern 4b	TCE	Hold-up/ transactional competence	External
Pattern 5	RBT/trans- action costs	Organisation competence	External
Pattern 6	RBT .	Production competence	External
Pattern 7	RBT	Product/production capability	External
1. Provide La Contra de		and the second	

compliance with contracted time, cost and specification) and minimising the potential for hold-up (and therefore also improving certainty in terms of cost). The problem of bundling in this case, is that minimising bureaucracy costs involves greater use of singlepoint contact with a private sector firm across a wide range of activities (transfer of control to private sector firm), whilst minimising hold-up involves the greater use of internalised management (or via agent) and control over private sector firms. Thus, there is tension or a trade-off in the extent to which both types of transaction costs can be minimised.

To address this, all activities assigned as a Pattern 4b activity with a very high potential for hold-up (that have a very high level of asset specificity and very high level of uncertainty) can be excluded from bundling with other activities on the basis that government is better placed to manage potential hold-up in these activities if it directly engages and/or collaborates with the private sector firms supplying these activities. Additionally, some or all of the Pattern 7 activities might have already been excluded from bundling - as explained in the previous section. The remaining pattern 5 and 6 activities (and perhaps some or all of the Pattern 7 activities where their involvement in bundling is not considered to further reduce already minimal levels of competition) can then be bundled within their respective work package/supply chain to minimise bureaucracy costs and maximum certainty or compliance with contracted time, cost and specification. This approach is consistent with Hart's (2003) much cited development of incomplete contracting theory concerning PPPs and recommendations from the House of Lords Select Committee on Economics Affairs (2010) again concerning PPPs. Hart (2003) concludes that, "PPP is good if the quality of the service can be well specified in the initial contract (or, more generally, there are good performance measures which can be used to penalize the service provider), whereas the quality of the building cannot be". Moreover, the House of Lords (2010) recommend that, "the projects most suitable for private finance are those where the requirements can be clearly specified at the outset and which are of size that consortia or private sector companies can take on their balance sheets". Thus, projects incorporating a significant level of activity at Pattern 4b that correspond with lack of ability to specify and possibility some projects that are dominated by Pattern 7 activities and which correspond with lack of ability to specify and/or high degree of complexity/size are excluded from PPP analysis. The prospect of a PPP can may then usefully be considered in relation to any DCOM bundle indentified within the project/as representing the project (comprising Pattern 5 and/or 6 activities, and/or possibly Pattern 7 activities – where including Patter 7 activities in bundling is not considered to further reduce competition including due to size/complexity).

### 4.5 Exchange Relationship Analysis

Each private sector contract engaged by government to supply a single activity/service or bundled service will require government to determine the most efficient exchange relationship with the private sector firm at the head of the supply chain/bundle. The exchange relationship can be considered to be a continuum from a more traditional arms-length or discrete (classical/neo-classical contract) exchange to a relational exchange. A discrete relationship is inefficient when it includes costly to write credible threats concerning performance but which may be necessary to pre-empt hold-up by the contractor/consortium post contract. Bridge (2008) has successfully developed TCE on the issue of the external exchange relationship and the key outcome of this work is shown in Figure 2.

Contracts that are dominated by Pattern 4b activities (Box 1) have a very high potential for hold-up and government can more efficiently seek to control these contracts using more collaborative approaches or seek to share risk in an alliance fashion. Contracts dominated by Pattern 5 and 6 activities (Box 2) reflect the efficient transfer of risk and control to the contractor/consortium concerned. Standard neo-classical contracts can be deployed to obtain a fixed priced for construction only and/or DC and/or DCOM services. If a DCOM contract with private finance is being used in the case of Pattern 5 and 6 activities, then a conventional PPP arrangement is appropriate. Contracts that are dominated by Pattern 7 activities (Box 3) again have a very high potential for hold-up. This time, however, government lacks in-house capability and lacks access to agents to effectively collaborate with the contractor/consortium concerned in delivering design, construction or operations and maintenance. In transferring control to the contractor/consortium, government can seek assurances through writing contracts with credible threats concerning compliance with contracted performance. At the same time and given the very high scale/complexity of these projects, government may relax the desire for a fixed price - particularly if the contract involves DCOM services and private finance. Here, a non-conventional PPP may be appropriate, perhaps including some sharing of risks along with performance incentives.

#### **5. CONCLUSIONS**

This paper proposes a mind-set change in the practice of selecting the procurement mode from that which may begin with a dominant performance outcome visible at the opening day of an asset to an approach in which the analysis commences with the conditions pertaining to the project. The model outlined in this paper that reflects this change and differs significantly from Infrastructure Australia's five step process for selecting a delivery model and

Efficient exchange (naturally occurring) +++ Relational +	Efficient exchange + Discrete +++	Inefficient exchange + Discrete +++
TCE Assets pecificity + Uncertainty +/+++ Frequency +	0 0 0/+++ 0/+++ +/0 0	+ ++++ + +/+++ 0 0
1	- 2	3

Figure 2: Exchange relationship analysis (Bridge 2008)

Grimsey and Lewis' (2009) procurement framework. That is, the model in this paper goes beyond the project's scale/complexity and includes in as part of its starting conditions the capability and competence of government versus private sector relative to the project. Also, the model in this paper explicitly involves the integrative application of Nobel Prize winning and empirically tested transaction costs and production theory to measure the project conditions and then indicate a procurement approach. In terms of VfM, the practice of going from a focus on a dominant project performance outcome to selecting the procurement mode is restricted to delivering VfM in nominal terms. That is, the procurement mode either delivers or does not deliver on the performance outcome. If it does deliver on this outcome, then the procurement has been successful, even though it may under deliver on other performance outcomes - potentially achievable by other procurement modes and it may fail to minimise transaction costs, as no planned attempt is being made to address these transaction costs in the procurement selection. In contrast, the approach to procurement selection in this paper's model and which commences with conditions, can carry a justifiable claim that it delivers superior VfM in relative terms.

The first-order procurement decision making model in this paper could be complementary to the PSC, in so far as, the model may cross validate the PSC. Moreover, given that the transaction costs and production theory measurements are all indirect and do not require estimates in monetary terms, the first-order procurement decision making model then lends itself to public dissemination – when part or all of the PSC may or may not be made widely available. As alternative to the PSC, however, the first order procurement decision making model would save time and cost in not going to the full extent of detail as required in the reference project design associated with the PSC. Also, if a PPP is selected by following the first order procurement decision making model and in the absence of a reference project, then this may send a stronger signal to the private sector and which in turn may encourage more innovation and competition.

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Grimsey and Lewis' (2009) procurement framework. That is, the model in this paper goes beyond the project's scale/complexity and includes in as part of its starting conditions the capability and competence of government versus private sector relative to the project. Also, the model in this paper explicitly involves the integrative application of Nobel Prize winning and empirically tested transaction costs and production theory to measure the project conditions and then indicate a procurement approach. In terms of VfM, the practice of going from a focus on a dominant project performance outcome to selecting the procurement mode is restricted to delivering VfM in nominal terms. That is, the procurement mode either delivers or does not deliver on the performance outcome. If it does deliver on this outcome, then the procurement has been successful, even though it may under deliver on other performance outcomes - potentially achievable by other procurement modes and it may fail to minimise transaction costs, as no planned attempt is being made to address these transaction costs in the procurement selection. In contrast, the approach to procurement selection in this paper's model and which commences with conditions, can carry a justifiable claim that it delivers superior VfM in relative terms.

The first-order procurement decision making model in this paper could be complementary to the PSC, in so far as, the model may cross validate the PSC. Moreover, given that the transaction costs and production theory measurements are all indirect and do not require estimates in monetary terms, the first-order procurement decision making model then lends itself to public dissemination – when part or all of the PSC may or may not be made widely available. As alternative to the PSC, however, the first order procurement decision making model would save time and cost in not going to the full extent of detail as required in the reference project design associated with the PSC. Also, if a PPP is selected by following the first order procurement decision making model and in the absence of a reference project, then this may send a stronger signal to the private sector and which in turn may encourage more innovation and competition.

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