MODELS FOR ENGAGING PUBLIC-PRIVATE PARTNERSHIPS IN CIVIL INFRASTRUCTURE PROJECTS: A CASE OF 'HAVING YOUR CAKE AND EATING IT TOO'?

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ABSTRACT

Public-Private Partnerships (PPP) are established globally as an important mode of procurement and the features of PPP, not least of which the transfer of risk, appeal to governments and particularly in the current economic climate. There are many other advantages of PPP that are claimed as outweighing the costs of PPP and affording Value for Money (VfM) relative to traditionally financed projects or non-PPP. That said, it is the case that we lack comparative whole-life empirical studies of VfM in PPP and non-PPP. Whilst we await this kind of study, the pace and trajectory of PPP seem set to continue and so in the meantime, the virtues of seeking to improve PPP appear incontrovertible. The decision about which projects, or parts of projects, to offer to the market as a PPP and the decision concerning the allocation or sharing risks as part of engagement of the PPP consortium are among the most fundamental decisions that determine whether PPP deliver VfM. The focus in the paper is on latter decision concerning governments' attitudes towards risk and more specifically, the effect of this decision on the nature of the emergent PPP consortium, or *PPP model*, including its economic behavior and outcomes. This paper presents an exploration into the extent to which the seemingly incompatible alternatives of risk allocation and risk sharing, represented by the orthodox/conventional PPP model and the heterodox/alliance PPP model respectively, can be reconciled along with suggestions for new research directions to inform this reconciliation. In so doing, an important step is taken towards charting a path by which governments can harness the relative strengths of both kinds of PPP model.

KEYWORDS: Pubic-Private Partnerships; Risk; Consortia; Value for Money

INTRODUCTION

HM Treasury (1998) define Public-Private Partnerships (PPP) as "an arrangement between two or more entities that enables them to work cooperatively towards shared or compatible objectives and in that there is some degree of shared authority and responsibility, joint investment of resources, shared risk taking and mutual benefit". According to the Infrastructure Journal online database, there were 1,376 PPP worth a total of approximately USD 485 billion between 2005 – 2012, and more than 40 countries have adopted a PPP mode to procure infrastructure (Haran et al. 2013). The World Bank's Infrastructure Economics and Finance Department and Public-Private Infrastructure Advisory Facility project database (Private Participation in Infrastructure 2014) also recorded more than 5,000 PPPs in 139 low and middle income countries in the last thirty years from 1984 to 2012. Cleary, PPP are established as an important mode of procuring infrastructure and the persistent global economic downturn

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indicates that we are likely to see an increasing incidence of PPP. That is, the OECD (2006) estimates USD 53 trillion is required globally in the period 2007-2030 to address the desire for new infrastructure creating an infrastructure deficit and at the same time governments are facing acute fiscal constraints. Moreover, in many developed countries there is an associated loss of capacity to deliver projects using government agencies and which promotes PPP–as substantially more risks for the design, construction, operations and maintenance can be transferred to the private sector, than in traditionally procured government financed projects.

Beyond the transfer of risks, there are many other advantages of PPP that are claimed as outweighing the costs of PPP and affording Value for Money (VfM) relative to traditionally financed projects or non-PPP. HM Treasury (2008: 35) define 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 minimizing upfront prices..." And in terms of the period of use of goods or services, the UK National Audit Office (2004: 3) 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". Generally then, VfM can be seen as an economic concept incorporating productive efficiency and which, among other things, includes project finance principles (The Productivity Commission 2014: 70). In the context of this paper, VfM distils to achieving the best ratio between cost and benefits or *f(costs/benefits)* through the acquisition of infrastructure in whole-life terms, including an efficient financing vehicle. Furthermore, HM Treasury (2008) adds that VfM is a *relative* concept and can be measured in comparison with other outcomes. Again, in the context of this paper, that is the cost and benefits delivered by PPP versus non-PPP procurement.

However, there are severe challenges in attempting to directly assess VfM and which arise largely from the intractability of data and particularly measuring costs and benefits in the operations and maintenance stage of a facility. That is, costs are whole-life and include both internal and external transaction costs that are much less observable than the production costs (comprising finance, design, construction, operations and maintenance costs). Meanwhile, benefits comprise largely the effects of the facility on the core activity and which may be difficult to isolate and evaluate in an objective manner. For example in schools, the effects of the facility on educational outcomes need to be isolated from other key factors that affect educational outcomes including the quality of the teaching personnel and nature of the students.

As evidence of the difficulties in attempting to directly assess VfM, KPMG and University College London (2010) have started to generate comparable and quantitative data on the costs and benefits of various operational arrangements across both PPP and non-PPPs in the health and educational sectors. However, this work has a number of key weaknesses and KPMG and University College London (2010) acknowledge their work is a first step. Consistent with this, the National Audit Office (2011) note that "There is no clear data to conclude whether the use of PFI has led to demonstrably better or worse value for money than other forms of procurement." At the same time, Thomas (2011) suggests that non-PPPs are equally responsible for the uncertainty concerning the relative merits of PPPs versus non-PPPs given non-PPPs' lack of transparency and accountability in particular "currently the form of public accounts means that the overall costs of infrastructure – capital, life cycle and maintenance costs – are shown in a number of different budgets and there is no single point of control for these budgets". In summary, whilst we await comparative whole-life empirical studies of PPP and non-PPP and mindful of the likely continued pace and trajectory of PPP, the virtues of seeking to improve PPP seem incontrovertible.

The decision about which projects or part of projects to offer to the market as a PPP and the decision concerning the transfer, or allocation of risks, as opposed to sharing risks and as part of engagement of the PPP consortium, are amongst the most fundamental decisions that determine whether PPP will deliver VfM. The focus in the paper is on latter decision concerning government's attitudes towards risk and, more specifically, the effect of this decision on the nature of the emergent PPP consortium including its economic behavior and outcomes. Consortia for PPPs encompass the entire financing structure including the Special Purpose Vehicle (SPV) or PPP Company and which comprises the project manager and the project's sponsors. *Prima facie*, allocating risks (in terms of those risks retained by government or transferred to the PPP consortium) as opposed to sharing risks (between government and the PPP consortium) presents as a largely dichotomous decision and in conjunction with a corresponding choice between fundamentally different kinds of stereotypical PPP consortia and their associated relative merits. That is, it is conventional to see the use of risk matrices or tables summarizing the allocation of various kinds of risk between government and the PPP consortium and in which design, construction and operations and/or maintenance risks are predominantly transferred to the PPP consortium (Grimsey & Lewis 2004). Although in this conventional approach, some kinds of risks may be shared, for example, *force majeure*, it is much less common to see the sharing of risk across the majority of different categories of risk and in an alliance fashion (including government engaging in a pain/gain share regime). Indeed, a key feature of PPP is bundling and which involves the allocation or transfer of a significant level of design, construction, operations and/or maintenance risks to the PPP consortium, in order to create the highest powered incentive to contain or reduce projects costs and/or enhance utilization of the facility (Iossa & Martimort 2015: 23).

This paper presents an exploration into the extent to which the seemingly incompatible alternatives of risk allocation and risk sharing, represented by orthodox/conventional PPP consortia and heterodox/alliance PPP consortia respectively, can be reconciled along with suggestions for new research directions to inform this reconciliation. In so doing, an important step is taken towards charting a path by which governments can harness the relative strengths of both kinds of PPP model. For the purposes of this paper, and so as to avoid confusion with individual firms that make-up a consortium, the term 'PPP model' is used to represent PPP consortia (comprising financiers and the SPV or PPP Company).

The problem of competing choices of PPP model is first described in terms of an explanation of the way in which the PPP model contributes to VfM along with an account of the economic behavior, key features and the outcomes of the conventional PPP model and the alliance PPP model. This is followed by suggestions to improve the ratio of cost and benefits delivered by both these kinds of PPP model and which informs research directions to advance the PPP model, specifically, and PPP more generally.

CHOOSING A PPP MODEL

The Role of the PPP Model in Contributing to VfM

The PPP model contributes towards improving the ratio of costs and benefits and subsequently VfM in terms of the extent to which it represents an efficient financing vehicle comprising the cost of finance (the numerator) and production benefits (the denominator) and whose determinants are as follows (The Productivity Commission, 2009):

- Costs of finance is driven by: Project risk management (assignment of non-diversifiable projects risks and management of the overall project risk); Transaction costs (costs of arranging and managing finance, and costs associated with delay or uncertainties with available finance); and information asymmetry (how much borrowers and lenders share, signal and can act on information on project prospects and risks in the investment decision); Information discovery that can add substantially to transaction costs. Here, uncertainties will be reflected in higher premiums required by investors and the finance vehicle can influence the incentives for the parties to share their information and hence the allocation of resources.
- Production benefits comprise whole-life cost savings arising from improvements in construction, operations and maintenance and/or enhancements to front-line service and which are driven by opportunities for innovations in the bundle of works in conjunction with incentives to innovate, including competition at bid stage and an environment that is conducive to innovations post-bid.

The economic behavior of conventional and alliance PPP models and the manner and extent to which these kinds of models contribute to VfM, and in turn, define their contrasting key features. These differences and features emerge in response to governments' decision to either allocate risk or share risk.

The Conventional PPP Model

When risks are allocated by the government to the PPP Company, in conjunction with an established rate of remuneration/availability charge or a concession by government to allow the PPP Company to collect and retain receipts directly from users, the PPP consortium will respond by seeking to prioritize containing risks - in pursuance of protecting its internal rates of return. Examples of behavior consistent with the PPP consortium seeking to contain risks and which produce signature features of this model are evident in the arrangement of the project's capital structure and in the management and governance of the project.

With regard to project finance, Williamson (1988) treats debt and equity mainly as alternative governance structures and argues that debt finance is efficient in the case of assets that are redeployable because debt finance works out of rules. In contrast, Williamson sees equity in project finance as more efficient when the asset is non-redeployable because equity exhibits discretion. As such, a predominantly debt-based approach to the capital structure of many civil infrastructure projects appears to be efficient as these assets are largely redeployable, in so far as, they are likely to generate a pool of interested buyers and can be sold-on, for example, a toll road. Indeed, it is usual for debt to comprise the substantial component of the capital structure of civil infrastructure PPP (usually over 70 percent) and this is a key feature of the conventional PPP model (Asenova & Beck 2003). Senior debt determines the bankability of project including seeking to satisfy itself that the PPP Company can deliver the project on time and to budget in order to start to generate the revenues and in such a way that it can service the

debt (Ye 2009). Among other things, this determines the nature and extent, or balance of any subordinate debt and equity from sponsors with the PPP Company. These downstream outcomes are driven by the requirements of senior debt that reduce the overall cost of senior debt but which are not necessarily best for VfM (that reflects the whole-life of the asset).

The project management of the PPP Company that emerges in response to governments' decision to allocate risk is also consistent with containing risks. That is, it often the case that the PPP Company is led by either a contractor or an investment bank (Grimsey & Lewis 2004). Furthermore, it is not uncommon for these kinds of initial project managers to sell their equity in the project and exit the PPP Company. These kinds of entity managing the PPP Company and their economic behavior, is driven by short-term realization of profits and another trait of the conventional PPP model. Whilst this behavior is conducive to containing risks, in particular construction risks, and delivering the asset on or before schedule and on budget, again, it is not necessarily best for VfM.

The governance and contractual structure that the project manager develops within the PPP Company accordingly promotes time and cost certainty and compliance with service requirements. As evidence of this, a further defining feature of the conventional PPP model is a rigid structure including a heavy reliance on Turnkey or Design & Construct agreements *within* the PPP Company's main concession agreement (Tiong & Anderson 2003). Turnkey or Design & Contract contracts have advantages in reducing the overall period of time for construction and minimizing construction costs (Ive & Chang 2007). These approaches to completing the design and construction works achieve benefits in time and cost through the development of *tried and tested* techniques and processes that contribute to containing risks. At the same time, innovations in design and construction rarely appear (Duffield & Clifton 2009; Eaton & Akbiyikli 2009; Leiringer 2006). Not surprisingly then, Turnkey and Design & Construct agreements are notorious for delivering standard design outcomes and which may not fully exploit the potential of the Facility Manager/Operator to influence the design to reduce whole-life costs and/or enhance the user's core activity (Baldwin 2003; Brewer et al. 2012; McDowell 2003). Hence, we can expect the conventional PPP model to similarly deliver routine designs.

Although there is a lack of comparative whole-life empirical studies of PPP and non-PPP, there is evidence that the conventional PPP model delivers superior outcomes to non-PPP procurement in terms of time and cost certainty to the end of construction and start of operations (for example, Raisbeck, Duffield & Xu 2010). This study and others provide strong corroborative evidence of the theory given in this section on the effect of government's decision to allocate risk and the subsequent economic behavior and defining features of the conventional PPP model. As such, we can anticipate the conventional PPP model, as a financing vehicle, to be strong in terms of cost of finance (numerator) and also in terms of production costs (part of the denominator) – *to the extent* that whole-life cost savings can be achieved using tried and tested techniques and processes. On this point, there is evidence that significant reductions in whole-life costs can be achieved through the accumulation of many small scale improvements and arising from the smart deployment of tried and tested approaches (Grimsey & Lewis 2004). Grimsey and Lewis (2004: 2) define a PPP as "arrangements whereby private parties participate in, or provide support for, the provision of infrastructure, and a PPP project results in a contract for a private entity to deliver public infrastructure-based services". It is interesting to contrast this definition with that of the HM Treasury's definition in the introduction, and it seems that Grimsey and Lewis's version is much closer to the conventional PPP model.

However, in projects attempting to deliver outcomes that are extremely complex and unusual (for example, infrastructure of an iconic nature) and when current technology is insufficient and which necessitates technological innovations including experimental technology, then we can anticipate that the conventional PPP model will fall short of delivering required outcomes in these cases. That is, taking risks and experimenting is a prerequisite to innovation and which is the opposite to the *modus operandi* of the conventional PPP model that seeks to contain risks. Hence, we expect this conventional PPP model to be weak in terms of production benefits (the other part of the denominator) and, correspondingly, weak in extremely complex and unusual projects requiring innovations. In contrast, we can expect the alliance PPP model to be superior in these kinds of projects.

Alliance-Based PPP Models

Clifton & Duffield (2006) consider that alliancing will address the weakness of the conventional PPP model in terms of fostering ongoing innovation. An alliance contract is a form of relational exchange and Clifton & Duffield select Gallagher & Hutchinson's (2003) definition of an alliance contract as: "an agreement between parties to work cooperatively to achieve agreed outcomes on the basis of sharing risks and rewards". Clifton & Duffield then refer Ross (2001) who considers that alliances have the following features:

- The proponent or owner underwrites projects costs;
- All parties win or lose together;
- Reimbursement to the non-owner participants (NOPs) is 100 percent open book and structured so that the NOPs receive an equitable sharing of gain and pain depending on how actual outcomes compare with pre-agreed targets in costs and non-cost performance areas;
- All decisions are made by the Project Alliance Board (PAB) and are to be unanimous. The PAB comprises representatives from each participant;
- All members of the integrated project team are selected on a 'best for project' basis, headed by a Project Manager;
- There is a strong commitment to resolve issues within the alliance with no recourse to litigation, except in a limited class of prescribed 'Events of Default'; and
- All aspects of the project delivery are focused on high performance teamwork and *breakthrough* (authors emphasis) outcomes founded on an alliance charter that sets out the mission, objectives and behavioral commitments of the participations.

As such, it seems that a PPP model based on alliance principles is much closer to the HM Treasury definition of a PPP than that developed by Grimsey & Lewis in relation to the conventional PPP model. Clifton & Duffield (2006) propose an alliance PPP model including changes during construction and service delivery managed by a gain and pain share mechanism as per typical alliance contracts. More specifically, they propose that the gain share regime involves time, cost and production measures or enhanced revenues, as well as subjective performance objectives including stakeholder advocacy, end user satisfaction and team member satisfaction. Clifton & Duffield note that these measures are established by the process of workshops including the target price (rather than established through a competitive bid) and that alliances are only suitable for a few project types that are high risk and complex and in which the project scope is not clearly defined. Forward and Aldis (n.d.) propose a similar alliance-based PPP model and reach similar conclusions on the application of this kind of PPP model that turn on the extent to which the project is likely to exhibit change.

All of this speaks to the maxim 'place the risk with the party best able to manage it'. This has less application in projects that suit alliancing, as the conditions surrounding the project are uncertain and/or the technology to be deployed in the project is not tried and tested and hence *ex ante* competencies across government and private sector are levelled and unable to inform which party is best placed to manage risk. Such that risk allocation in these cases, will result in unduly high prices incorporating a premium for risks that can't be adequately identified and assessed. There are now many examples of projects claimed as successful and delivered by alliancing using government finance and including iconic buildings, such as the National Museum of Australia that incorporated innovation in design and construction and opened in 2001.

In terms of PPP, however, Clifton & Duffield acknowledge limitations arising from the alliance PPP model that amount to serious impediments to adopting this alternative to the conventional PPP model and *even in projects that suit alliancing*. Key amongst these impediments are governments' desire for cost certainty associated with risk transfer and a lack of willingness of financiers to engage in a model with open-ended exposure. Since Clifton & Duffield's article, however, there has been positive movement in terms of private sector finance. More specifically, equity to engage in an alliance-based PPP model for greenfield projects. For example, in Australia (that is ranked fourth globally, in terms of superannuation funds under management - at over USD 1.3 trillion) Industry Super Australia (ISA, 2014) has proposed a new "Inverted Bid Model" (IBM) on behalf of Australia's largest industry super funds but also to reflect other sources of equity including sovereign wealth funds and equity from overseas. ISA's IBM has a number of features consistent with those listed above including an 'open book' for the tender of design and construction, operation and maintenance and residual debt. This approach is similar to the Aggregator Model in the UK and unsolicited bids more generally.

Although there are examples of progress with equity's appetite to accept an open-book environment in terms of greenfield infrastructure, governments' desire for cost certainty associated with risk transfer, as mentioned in the introduction, has though increased since the Global Financial Crisis and it would appear set to increase further, as many developed countries continue to face severe fiscal challenges. In which case, the uptake of alliance-based PPP may well remain muted. Beyond this, governments do have good reason to be cautious when considering committing to an alliance-based contract. That is, it's important to appreciate that alliance contracts for the delivery of infrastructure is only a form of relational contracting and falls short of a genuine relational exchange. To illustrate this, Bridge (2008) develops a trust-commitment-relationship (TCR) trinity to clarify the relationship between Transaction Cost Economics (TCE) and nature of exchange relationship, as shown in Figure 1.

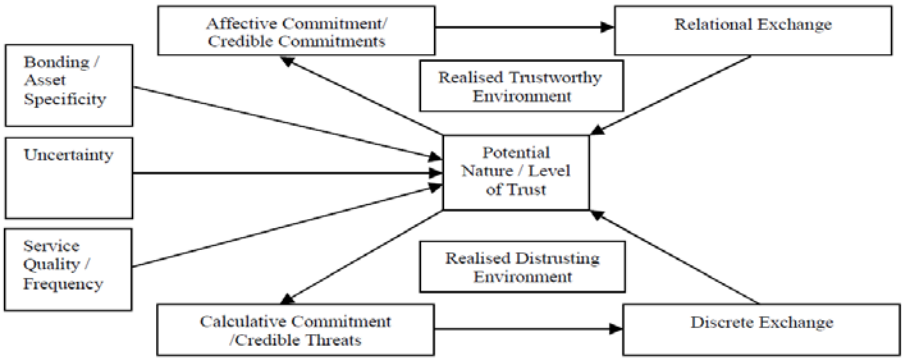

Figure 1: The TCR trinity (Bridge 2008)

Bridge (2008) then operationalize the TCR trinity in conjunction with conceptualizing the nature of the external exchange relationship as a continuum from relational exchange to discrete exchange, as per Figure 2.

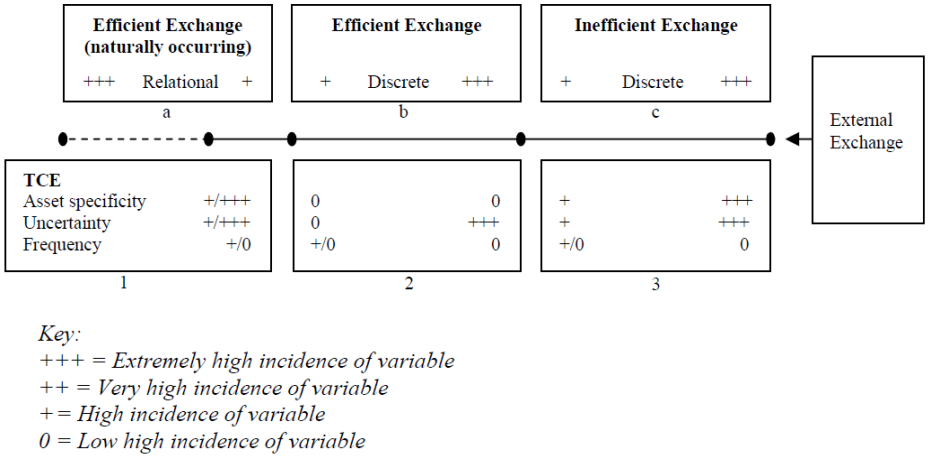

Figure 2: Operationalizing the TCR trinity (Bridge 2008)

Figures 1 and 2 indicate that in the presence of high levels of asset specificity, uncertainty and frequency, a high level of trust and commitment can ensue and with a lesser reliance on contractual safeguards; hence, TCE predicts a naturally occurring relational exchange. At the other extreme and in the absence of a high level of frequency, a distrusting atmosphere with the likelihood of negative opportunism can prevail. Here, the exchange relationship is highly discrete and it becomes appropriate to deploy credible threats, such as penalties for non-performance. Returning to the issue of alliance-based contracts in infrastructure falling short of a genuine relational exchange, we can see that the kinds of projects that best suit the alliance PPP model are likely to be rare and therefore governments are not able to generate follow-on projects for the alliance-PPP consortia delivering the focal project. Even if government could generate a pipeline of these kinds of projects, transparency and accountability prevents governments from generating a genuine relationship with PPP consortia, as government needs to tender and appraise bidders on the same criteria on the occasion of each new project. In other words, frequency will remain very low in terms of the procurement of alliance PPP and the prospect of negative opportunist behaviour on the part of the PPP consortia will remain very high.

As such, the best that government can achieve in terms of an alliance PPP model is a contrived relational exchange. In pursuance of this, there remains a lack of empirical tested theory to guide optimum incentive design in the context of major infrastructure and so government needs to exercise high levels of skill and judgment in this regard. More specifically, Rose and Manley (2010) highlight the importance of striking the right balance across a range of matters concerning motivation including stakeholder involvement; contract and relationship intentions; price negotiation; performance and incentive goals and fair and flexible performance measures. Clearly, this is not a straightforward task and Rose and Manley note that the cost is high in failing to achieve the best balance of incentives and measurement. This would be exacerbated in the case of an alliance PPP that is likely a very large project and with a natural tendency for the PPP consortia to resort to negative opportunistic because of the lack of preconditions for a naturally occurring relational exchange.

In summary, we can anticipate that the alliance PPP model, as a financing vehicle, is weak in terms of cost of finance. That is, even if private finance in form of equity is extended to comprise the majority of the capital structure, the required returns and costs of this finance are likely to be high and quite possibly prohibitive in all cases except perhaps some projects in which the demand and revenues can be estimated with a very high level of precision and confidence. In projects in which demand and revenue are less predictable, government could consider underwriting equity's Internal Rate of Return but then this adds to governments' on-book contingent liability that affects governments' credit ratings, and ultimately government then absorbs the lion's share of the project's risk and which runs counter to genuine relational exchange. Even in projects in which demand and revenues can be predicted with a high level of confidence, the lesser track record and incidence of the alliance PPP model, compared to the conventional model, coupled with the alliance PPP model's 'open book' environment, is likely to generate a high cost of debt finance – and perhaps worse, forcing institutions providing debt away from considering involvement in these projects. We also consider the alliance PPP model to be weak in terms of production costs and more specifically the level of whole-life costs - as prices, or the budget, is established in negotiation and not under competitive tension. Transaction costs in arranging finance and establishing and maintaining the consortia may also be higher in an alliance PPP model. There is also always going to be the lurking prospect of market failure *ex post* and resulting from negative opportunistic behaviour on the part of the PPP consortia in appropriating quasi-rents and super profits from variations in the works – if government does not strike the right balance in terms of incentives and performance measures. Here, governments could consider developing a guaranteed contract sum, in conjunction with a gain-pain share regime, as is common in alliance construction projects. Again though, this would increase the already likely high level of production costs. All that said, the potential for the alliance PPP model to leverage its environment that fosters innovations and, in so doing, go far beyond the reach of the conventional PPP model in terms of production benefits that include delivering outcomes that radically enhance the front-line service and/or deliver shifts in technology and new ways of working, cannot be ignored.

Reconciling the seemingly irreconcilable

The idiom *'You can't have your cake and eat it'* is mostly interpreted as you can't have the best of both worlds and two incompatible things. In the context of this paper, this is presented above in terms of choosing between the conventional PPP model (driven by risk allocation) or the alliance PPP model (associated with risk sharing). That is, risk allocation and risk sharing are considered as effectively incompatible and so at the level of individual projects it's considered substantially a choice of either one of the two PPP models. However, at the level of a portfolio of projects government can deploy both models by choosing (supported by theory, for example TCE) the alliance PPP model when the project is extremely unusual and complex and requires advances in technology and/or new ways of working – driven by innovations, and in all other projects (likely to be the substantial majority of cases) governments can select the conventional PPP model.

Other interpretations of the idiom relax the issue of strict incompatibility and convey opportunity costs or trade-off. This version of the idiom is worth of exploring in the context of this paper and in terms of individual projects. That is, the imperative of seeking to improve the cost and benefits delivered by the PPP model is heightened when the VfM hurdle is increased

with governments' low cost of borrowing and when government agencies demonstrate competence in the project management and governance of an unbundled project (that is, separate contracts for design; construction; operations and maintenance direct to government). The VfM hurdle is also increased where there are economies of scale in activities in the project that are common with ongoing activities elsewhere in the jurisdiction. For example, routine maintenance of roads across a county or a state that can yield economies of scale when government procure this activity across a network of roads and which then increases the need for the PPP Company to work harder to find efficiencies to offset these economies of scale and justify undertaking the maintenance of the road it has constructed - as separate to other roads in the network maintained as part of an area-wide contract.

A paradox then develops in countries in which these conditions prevail, especially in those countries whose governments are experiencing record low levels of cost of borrowing and have access to public agencies with procurement competencies across the range of projects suited to the conventional PPP including more straight forward projects. That is, these governments may *want* more PPP but find they *need* to present a much higher VfM hurdle to potential PPP consortia. Therefore, there is a strong and urgent case for seeking to improve, in particular, the conventional PPP model. And as the alliance PPP model will suit certain type of projects, however rare these may be, there must also be merit in seeking to improve the alliance PPP model. At this point then, there is value in being speculative in beginning to articulate potential improvements to both PPP models and as a stepping stone towards identifying research directions that are the most likely to deliver the greatest return.

POTENTIAL IMPROVEMENTS AND RESEARCH DIRECTIONS

All PPP models

The literature on PPP models is patchy. However, it can be pieced together to present the PPP model as a problem of substantially two competing choices. The first is the orthodox or conventional model based on risk allocation and whose strength lies in certainty of defined outcomes for government including budget certainty, but whose weakness is thought to arise from a lack of innovations that pertain to production benefits and which limit how much the conventional PPP model will deliver a facility that enhances utilization or front-line activity. The second is the heterodox alternative or alliance-based PPP model that whilst expected to be strong in terms of innovations and potential to enhance front-line activity, lacks budget certainty.

Given the lack of veracity of the literature and the dearth of empirical studies on the efficacy of the PPP model, there appears to be much value in firstly developing a wide-ranging and deep data base or baseline of data that explores the key underlying position developed in this paper. That is, this data base would establish across the globe the prevalence of the majority risk allocation approach or conventional PPP model, as opposed government engaging in a risk sharing approach including a gain/pain share regime as part of an alliance-based PPP model and including surfacing the proportion of models that differ by degree between these extremes (albeit expected to be the least represented category). Additionally, this baseline data would test the expected relative of strengths of the conventional PPP model in terms of time and budget certainty and the expected relative strengths of the alliance-based PPP model with regard to innovations.

The Conventional PPP Model

Again, given the weaknesses in the literature and lack of depth and breadth of empirical studies on the efficacy of the PPP model, the following suggestions and corresponding research are *a priori* and seek to enhance the efficiency of the conventional PPP Model by building on its expected strengths in terms of containing risk and seeking to address it expected weaknesses by developing a more conducive environment to innovations. More specifically, the following are suggestions for empirical investigations and include the need to assess their effect on VfM;

- The role of finance: Optimizing the capital structure, including the most appropriate balance of debt and equity (across differences project sizes and sectors); the effect of different sources of equity; and the extent to which equity is at risk.
- The role of project management: Composition of sponsors; which sponsor leads the PPP Company; and the extent to which performance of the project manager is moderated by lock-in requirements that prevent the project manager selling their equity and exiting the PPP Company.
- The role of government and contract administration: Ways to allow the Operator or Facility Manager greater influence on the design, for example, ruling-out the use of Turnkey and Design & Construct contracts within the PPP Company.
- Explicit incentives for innovations: Mechanisms to encourage innovations, for example, a fund or bonuses for innovation.

Alliance-Based PPP Models

The most obvious avenue for investigation in the alliance PPP model concerns establishing the right balance of incentives and seeking to optimize the drivers of this balance surfaced by Rose and Manley (including stakeholder involvement; contract and relationship intentions; price negotiation; performance and incentive goals and fair and flexible performance measures). This research is being developed in a construction context and so there are opportunities to explore this work in a PPP context.

Hybrid PPP Models?

We can gaze even further into the possible improvements in the PPP model that combine features of the conventional PPP model and the alliance-based PPP model to seek to harness the relative merits of risk allocation and risk sharing. For example, we can explore conventionally procured PPP models in terms of the extent to which the PPP Company applies alliancing principles with its company. To the extent that alliancing principles applied by the PPP Company under the conventional model are in isolation from the government, there may well be room for improvement including again the issue of striking the right balance of incentives. We can also investigate the effects of competitive alliances, in which the budget is established in competition amongst a number of PPP consortia and not as a result of negotiation between government and one PPP consortia. More radically, we can examine government combining the conventional PPP model and the alliance-based PPP model albeit in a sequential fashion. For example, the government might commence a PPP with an alliance approach and perhaps to end of construction but then revert to the conventional PPP mode in operations. Imagining new ways of configuring PPP models enlightens the search for examples or informative outliers in practice

that match or might be close to these hybrid types of PPP models and the basis of developing and testing new hypotheses.

CONCLUSION

Based on a thin literature on the efficacy of competing PPP models and in theory, the conventional PPP model is expected to be relative strong in terms of time and budget certainty whilst the alliance-based PPP model relatively strong with regard to innovations. Furthermore, the conventional PPP model is assessed as having greater appeal in terms of its application to a far wider range of projects but appears to be under great stress and under conditions in which government has access to low costs of borrowing; is concerned to protect its credit rating and retains procurement competence in delivering an appreciable proportion of the types of project to which the conventional PPP model is suited.

Whilst we await clearer direction from comparative whole-life empirical studies of VfM in PPP and non-PPP infrastructure and mindful of the global pace and trajectory of PPP, the virtues of seeking to improve PPP generally, and both the conventional and alliance PPP models more specifically, seem incontrovertible. As such, what is now clear is that there is an urgent need to develop a deep and wide-ranging set of data through a global study that delivers this rich data in a coordinated and coherent manner, and with a view to creating a framework to facilitate the empirical investigations suggested in this paper.

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