Ranked Critical Factors in PPP Briefings

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Abstract: Public-private partnerships (PPPs) are increasingly used to procure Australian infrastructure projects. As with all construction projects, the early briefing stages are often the most crucial in determining a successful outcome. There is, however, a lack of systematic research on the type and nature of the critical factors affecting the effectiveness and efficiency of PPP during this period. A literature review is presented of PPP usage in Australia, in which four main categories of factors (procurement, stakeholder, risk, and finance) are identified, each with several subfactors. A questionnaire survey involving state government stakeholders is also described, and a mathematical model that ranks the factors involved is developed. This is followed by an examination of the potential of the factors to help improve the PPP briefing stage for both public and private sectors. **DOI: 10.1061/(ASCE)ME.1943-5479.0000131.** © *2013 American Society of Civil Engineers.*

CE Database subject headings: Procurement; Risk management; Financial factors; Partnerships; Private sector; Australia; Construction industry; Infrastructure.

Author keywords: Critical factors; Procurement; Stakeholder; Risk; Finance; Briefing stage; Public-private partnership; Infrastructure; Questionnaire survey; Queensland; Australia.

Introduction

Public-private partnership (PPP) is defined as "a procurement method [in] which projects are part of a broader spectrum of contractual relationships between the public and private sectors to produce an asset and/or deliver a service. They are distinct from early contractor involvement, alliancing, management contracting, traditional procurement (design & construct) and other procurement methods" (Infrastructure Australia 2008). Public-private partnerships in Australia can be traced back to the 1980s and 1990s, such as the Gateway Motorway and Bridge, Brisbane (completed in 1986), the Sydney Harbour Tunnel (completed in 1992), and the Sydney Olympic infrastructure (completed in 1999). Three recently completed large-scale PPP projects in Queensland are the Southbank Institute (2004) and North-South Bypass Tunnel (2006), followed by the Brisbane Airport Link project in 2008. The Harbour Tunnel and Stadium Australia in Sydney; the M2, M4, and M5 tollways in New South Wales (NSW); and the Ord River Hydroelectric Scheme in Western Australia provide other examples of Australian PPPs in transport projects (Duffield 2001; Jefferies and Chen 2004).

Duffield (2005) classifies PPPs in Australia into first and second generation in a policy document released by the Victorian government entitled *Partnerships Victoria*. This guideline was produced with the intention of securing the financial and efficient benefits that involvement of the private sector can provide without compromising community needs (Victorian Government 2001). The first generation was led by the public sector to gain access to private capital by a near full transference of project risks. Whereas in second generation of PPPs, state governments sought to directly control core services and share value-for-money outcomes with the private sector. One of the most recently released policies relating to PPPs from the Australian Department of Finance and Administration (2005) states that PPPs should be used where they can offer superior value for money outcomes relative to other procurement methods.

In addition, it has been felt by many that alternative procurement and finance arrangements for infrastructure projects are needed in the recent conditions of global credit market shocks to inject much needed capital and with a greater sharing of risks. Many governments have responded to the economic crises by providing economic stimulus packages, and because infrastructure projects have a significant effect on economic and social activities, the Australian government is expanding private-sector involvement in this by increasing the number of its PPP projects.

The combination of these factors has given New South Wales, for example, an enviable reputation for cooperating with the private sector in the delivery of public infrastructures, particularly in roads, railways, and Olympic projects. A report entitled *Working with government: Guidelines for privately financed projects* was recently published by New South Wales Treasury (2006) to increase the benefits of and comment on the issues and concerns held by the private sector to help reinforce relationships between the public and private sectors and gain acceptance of new policies.

Social infrastructure projects such as schools, courts, and hospitals are targets for the use of PPPs in Australia. As higher levels of architectural design are required for these building types, projects risks in the form of quantitative definitions of value for money are the focus of policy makers (Commonwealth of Australia 2006; New South Wales Treasury 2006). Participants in states such as Western Australia suggest that they would like to use more PPPs with an alliance agreement. Compared with Western Australia,

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Note. This manuscript was submitted on August 23, 2011; approved on April 24, 2012; published online on April 27, 2012. Discussion period open until September 1, 2013; separate discussions must be submitted for individual papers. This paper is part of the ***Journal of Management in Engineering***, Vol. 29, No. 2, April 1, 2013. © ASCE, ISSN 0742-597X/2013/2-164-171/$25.00.

however, New South Wales and Victoria have taken quick action to profit from their previous experiences in the use and selection of PPPs for infrastructure projects (Love et al. 2008).

With its large topographical landscape and rapidly growing urban sprawl, the emphasis on traditional economic infrastructure projects such as roads appears to be set to continue in the future in Australia. As a result of their more-defined revenue streams, the use of PPPs to procure these kinds of projects appears to have been successful. However, their application to social infrastructure projects such as hospitals and schools seems to be rather less so (Jefferies 2006). Meanwhile, state governments in Australia continue to devolve their control of core activities to the private sector, especially during the operations stage (Curnow et al. 2005) to the point where it may be that the involvement of the private sector is reaching an unsustainable level as their scope for recovering sufficient financial rewards diminishes.

PPP Briefing Stage

A brief is a formal document produced at the end of the project briefing stage that defines the detailed stakeholder requirements. The briefing stage was defined by Kelly and Duerk (2002) as "the process of gathering, analyzing, and synthesizing information needed in the building process in order to inform decision-making and decision implementation." The term *architectural programming* is normally used in the United States to present a similar stage (Yu 2006). Architectural programming was defined by Hershberger (1999) as "the first stage of the architectural design process in which the relevant values of the client, user, architect, and society are identified; important project goals are articulated; facts about the project are uncovered; and facility needs are made explicit." Gathering site and regulatory information, forming the project team and consultants, presenting design ideas and project team experience, and testing the project's economic structure are all activities involved in the briefing stage.

Decisions made in briefing need to be clearly recorded for architects to be aware of their likely consequences in practice (Andreu and Oreszczyn 2004). Industry has attempted to improve the briefing stage to better capture client/owner needs, and several aids have been developed, such as the web-based tool proposed by Hansen and Vanegas (2003), to automate the briefing stage and provide clear statements of client/owner requirements to streamline information gathering and retain knowledge. Other techniques, such as fuzzy logic and quality function deployment (Yang et al. 2003; Seo et al. 2004), have also been developed to enhance the briefing process.

Because of the importance of PPP and briefing, several studies have sought to identify their critical success factors. For example, Kumaraswamy et al. (2007), Salman et al. (2007), Jefferies et al. (2002), and Thomas et al. (2003) identified the factors affecting the success of PPPs in many countries, including Australia. The factors that influence briefing have also been identified (e.g., Yu 2006), but no studies to date have focused on the critical factors involved in PPP briefing. The research presented in this paper, therefore, addresses this gap in knowledge. This can be divided into four main groupings: (1) procurement issues, (2) stakeholder issues, (3) risk issues, and (4) finance issues.

Procurement Issues

Analysis of the existing literature indicates 15 procurement-related factors (Table 1). For example, Leung et al. (2008) suggest that formal briefing sessions and regular formal meetings influence project success and participant satisfaction in construction projects. Also, the Hong Kong survey of Yu et al. (2008) found significant implications for industry practitioners in producing briefing guidelines, whereas the Construction Industry Board (1997) suggests that a clear and agreed objective and carefully thought-out requirements are critical for the success of the briefing process, with the former requiring an understanding of the values of the organization. In addition, Blyth and Worthington (2001) found defining the process, timely decision making, and other key areas to be essential to briefing success, whereas London et al. (2005) found establishing the client/owner's requirements to be a problematic issue.

Stakeholder Issues

Achieving efficiency and effectiveness of relationships among stakeholders during the briefing process is considered by many to be especially crucial in PPPs. From the literature, 18 factors that may affect this were identified (Table 2). For example, the Construction Industry Board (1997) claims that trusting relationships among stakeholders are important; Blyth and Worthington (2001) consider clear and comprehensive communication to be key aspects; and Chan et al. (2003) find that improved relationship among project participants and improved communication among project participants produced the most significant benefits obtained from partnering in PPP projects.

Different experiences and lessons from projects allow stakeholders to respond more freely to the briefing document. More

Table 1. Procurement-Related Factors

Factors	Remarks
Clear goals and objectives	Briefing is a process that should have a clear goal and/or objectives.
Experience of the brief writer	An experienced person is needed to develop a brief.
Clear end-user requirements	A brief needs to make clear what the end-user requirements are.
Development of a framework agreed by the key parties	During briefing, the process to formulate a brief needs to be agreed by the key parties.
Control of process	The public sector should lead throughout the briefing process.
Adequate time for briefing	Briefing should be allocated with adequate time.
Consensus building	A consensus of the brief among the various stakeholders needs to be developed during the briefing stage.
Proper priority setting	Priority of decision to be made should be agreed by the key parties in briefing.
Time for freezing of brief documents	A schedule should be set for the completion of the brief.
Flexibility of briefs to cater for changes	Flexibility in briefs should be provided to cater for possible changes.
Good record of decisions made	Decisions made should be recorded in details.
Identification of client/owner requirements	Client/owner requirements should be identified during briefing.
Thorough understanding of client/owner requirements	Client/owner requirements should be thoroughly understood.
Feedback from completed projects	Feedbacks from completed projects are needed to improve briefing.
Clear and precise briefing documents	A clear and precise brief should be available at the end of the briefing.

J. Manage. Eng. 2013.29:164-171.

Table 2. Stakeholder-Related Factors

Factors	Remarks
Experience of the client	Client/owner should have related experience of briefing.
Clear management structure	Client/owner needs a clear management organization structure for briefing.
Knowledge of client's responsibility	Knowledge of the client's responsibility is needed.
Skillful guidance and advice from project manager	Project manager should give appropriate guidance and advice during briefing.
Holding workshops for stakeholders	Workshops for stakeholders should be held regularly.
Good facilitation	Good facilitation of briefing should be given to stakeholders.
Selection of briefing team	Briefing team needs proper participant selection.
Clarity of roles of stakeholders	Roles of stakeholders should be clarified clearly.
Sufficient consultation with stakeholders	Briefing needs sufficient consultation with stakeholders.
Experience of stakeholder group	Stakeholders' experience of attending briefing should be considered.
Balance of the needs/requirements of different stakeholders	Needs/requirements of different stakeholders need to be balanced.
Knowledge of consultants	Knowledge of consultants should be considered.
Knowledge of statutory and lease control of the project	Knowledge of statutory and concession period control of the project are needed in briefing.
Team commitment	Team commitment should be clear.
Honesty	Honesty among stakeholders is critical for briefing.
Openness and trust	Openness and trust should be built among stakeholders.
Open and effective communication	Briefing needs open and effective communication.
Agreement of brief by all relevant parties	Agreement on the brief should be obtained among all relevant parties.

public and private sector cooperation results in the sharing of more knowledge about the briefing stage (Jin and Doloi 2008). Balancing requirements among partnerships is critical, as too much or too little contribution from both sides can lead to overlaps or oversights of activities and risks. Similarly, Jin and Doloi (2008) also claim the effective management of cross-cultural business communications during the briefing stages to be an equally crucial issue.

Risk Issues

In Australia, PPP is seen as an opportunity for state governments to avoid risks by purchasing outputs. Therefore, it is never too late for risks to be allocated in PPP briefing. How well the private sector manages the risks transferred to it and how the public sector manages the contract over the concession period influence the extent to which long-term value for money can be achieved in PPPs (Australian Department of Finance and Administration 2005). It is necessary, therefore, to identify the key risks during PPP briefing and explicate initial thinking on risk allocation. These considerations, in conjunction with the findings in the literature, resulted in the identification of nine factors relating to risk issues in the PPP briefing stage, summarized in Table 3.

Finance Issues

The final set of six finance-related factors is summarized in Table 4. For example, Akintoye et al. (2003) found that key factors include the high cost of the procurement process, lengthy and complex negotiations, difficulty in specifying the quality of service needed, pricing facilities management services, potential conflicts

Table 3. Risk-Related Factors

Factors	Remarks
Commencement of risk register	Risk issues needs to be identified in the briefing stage.
Special risk assessment	Special risk assessment should be set for the brief.
Quantification of consequences of risks	Consequences of quantitative project risks should be considered.
Estimation of risk probabilities	Probability of project risks should be estimated.
Calculation of risk values	Cost of project risks should be calculated in briefing.
Identification of desired risk allocation	Desired project risk allocation should be determined during briefing.
Possible allocation of responsibilities and risks between the government and the private sector	Possible allocation of responsibilities and risks of the project between the government and the private sector should be set in the brief.
Good measurement of risk management/mitigation	Risk mitigation management of the project needs to be well measured.
Calculation of transferable and retained risks	Project-related transferable and retained risks should be calculated in the brief.

Table 4. Finance-Related Factors

Factors	Remarks
Practical budget and program	Practical budget and program of the project are needed.
Prepared bidding for funds through the RAE process	Bidding for funds from the government should be prepared via the policy bureau through the resource allocation exercise process.
Conduct of socioeconomic studies	Socioeconomic studies regarding the project should be conducted.
Demonstration of how PPP can achieve the best value for money	Whether and how PPP can achieve the best value for money should be indicated.
Proposed commercial arrangement	Proposed commercial arrangements, including contract duration, payment mechanism, and other partnership/financial arrangements, should be formulated in the brief.
Good financial standing of the private partner	Good financial standing of the private partner needs to be considered in briefing.

of interests among those involved, and the public sector clients/owners' inability to manage consultants. These factors appear to be critical to solving the financing issues of PPPs. Funding and budget need to be established and allocated during PPP briefing. In Western Australia, for example, the use of PPPs has been very limited, and they have not been typically ascribed to the public sector's procurement portfolio as has happened in other states. Usually, the proposed procurement approach does not allow for the consideration of PPP options mainly because political and financial issues need to be considered by the state's Department of Treasury (Love et al. 2010).

Research Method

The empirical research comprised a questionnaire survey of government departments directly involved in PPPs and was conducted in southeast Queensland from August to October 2010. The target departments were the Department of Education and Training, Department of Infrastructure and Planning, Department of Transport and Main Roads, and Department of Treasury. All have working experience with PPP projects, including Brisbane's Southbank Institute, North-South Bypass Tunnel, and the Airport Link project. Seventy-eight completed questionnaires were received, representing a response rate of 26.4%.

Respondents answered the questionnaire basing on a particular PPP project in which they had participated. They answered in two sections: (1) background information, mainly relating to the type and nature of the PPP project involved, and their role and experience in the project; and (2) the four categories of factors (procurement-related, stakeholder-related, risk-related, and finance-related) likely to affect the success of PPP briefing, rated on a Likert scale of 1–5, where 1 represents "strongly disagree" and 5 represents "strongly agree."

Data Analysis

More than half of the respondents (56.4%) work in infrastructure projects (including railways, tunnels, and roads), whereas 43.6% had experience in PPP building projects such as hospitals and schools. All except one response relate to new build work. Twenty respondents (25.6%) are from professional groups, including contractor/suppliers, engineers, and surveyors, and the remaining 50 (74.4%) are managers (administrators, client/owner representatives, contract managers, financial managers, and legislative councillors). In all, 47 and 31 respondents, respectively, are directly and indirectly involved in the briefing stage.

Homogeneity Tests

Before calculating values for the factor rankings, comparisons based on different background variables were made to test the homogeneity of the data. Table 5 provides the mean scores for each of the procurement-related factors for the buildings and infrastructure projects together with the two-tailed t-test p values. This indicates significantly different ($p < 0.05$) mean scores for nine factors. In general, therefore, it seems that the results are not homogeneous across project types, with the procurement-related factors having a higher influence on building projects than infrastructure projects.

Similar results were also obtained in comparing the mean scores of stakeholder-related, risk-related, and finance-related factors, with 13, 5, and 3 significant differences, respectively (see the appendix).

As contractors and clients always have different opinions in the briefing stage, homogeneity tests were also carried out on this aspect, again with similar results showing many significant differences in mean factor scores for the contract of client/owner respondents (see the appendix).

Ranking Analysis

In view of the heterogeneous nature of the data, it is clear that the different background information of PPPs should be considered. To do this, samples in which background information is closer to the majority of the collected data was assigned a higher score, and vice versa. Denoting the number of respondent by N, each respondent is represented as a vector, where the dimension is the same as the factor number. The sample is denoted as $\mathbf{x}_i = (x_{i,1}, x_{i,2}, \ldots, x_{i,d}) \in R^d$, where d is the dimension number. The background information variables can be regarded as class labels (Duda et al. 2000; Bishop 2006; Hastie et al. 2008) used to distinguish the samples from the different groups. Consequently, the data from the 78 respondents are grouped into several classes of background information. For example, respondents who chose the same type of the PPP project are grouped into one class. The class label for $\mathbf{x}_i$ is denoted as l_i. A variable k is introduced to represent the different background information types. This ranges from 1 to 4 to denote the type of the PPP project, the nature of the PPP project, the role in the PPP project, and the experience from the PPP project, respectively.

Table 5. Type of PPPs and Procurement-Related Factors

Factors	p (two tailed)	Average mean	Mean of infrastructure projects	Mean of building projects
Clear goal and objectives	0.000	4.73	4.52	5.00
Identification of client/owner requirements	0.000	4.73	4.52	5.00
Clear and precise briefing documents	0.000	4.73	4.52	5.00
Feedback from completed projects	0.000	4.67	4.41	5.00
Thorough understanding of client/owner requirements	0.000	4.60	4.30	5.00
Good record of decisions made	0.000	4.59	4.27	5.00
Flexibility of briefs to cater for changes	0.014	4.56	4.39	4.79
Time for freezing of brief documents	0.000	4.46	4.05	5.00
Proper priority setting	0.005	4.01	3.86	4.21
Experience of the brief writer	0.104			
Clear end-user requirements	0.068			
Development of a framework agreed by the key parties	0.674			
Control of process	0.073			
Adequate time for briefing	0.104			
Consensus building	0.481			

To distinguish the data sample in each background group, the weight for each sample $\mathbf{x}_i$ is defined as

$$w_{\mathbf{x}_i} = \frac{1}{4}\sum_{k=1}^{4} w_{l_i}^k = \frac{1}{4}(w_{l_i}^1 + w_{l_i}^2 + w_{l_i}^3 + w_{l_i}^4) \quad (1)$$

where $w_{l_i}^k$ = weight for $\mathbf{x}_i$ with class label l_i in background type k.

For background information type k, the weight is computed as

$$w_{l_i}^k = \exp\left(-\frac{1}{2}(\boldsymbol{\mu}_{l_i}^k - \boldsymbol{\mu}^k)^T\Sigma^{-1}(\boldsymbol{\mu}_{l_i}^k - \boldsymbol{\mu}^k)\right)$$
$$= \exp\left(-\frac{1}{2}(\boldsymbol{\mu}_{l_i}^k - \boldsymbol{\mu})^T\Sigma^{-1}(\boldsymbol{\mu}_{l_i}^k - \boldsymbol{\mu})\right) \quad (2)$$

where $\boldsymbol{\mu}_{l_i}^k$ is the mean of class l_i in the background variable k; $\boldsymbol{\mu}^k = \boldsymbol{\mu}$ is the mean of total N data samples; and Σ is the covariance matrix of data, which is

$$\Sigma = \frac{1}{N-1}\sum_{i=1}^{N}(\mathbf{x}_i - \boldsymbol{\mu})(\mathbf{x}_i - \boldsymbol{\mu})^T \quad (3)$$

The weight score in Eq. (2) is used to reduce the influence of the outlying distributed data samples. For example, if the class mean $\boldsymbol{\mu}_{l_i}^k$ in background class k is far away from the total data mean $\boldsymbol{\mu}$, a small weight is given to the sample $\mathbf{x}_i$ with class l_i. Contrarily, if the class $\boldsymbol{\mu}_{l_i}^k$ in background class k is near to the total data mean $\boldsymbol{\mu}$, a large weight is given because the samples in that background variable represent the majority of the collected data. The covariance matrix Σ is used to compute a better distance function instead of the Euclidean distance (Duda et al. 2000). Moreover, the weight ranges from 0 to 1.

The weight for background k is the same as the exponential term of a multivariate Gaussian distribution in class l_i:

$$\frac{1}{(2\pi)^{d/2}}\frac{1}{|\Sigma|^{1/2}}\exp\left(-\frac{1}{2}(\boldsymbol{\mu}_{l_i}^k - \boldsymbol{\mu})^T\Sigma^{-1}(\boldsymbol{\mu}_{l_i}^k - \boldsymbol{\mu})\right) \quad (4)$$

which ignores the constant term. A similar weighting scheme has been widely used in nonparametric kernel methods (Schölkopf and Smola 2001), neural networkbased machine learning (Bishop 2006), and manifold approximation (Belkin and Niyogi 2005).

Recall that in Eq. (1), the weight indicates that if a data sample is close to the majority of all the four background variables, it is allocated a large weight in computing the final ranking. The final ranking score for factor j is thus calculated as

$$r_j = \sum_{i=1}^{N} w_{\mathbf{x}_i}x_{i,j} = w_{\mathbf{x}_1}x_{1,j} + w_{\mathbf{x}_2}x_{2,j} + \cdots + w_{\mathbf{x}_N}x_{N,j} \quad (5)$$

and the results are shown in Table 6.

This indicates that the "experience of the brief writer" (3.23) is considered by the respondents to be the most important procurement-related factor in PPP briefing. "Adequate time for briefing" (3.22) and "control of process" (3.18) occupy the second and third positions in the ranking list. The least important factors, on the other hand, are "time for freezing of brief documents" (2.87), "development of a framework agreed by the key parties" (2.75), and "proper priority setting" (2.62).

In terms of stakeholder-related factors, "open and effective communication" (3.21) is the most important factor, followed by "skillful guidance and advice from project manager" (3.17) and "openness and trust" (3.13) (Table 7). These three factors provide the opportunity for all stakeholders involved in briefing to have direct access to PPPs with firsthand knowledge of plans and requirements. Related staff can immediately answer questions and provide detailed advice in such a culture and environment.

Table 6. Ranking Scores of Procurement-Related Factors

Factors	Ranking score
Experience of the brief writer	3.23
Adequate time for briefing	3.22
Control of process	3.18
Identification of client/owner requirements	3.05
Clear goals and objectives	3.04
Clear and precise briefing documents	3.03
Feedback from completed projects	3.02
Thorough understanding of client/owner requirements	2.99
Clear end-user requirements	2.96
Consensus building	2.94
Good record of decisions made	2.93
Flexibility of briefs to cater for changes	2.92
Time for freezing of brief documents	2.87
Development of a framework agreed by the key parties	2.75
Proper priority setting	2.62

"Commencement of risk register" (3.27), "quantification of consequences of risks" (3.25), and "calculation of transferable risks and retained risks" (3.22) are the top three risk-related factors in PPP briefing (Table 8), reflecting that it is never too early to identify risks in PPPs and that risks are properly identified and allocated to the parties who are best able to manage them. Some Australian officers explained that the reasons the three lowest factors were less important in the factor list were that risks, such as those involving the price of materials, change with international markets and are thus impossible to evaluate in advance.

Finally, Table 9 shows "practical budget and program" (3.41) and "proposed commercial arrangement" (3.31) as the most important finance-related factor, with "demonstration of how PPP can achieve the best value for money" (3.01) and "prepared bidding for funds through the resource allocation exercise (RAE) process" (2.80) as the least important. In summary, officers in state governments of Australia pay more attention to a reasonable budget and procurement program than value for money during PPP briefing. Twenty government respondents who have been directly involved in briefing stages of PPPs claimed that market soundings were more worthy of consideration than financial standing of the private partner in the very early stage of PPP projects.

Table 7. Ranking Scores of Stakeholder-Related Factors

Factors	Ranking score
Open and effective communication	3.21
Skillful guidance and advice from project manager	3.17
Openness and trust	3.13
Clarity of roles of stakeholders	3.12
Holding workshops for stakeholders	3.07
Knowledge of statutory and lease control of the project	3.04
Selection of briefing team	3.03
Experience of the client	3.00
Knowledge of client's responsibility	2.99
Honesty	2.98
Knowledge of consultants	2.96
Clear management structure	2.95
Experience of stakeholder group	2.94
Sufficient consultation with stakeholders	2.93
Team commitment	2.86
Good facilitation	2.82
Balance of the needs/requirements of different stakeholders	2.78
Agreement of brief by all relevant parties	2.67

Table 8. Ranking Scores of Risk-Related Factors

Factors	Ranking score
Commencement of risk register	3.27
Quantification of consequences of risks	3.25
Calculation of transferable and retained risks	3.22
Estimation of risk probabilities	3.21
Special risk assessment	3.17
Possible allocation of responsibilities and risks between the government and the private sector	3.13
Calculation of risk values	3.12
Identification of desired risk allocation	3.03
Good measurement of risk management/mitigation	2.86

Table 9. Ranking Scores of Finance-Related Factors

Factors	Ranking score
Practical budget and program	3.41
Proposed commercial arrangement	3.31
Good financial standing of the private partner	3.23
Conduct of socioeconomic studies	3.16
Demonstration of how PPP can achieve the best value for money	3.01
Prepared bidding for funds through the RAE process	2.80

Conclusion

Public-private partnerships have become more and more popular for the delivery of Australian public sector services after its initial official adoption by the federal government in the 1980s. Of particular importance is the briefing stage of the PPP process, where the parties' requirements are negotiated and policies are formed. During this stage, the public and private sectors share the responsibility for procurement, stakeholder relationships, risk allocation, and financial arrangements.

Despite its importance, however, PPP briefing and associated influencing factors have received little scrutiny to date. To rectify this, four main factor categories are identified—procurement, stakeholder, risk, and finance. Of the procurement factors, the most important are the need for experienced brief writers, adequate time, and process control to ensure the briefing stage passes smoothly. For the stakeholder factors, an open and effective communication environment is most important for both public and private sectors to adequately understand the stakeholders' requirements rather than depending on relayed information at a later stage. For the risk factors, identifying important risks involved needs to start as early as possible with consideration of possible risk transfer. The most important finance factors are concerned with the public sector paying attention to practical budget issues and the proposed commercial arrangements, including contract duration and payment mechanisms. The limitation of this study is that the population of the survey comprise public sector bodies, including state governments. However, the identified factors for the PPP briefing stage provide an opportunity for both state governments and industry to develop a more workable model that is better suited to Australian situations to achieve the success of PPP projects. The private sector also could obtain valuable information on public sector needs during the briefing stage in practice. Further research would benefit from the collection of views from the private sector relating to these factors.

Appendix. Results of Homogeneity Tests

Table 10 shows the results of homogeneity tests for various factors based on the type of PPPs, and Table 11 shows the results of homogeneity tests for various factors based on the role of PPPs.

Table 10. Type of PPPs

Factors	p (two tailed)	Average mean	Mean of infrastructure projects	Mean of building projects
Stakeholder-related factors				
Open and effective communication	0.043	4.94	4.89 (0.05)	5.00 (0.06)
Skillful guidance and advice from project manager	0.001	4.91	5.00 (0.09)	4.79 (0.12)
Clarity of roles of stakeholders	0.001	4.86	4.75 (0.11)	5.00 (0.14)
Holding workshops for stakeholders	0.031	4.76	4.89 (0.13)	4.59 (0.17)
Knowledge of statutory and lease control of the project	0.000	4.73	4.52 (0.21)	5.00 (0.27)
Knowledge of clients business	0.013	4.64	4.52 (0.12)	4.79 (0.15)
Honesty	0.013	4.64	4.52 (0.12)	4.79 (0.15)
Clear management structure	0.000	4.58	4.41 (0.17)	4.79 (0.21)
Sufficient consultation with stakeholders	0.000	4.53	4.16 (0.37)	5.00 (0.47)
Experience of stakeholder group	0.000	4.46	4.73 (0.27)	4.12 (0.34)
Good facilitation	0.000	4.37	4.05 (0.32)	4.79 (0.42)
Agreement of brief by all relevant parties	0.000	4.12	4.43 (0.31)	3.71 (0.41)
Experience of the client	0.334			
Selection of briefing team	0.133			
Balance of the needs requirements of different stakeholders	0.062			
Knowledge of consultants	0.028			
Team commitment	0.050			
Openness and trust	0.269			
Risk-related factors				
Quantification of consequences of risks	0.043	4.94	4.89 (0.05)	5.00 (0.06)
Calculation of transferable and retained risks	0.043	4.87	4.77 (0.10)	5.00 (0.13)
Special risk assessment	0.001	4.86	4.75 (0.11)	5.00 (0.14)
Identification of desired risk allocation	0.000	4.60	4.30 (0.30)	5.00 (0.40)
Good measurement of risk management/mitigation	0.000	4.37	4.05 (0.32)	4.79 (0.42)
Commencement of risk register	0.174			
Estimation of probabilities of risk	0.895			

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Table 10. (*Continued*.)

Factors	*p* (two tailed)	Average mean	Mean of infrastructure projects	Mean of building projects
Calculation of risk values	0.310			
Possible allocation of responsibilities and risks	0.668			
Finance-related factors				
Conduct of socioeconomic studies	0.000	4.60	4.30 (0.30)	5.00 (0.40)
Demonstration of how PPP can achieve the best value for money	0.000	4.46	4.05 (0.41)	5.00 (0.54)
Prepared bidding for funds through the RAE process	0.000	4.12	3.80 (0.32)	4.53 (0.41)
Practical budget and program	0.360			
Proposed commercial arrangement	0.269			
Good financial standing of the private partner	0.652			

Table 11. Role of PPPs

Factors	*p* (two tailed)	Average mean	Mean of contractors	Mean of clients
Procurement-related factors				
Control of process	0.002	4.90	4.60 (0.30)	5.00 (0.10)
Clear goal and objectives	0.000	4.73	5.00 (0.27)	4.55 (0.18)
Identification of client/owner requirements	0.000	4.73	5.00 (0.27)	4.55 (0.18)
Clear and precise briefing documents	0.000	4.73	5.00 (0.27)	4.55 (0.18)
Feedback from completed projects	0.011	4.67	4.75 (0.08)	4.55 (0.12)
Clear end-user requirements	0.000	4.59	5.00 (0.41)	4.55 (0.04)
Good record of decisions made	0.000	4.59	5.00 (0.41)	4.32 (0.27)
Flexibility of briefs to cater for changes	0.016	4.56	4.75 (0.19)	4.38 (0.18)
Consensus building	0.000	4.51	4.20 (0.31)	4.77 (0.26)
Time for freezing of brief documents	0.000	4.46	4.50 (0.04)	4.32 (0.14)
Development of a framework agreed by the key parties	0.001	4.31	4.50 (0.19)	4.06 (0.25)
Proper priority setting	0.001	4.01	3.65 (0.36)	4.17 (0.16)
Experience of the brief writer	0.104			
Thorough understanding of client/owner requirements	0.061			
Adequate time for briefing	0.104			
Stakeholder-related factors				
Open and effective communication	0.000	4.94	4.75 (0.19)	5.00 (0.06)
Clarity of roles of stakeholders	0.014	4.86	5.00 (0.14)	4.77 (0.09)
Knowledge of statutory and lease control of the project	0.000	4.73	5.00 (0.27)	4.55 (0.18)
Selection of briefing team	0.037	4.71	4.75 (0.04)	4.62 (0.09)
Knowledge of clients business	0.000	4.64	5.00 (0.36)	4.40 (0.24)
Honesty	0.000	4.64	5.00 (0.36)	4.40 (0.24)
Knowledge of consultants	0.000	4.63	5.00 (0.37)	4.38 (0.25)
Experience of the client	0.000	4.58	4.25 (0.33)	4.85 (0.27)
Clear management structure	0.000	4.58	4.75 (0.17)	4.40 (0.18)
Sufficient consultation with stakeholders	0.048	4.53	4.25 (0.28)	4.53 (0.00)
Experience of stakeholder group	0.000	4.46	3.80 (0.66)	4.85 (0.39)
Team commitment	0.002	4.42	4.50 (0.08)	4.26 (0.16)
Good facilitation	0.000	4.37	4.50 (0.13)	4.17 (0.20)
Balance of the needs requirements of different stakeholders	0.000	4.36	5.00 (0.64)	3.94 (0.42)
Skillful guidance and advice from project manager	0.080			
Holding workshops for stakeholders	0.346			
Openness and trust	0.185			
Agreement of brief by all relevant parties	0.221			
Risk-related factors				
Quantification of consequences of risks	0.000	4.94	4.75 (0.19)	5.00 (0.06)
Calculation of transferable and retained risks	0.000	4.87	4.50 (0.37)	5.00 (0.13)
Special risk assessment	0.014	4.86	5.00 (0.14)	4.77 (0.09)
Estimation of probabilities of risk	0.000	4.86	4.45 (0.41)	5.00 (0.14)
Possible allocation of responsibilities and risks	0.000	4.73	4.50 (0.23)	5.00 (0.27)
Calculation value of risks	0.000	4.72	4.25 (0.47)	4.85 (0.13)
Good measurement of risk management/mitigation	0.000	4.37	4.50 (0.13)	4.17 (0.20)
Commencement of risk register	0.399			
Identification of desired risk allocation	0.061			
Finance-related factors				
Good financial standing of the private partner	0.000	4.77	5.00 (0.23)	4.62 (0.15)
Demonstration of how PPP can achieve the best value for money	0.000	4.46	5.00 (0.54)	4.11 (0.35)
Prepared bidding for funds through the RAE process	0.001	4.12	4.00 (0.12)	3.96 (0.16)

Table 11. (*Continued*.)

Factors	p (two tailed)	Average mean	Mean of contractors	Mean of clients
Practical budget and program	0.207			
Conduct of socioeconomic studies	0.061			
Proposed commercial arrangement	0.185			

Acknowledgments

The research was supported by a grant from the Hong Kong Polytechnic University. The first author is grateful to Queensland University of Technology for their appointment of visiting professor and provision of facilities to carry out this research.

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