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# PROCEEDINGS

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# Understanding the Factors Critical to Success of PPPs in New Zealand: Public and Private Sector Standpoint

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## ABSTRACT

Funding modern day projects in the face of declining public reserve pools has influenced the scale of infrastructure provision. Public private partnership (PPP) emerged as an effective solution for delivering infrastructure in many countries. However, not all projects have been reported successful. Literature suggests that an understanding of critical success factors (CSFs) is imperative to achieving project goals/successes, hence CSFs for PPPs has generated research interests worldwide. However, there is little to no research in this area in New Zealand. To address this gap, this study established a rank-order of CSFs, which could improve the delivery of future PPP projects in New Zealand. 27 CSFs were identified from the review of literature and presented to PPP practitioners, to capture their perceptions in New Zealand. The questionnaire survey was essentially Likert scaled. Findings revealed that “client’s brief”, “sound economic policy”, “approval and negotiation process”, “project’s technical feasibility” and “competitive procurement process” are five top ranked factors overall. A comparison between the perceptions of public and private sector respondents is also drawn to highlight the difference in opinions of these practitioners. The results of the study can assist stakeholders in policy formulation and investment related decision-making.

**Keywords:** Public private partnerships, Mean value analysis, Critical success factors, Infrastructure

## 1 Introduction

Infrastructure demand is on the rise with the ever-growing urban population worldwide (Mcnichol et. al., 2015). Governments are struggling to keep up with such high level of investments in infrastructure. Hence, innovative procurement methods, which involve the private sector, have become a necessity to remedy this situation. One such method is public private partnerships, which helps public sector to achieve its goal of infrastructure provision by tapping into resources of private sector. Moreover, it provides private sector an opportunity to capitalize on its investment. Public private partnership is a popular choice for project delivery and has grown in the recent years with a key reason being the unprecedented lack of economic growth all over the world (Kleimeier & Versteeg, 2010). PPP has been utilized to deliver transport,

telecommunication and energy sector projects for infrastructure expansion in numerous cases (Carnis & Yuliawati, 2013). A key reason behind increasing popularity of PPPs worldwide is the execution of numerous successful projects (Hodge & Greve, 2007). It has been used to achieve value for money with the help of private sector involvement in countries like China, UK, Malaysia and Australia (Chou & Pramudawardhani, 2015). In past, provision, improvement and operation of general infrastructure was achieved using public finances. However, after the rise of PPP more recently, public sector is using private sector’s expertise to provide infrastructure (Iossa & Martimort, 2015; Bwanali & Rwelamila, 2017). Private sector is normally engaged through the use of concession contracts for a pre-determined period of time (Ross & Yan, 2015). The incentive for application of PPP lies primarily in its

## PROCEEDINGS

6<sup>th</sup> New Zealand Built Environment Research Symposium (NZBERS 2020)

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ability to allocate different risks to the project parties (Sastoque et al., 2016). However, if not managed properly, these risks can result in project failure as well. For this reason, PPP is not considered suitable for projects having high amounts of uncertainty and insecurity of cash flows (Blanc-Brude & Makovsek, 2013). It is rarely used for research and development activities, product launching and other possible risk heavy endeavors. So, projects having manageable risks and well-established operating methodologies are ideal candidates for PPP application (Grimsey & Lewis 2007). These risks can be related to different project stages such as conception, planning, construction and operation.

New Zealand government showed its interest in pursuing PPP option for infrastructure development in 2009. Infrastructure Transaction Unit (ITU) was established to streamline the process for PPP implementation (Liu & Wilkinson, 2011). PPP policy published by the government highlighted its intentions to prefer PPP over traditional methods of delivery provided they deliver value for money (Treasury New Zealand, 2015). National Infrastructure Plan issued in 2010, stressed Government's priorities for infrastructure and its willingness to use PPPs across sectors. Mayoral position paper on PPPs, published in 2013, identified PPPs as a viable procurement strategy in New Zealand (EY, 2013).

Hobsonville schools project was the first project procured through "Design, Build, Finance and Maintain (DBFM)" modality of PPP under a concession contract of 25 years in 2012 (Treasury New Zealand, 2018). Since then, ten new social infrastructure projects, including schools and prisons, have been launched and executed, most of which are in operation stage. Furthermore, two road infrastructure projects are in their construction stage (Treasury New Zealand, 2018).

With the increasing popularity of PPPs internationally, a few numbers of areas related to PPP have been researched upon. A considerable attention has been paid to research domains relevant to relationship management, government regulation and guarantees, procurement and legal issues within PPPs (Osei-Kyei & Chan, 2015). A research trend established by Zhang et al. (2016) by systematically reviewing PPP literature in Chinese and international journals revealed PPP success factors as a promising area for research. Ke et al. (2009) also stressed the importance of this area in his study, which established seven major areas for PPP research. It is evident from such indicators that research interest in

this area will only grow, as PPPs are continuously being applied in other markets around the world.

Al-Saadi & Abdou (2016) suggests that critical success factors are considered vital for successful implementation of PPP projects. Various research methods such as interviews, questionnaires and case studies have been used in the past to investigate these CSFs in numerous countries. However, there is little known about these CSFs in countries such as New Zealand which have just began to adopt PPPs. This study aims to address this gap by investigating the factors critical for success of PPP projects in New Zealand perspective.

## 2 Literature Review

According to Sehgal & Dubey (2019) CSFs are those particular features and activities of a project, which result in its favorable result when followed in execution of the project. The concept of CSFs has been around since the 1970s (Osei-Kyei & Chan, 2015). Its application in numerous areas such as information systems, business services and manufacturing industry has been observed as a managerial tool (Li et al., 2005). Jefferies (2006) argued that these factors have a positive influence on the outcome of the project if managed periodically.

Since the early 1990s, several researchers have applied this idea of CSFs to formulate and understand PPP policy and guidelines (Zhang et al., 2016). A lot of research has been undertaken to identify CSFs in countries such as UK, Australia, China, Singapore, Malaysia, Nigeria and Ghana (Li et al., 2005; Jefferies et al., 2002; Jefferies, 2006; Qiao et al., 2001; Chan et al., 2010; Hwang et al., 2013; Ismail, 2013; Olusola et al., 2012). A range of areas of PPPs from different sectors consisting of various project models within PPP has been explored in these studies. Some of these sectors for which CSFs have been explored by researchers include transportation, power, telecommunication and housing.

Qiao et al. (2001) identified and analysed 27 CSFs of BOT projects in China against different stages of the project. They argued that "stable political and economic situation" needs to be given importance in the evaluation phase of the project. Moreover, factors such as "technical solutions" for tendering stage, "reasonable risk allocation" for award phase, "competent project team" for construction phase and "management control" for operation phase of the project were identified to be important. Similarly, Zhao et al. (2010) investigated 31 success factors for Chinese PPP power projects that were

### PROCEEDINGS

6<sup>th</sup> New Zealand Built Environment Research Symposium (NZBERS 2020)

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delivered using the “build own transfer (BOT)” mode by reviewing relevant literature and carrying out interview with experts.

A recent study by Yang et al. (2017), followed a similar approach in exploring the CSFs for BOT projects in China. Their findings reveal that “reasonable risk allocation”, “government support and guarantee”, “a strong project consortium” and “project technical feasibility” are top ranked important CSFs for BOT project in China.

On the other hand, despite the unique characteristics of PPP projects several studies have also engaged this concept of CSFs for PPP infrastructure projects in general, without specifying sector or project type (Ismail 2013; Chan et al. 2010).

Li et al. (2005) identified 18 CSFs for PPP/PFI projects in the UK construction industry and examined their relative importance using a questionnaire survey. Mean analysis of these factors found “appropriate risk allocation”, “strong private consortium” and “available financial market” to be the most crucial factors. Similarly, for an Australian sports stadium project, Jefferies et al. (2002) identified and examined 15 CSFs, which was delivered using the “build operate own transfer (BOOT)” mode of PPP. “Technical innovation”, “efficient approval process”, “solid consortium” and “good resource management” were found to be the most significant CSFs. The findings suggest that the negotiation process plays a key role in project success.

Following Li et al. (2005) 18-CSF list, Chan et al. (2010) explored this concept in People’s Republic of China. An empirical questionnaire survey instrument was employed to solicit the views of Chinese PPP experts. They employed factor analysis technique to group these factors into clusters which are, “macroeconomic stability”, “shared responsibility between public and private sectors”, “transparency in procurement”, “stability in political and social atmosphere” and “informed government”. They further concluded that the factor group “stable macroeconomic environment” is very critical due to rapidly changing global financial situation. Ismail (2013) also adopted the same methodology to study these CSFs in Malaysian PPP projects.

Following the New Zealand government’s decision to pursue PPP as a procurement model, Liu and Wilkinson (2011) investigated the barriers and drivers for its adaptation in New Zealand’s perspective. They used semi-structured interviews with PPP experts to investigate these issues. Some of the drivers in their findings are also

the key critical success factors highlighted in a number of international critical success factors studies, namely, better risk allocation and whole of life cost savings.

Asquith et al. (2015) studied the effect of political influence on PPP health sector project in New Zealand. They conducted an exploratory study to identify the critical success factors for partnerships contracts in the health sector. Their findings suggest that clear contractual relationships, commitment and trust play key roles in determining the success of these partnerships. Furthermore, private sector respondents showed their concern about reforms in the political process, which dictates their decisions about entering into these partnerships.

Although several previous studies address CSFs related to PPP in international literature, studies focusing this area in New Zealand’s context remain sparse. Moreover, due to distinctive characteristics of PPP to a country require a study on CSFs specifically for PPP in that country. Hence, this present study fills the gap by investigating the CSFs for implementation of PPP in New Zealand. The factors noted above from the most prominent studies have been extracted into 27 CSFs, as shown in Table 1.

**Table 1: List of CSFs identified from literature**

Critical Success Factors	References								Total
	1	2	3	4	5	6	7	8	
Appropriate risk allocation	*	*	*	*	*	*	*	*	8
Strong private consortium	*	*	*	*	*	*	*	*	8
Favourable legal framework	*	*		*	*	*	*	*	7
Transparency in procurement	*	*	*	*	*	*		*	7
Political support	*	*	*	*		*	*		6
Strong and committed public authority	*			*	*	*	*	*	6
Risk sharing	*			*	*	*	*		5
Adequate financial market	*		*	*		*	*		5
Stable macroeconomic conditions	*			*		*	*	*	5
Credible cost benefit	*			*		*	*	*	5

PROCEEDINGS

analysis									
Social support	*		*	*		*		*	5
Government guarantees	*		*	*		*		*	5
Commitment and responsibility	*	*		*		*			4
Sound economic policy	*			*		*		*	4
Shared authority	*				*	*		*	4
Sound governance	*		*			*		*	4
Multipurpose project targets	*			*		*		*	4
Competitive procurement	*		*			*			3
Project's technical feasibility	*		*					*	3
Client's brief		*	*						2
Innovation/Project complexity							*		1
Approval and negotiation process		*							1
Environmental impact		*							1
Community support		*							1
Business diversification			*						1
Credit rating of investors		*							1
Availability of suitable financier		*							1

References: 1 = (Li et al., 2005); 2 = (Jefferies, 2006); 3 = (Chan et al., 2010); 4 = (Ismail, 2013); 5 = (Hwang et al., 2013); 6 = (Chou & Pramudawardhani, 2015); 7 = (Al-Saadi & Abdou, 2016); 8 = (Yang et al., 2017)

### 3 Methodology

This study followed a three-step approach. In the first step, 27 CSFs were identified by reviewing PPP literature. A 5-point Likert scale questionnaire survey was conducted in the second step, which gathered the opinions of PPP practitioners working in New Zealand concerning the importance of the identified factors. In the last step, mean score of factors was used to rank them which indicated their relevant importance and draw a comparison between the perceptions of public and private sector individuals. The top five factors were selected for discussion.

As stated above, the 27 critical success factors identified

from existing literature (table 1) have received recognition from several researchers. These factors were examined using a five-point Likert scale questionnaire survey. Many other studies have utilized similar kind of scale in the area of construction management (Li et al., 2005; Chan et al., 2010; Ismail, 2013; Yang et al., 2017).

The survey measured the opinions of PPP professionals from public and private sectors in New Zealand regarding CSFs for PPPs. The complete questionnaire comprised two parts. The first part contained questions about the respondents' individual profiles and the second part surveyed the respondent's level of agreement against each of the identified CSFs. Questionnaire was pre-tested with the help of three academic and PPP professionals, before the start of data collection. Their proposed changes were incorporated in the questionnaire to help the respondents understand questions better.

The questionnaire survey was administered through Survey Monkey in July, August and September 2019 among New Zealand practitioners with involvement in PPP projects. Convenience sampling method was adopted to gather responses. Initial set of respondents were approached from an on-going PPP project. Considering the level of experience of these individuals in PPP scene, it was expected that they had connections with other potential respondents also, hence, some of the them were asked to distribute the survey form link to their peers as well.

The data was analysed using mean value analysis (MVA) and based on calculated mean scores, ranking of CSFs was generated. This method has been used by several studies in the past to analyse similar kind of data (Ismail 2013; Hwang et al., 2013). MVA is considered an acceptable method for ranking factors (Chou & Pramudawardhani, 2015). Cronbach's alpha using SPSS was calculated to check the reliability of the data. Cronbach's Alpha value was 0.916 suggesting high reliability of the data.

### 4 Findings and discussion

A total of 58 responses were received through Survey Monkey. It was anticipated that some respondents might not be familiar with all the success factors identified from literature. To remove any bias from the data obtained from the survey respondents, an additional 'no idea' option for each question was included. Moreover, to safeguard the quality of the data, 12 responses were excluded from the analysis for their incompleteness.

Basic information gathered from the first section of

#### PROCEEDINGS

6<sup>th</sup> New Zealand Built Environment Research Symposium (NZBERS 2020)

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questionnaire is presented in Table 2. Most of the respondents belong to the private sector. Out of the total 46 valid responses, 32 belong to the private sector and 7 from public sector. About half of the private sector respondents have gained their PPP experience working with the main contractor. Low response rate from public sector is consistent with previous studies in similar area (Chan et al., 2010; Ismail, 2013). Moreover, public private partnership tends to involve more private sector individuals as the public sector's role is mostly limited to serve as a facilitator in these kind of partnerships. Only 15% of the respondents have PPP work experience of more than 15 years. This could be due to the relatively new nature of PPPs in New Zealand. However, almost half of the respondents have experience of more than 5 years. In addition, 43% of the respondents have also worked on PPP project outside New Zealand.

**Table 2: Basic information of survey participants**

Item	Type	N	(%)
Public	Central government	5	11
	Local government	2	4
Private	Main contractor	19	42
	Consultant	5	11
Others	Subcontractor	8	17
		7	15
			100
Position	Project Director	4	9
	Construction Manager	3	7
	Project Manger	11	24
	Project Engineer	5	11
	Quantity Surveyor	4	9
	Planning Engineer	3	7
	Others (Supervisor, Contract administrator, Area manager etc.)	16	35
			100
Experience	upto 5 years	24	52
	5-10 years	10	22
	11-15 years	5	11
	Over 15 years	7	15
			100
Country	New Zealand	26	57
	Australia	7	15

	UK	4	9
	Ireland	2	4
	Others	7	15
			100

#### 4.1 Ranking of Critical Success Factors (CSFs)

Mean value analysis of the survey responses for the identified CSFs is used to rank factors in order of their importance. Overall mean scores for these factors range from 3.50 to 4.137 as shown in Table 3. There isn't much difference in the range of mean values of public and private sector respondents from the overall mean score. The results indicate that all the factors identified are deemed important by the survey respondents. However, 14 out of 27 factors are above the mean score of 4 which are considered more important than others.

The top five important factors based on respondent's perception are client's brief, sound economic policy, approval and negotiation process, project's technical feasibility and competitive procurement process. A brief discussion of some of these factors is provided in the following paragraphs.

Client's brief, with an overall mean value of 4.137 is the most important CSF in New Zealand's perspective. A client's brief helps in clear communication of public sector requirements which play a vital role in the success of PPPs (Cheung et al., 2012). Sound economic policy was rated as the second most important factor for successful implementation of PPPs in New Zealand by the survey participants.

Approval and negotiation process and project's technical feasibility are both identified as the third most important factor for success of PPP projects in New Zealand. These factors have received considerable attention from PPP practitioners in other countries as well. Li et al. (2005) in his study for PPP CSFs for UK construction industry ranked project's technical feasibility at sixth position. PPP tend to have a complex approval and negotiation process (Li et al., 2005). Jefferies (2006) identified this factor to be crucial for success in his case study of Australian Super Dome project. He argued that it can help identify key issues to be resolved at the early stage. Project company's ability to effectively handle the technical aspects play an important role in winning the contract (Chan et al. 2010).

Competitive procurement process is ranked fifth by the participating respondents with an overall mean value of 4.08. Li et al., 2005, identified this factor as the most

important factor in opinion of the public sector respondents.

Surprisingly, the success factor ‘Macroeconomic stability’ has not gotten much attention from the respondents and ranks last in the table above. In Chan et al. (2010) ranking of CSFs it was ranked fourth. Li et al 2005 also emphasized the importance of favourable economic condition for successful execution of PPP projects. New Zealand enjoys a stable economy (OECD, 2019), which is one of the potential reasons for this factor’s low importance in respondents’ point of view.

inventive techniques (Cheung and Chan, 2010). As public sector is considered to be reluctant in adopting to innovation, from their perspective the second rank of this factor is somewhat justified. Strong private consortium have also been identified as the top ranked factor in some previous studies (Li et al., 2005; Chan et al., 2010).

### 5 Conclusion

PPP has emerged as an innovative way of procuring public infrastructure projects. Private sector expertise and finances are used for provision of a project or service under long term contracts. These long-term contracts and

**Table 3: Mean scores and ranking of factors**

Critical Success Factors	Mean Score			Rank		
	Overall	Private	Public	Overall	Private	Public
Client's Brief	4.137	4.146	4.182	1	1	12
Sound Economic Policy	4.10	4.102	4.092	2	2	14
Approval and Negotiation Process	4.096	4.097	4.091	3	3	15
Project's Technical Feasibility	4.096	4.073	4.08	3	7	9
Competitive Procurement	4.08	4.077	4.091	5	4	17
Availability of Financier	4.08	4.051	4.182	5	8	11
Strong Public Agency	4.078	4.075	4.091	7	5	18
Realistic Cost-Benefit Analysis	4.076	4.024	4.273	8	10	6
Multi-purpose Objectives	4.04	4.0	4.20	9	11	7
Committed Public and Private Sectors	4.039	4.024	4.10	10	9	13
Good Governance	4.019	4.075	3.818	11	6	23
Innovation/Project Complexity	4.00	3.902	4.364	12	15	2
Appropriate Risk Allocation	4.00	3.90	4.364	12	16	3
Transparent Procurement Process	4.00	3.951	4.181	12	12	10
Favorable Legal Framework	3.98	3.923	4.182	15	14	8
Environmental Impact	3.91	3.925	4.091	16	13	16
Government Guarantees	3.967	3.838	3.81	17	18	22
Risk Sharing	3.923	3.829	4.272	18	19	5
Strong Private Consortium	3.885	3.902	4.40	19	17	1
Shared Authority	3.843	3.732	4.363	20	22	4
Community Support	3.807	3.781	3.91	21	20	20
Political Support	3.788	3.78	3.82	22	21	21
Social Support	3.72	3.70	3.8	23	24	22
Adequate Financial Market	3.714	3.717	3.7	24	23	25
Credit Rating of Investors	3.557	3.43	4	25	27	19
Stable Macroeconomic Conditions	3.54	3.53	3.54	26	25	26
Business Diversification	3.50	3.43	3.4	27	26	27

Innovation and project complexity, and strong private consortium are perceived as top two most important CSF by the public sector participants in this study. Solving complex project issues using innovative methods is one of the strong suits of private sector. It is one of the key reasons for private sector involvement in provision of public infrastructure as public sector often lacks the use of

complex arrangements can cause many issues during this process. Success of the project is dependent on many factors which if managed properly can lead to positive results.

This study examined the relevant critical success factors of PPP in New Zealand and ranked them in order of their importance. The findings show that all factors have a

mean score of 3.50 and above which indicate that they were somewhat significant in PPP practitioners' views. Some of the top ranked factors are client's brief, sound economic policy, approval and negotiation process, project's technical feasibility, competitive procurement process and strong private consortium.

In future, as more responses are collected from public and private sector participants, factor analysis technique will yield useful factor groupings. Moreover, comparison between the perceptions of public and private sector parties can be improved by gathering more responses from public sector to generate some useful insights.

There are some limitation to this study. Firstly, the CSFs are collected from the literature in general and from international PPP experience in other countries, some of which might not reflect a true representation of New Zealand. Secondly, all of the identified CSFs may not apply to all the PPP projects due to their generic nature. A project specific context, such as PPPs in social or road infrastructure, may be investigated in future. Lastly, similar studies can be conducted using a different research instrument such as case study or interviews to highlight the opinions of the practitioners.

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