



Structural Equation Model of Strategies for Successful Stakeholder Management in PPPs

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Abstract

Public Private Partnerships (PPPs) have become an increasingly popular choice for the delivery of infrastructure facilities in the recent years. With the involvement of multiple numbers of stakeholders in a PPP project, stakeholder management (SM) plays a decisive role in project success. However, many issues in the recent PPP projects in Australia as well as around the world can directly or indirectly related to the SM concerns of a project. The correct selection of SM strategies and a proper framework will help to solve most of the current SM related issues in PPP projects. In an attempt to understand these pre-emptive SM strategies and their links to SM management related issues in PPP projects, a hierarchical structural model was established. Subsequently, by employing the structural equation modelling technique, the model adapts a total of 34 SM strategies and 12 SM related issues. Based on the survey data collected across the industry experts who have exposure to a various number of PPP projects in Australia the results of the model confirmed that the SE is a key to minimize the SM related issues in the PPP projects. Further, interestingly stakeholder management monitoring and SM related issues has a positive significant relationship suggesting that more the stakeholder management monitoring might lead to more issues. Finally, the relationships between the main tasks of SM were confirmed via the model. With a clear understanding of the significance of these SM strategies in PPP projects the findings could potentially contribute to the PPP project success.

Keywords: Issues, Public Private Partnerships, SM, Strategies and Structural Equation Modelling.

1 Introduction

Stakeholder management (SM) is considered as an effective management approach to fulfil the stakeholder concerns and to develop robust stakeholder relationships in complex project environments (Bourne and Walker 2005). As such, a robust body of literature was developed related to SM in

construction projects. However, a very few studies has been undertaken in relation to SM in PPP projects (De Schepper et al. 2014). PPP procurement structure attempts to bridge the efforts of the public and private sectors to provide a facility to be used by the public. Chinyio and Akintoye (2008) confirm the importance of SM in the modern forms of construction procurement such as partnering and private finance initiative. Accordingly many stakeholders are involved whose interests are not always likely to agree. Further, the prior research on the success factors of PPP projects emphasized that stakeholder consideration is a key to attain PPP project success (Tang et al. 2013).

However, the poor management of stakeholder relationships is one of the main reasons for the failure of many PPP projects in global context (El-Gohary et al. 2006, Henjewelet al. 2013, De Schepper et al. 2014). De Schepper et al. (2014) point out the stakeholder relationship issues are directly related to the concerns in ineffective SM approaches. However, no significant effort was put towards to effectively address the current emerging issues related to SM in PPPs. As such, this research tries to address the identified knowledge gap by exploring the SM related issues in Australian PPPs and by investigating the strategies to cope with the issues. The findings herein are the outcomes of hypothesis testing developed during the literature review followed by Structural Equation Modelling. The next sections will introduce the hypothesis through examining the empirical findings in the extant literature. Subsequently the research methodology was explained followed by the research findings and a discussion. Finally, it concludes the findings and inquires further research directions.

2 Literature Review

Assudani and Kloppenborg (2010) highlight that the major activities related to SM can facilitate and act as a key to project success. And at the same time the scholars have commended that stakeholders play a decisive role in construction projects and satisfying their needs can make or break a project (Bourne and Walker 2005, El-Gohary et al. 2006). Therefore, it is clear that many authors have seen SM as a core element in construction project success. When considering PPP project scenario a variety of authors have highlighted SM related issues in PPP projects. Therefore, it was hypothesized that successful SM will help to solve the current emerging SM related issues in PPP projects. Based on the developed SM frameworks, stakeholder analysis (SA), stakeholder engagement (SE), stakeholder management action plan (SMA) and stakeholder monitoring (SMO) are the main components in construction SM. And it was hypothesized that the main stages of SM will remain the same for PPPs although the measurements for each activity may vary due to the inherent uniqueness in PPP projects. As such, it is reasonable to hypothesize the success in SA, SE, SMA and SMO will significantly influence SM related issues in PPP projects.

H1: SA has a significant influence on SM related issues

H2: SE has a significant influence on SM related issues

H3: SMA has a significant influence on SM related issues

H4: SMO has a significant influence on SM related issues

Subsequently, the relationships between the SM stages were also hypothesised. Such hypothesis were developed based on the SM frameworks developed for construction projects. According to the Karlsen (2002) planning activity is followed by identifying activity and the other activities namely analysing, communicating, acting and following up were proceeding activities. In his framework planning, identifying and analysing activities can be considered as the three main processes of SA. Further, the analysing activity is followed by the communicating activity. The communicate activity is directly associated with SE. Therefore, it can be established that SA directly links with SE. Further, according to Yang and Shen (2014), SA effects “act” and “continuous support”. “Act” was defined as the implementation of the formulated SM strategies, which goes in line with the SMA in the current

conceptual framework. Therefore, it was established that SA effects SMA. Further, “continuous support” activity consisted with the main activities in SMO and therefore it was established that SA has a direct influence on SMO.

H5: SA has a significant influence on SE.

H6: SA has a significant influence on SMO.

H7: SA has a significant influence on SMA.

The relationships of SE with SMO and SMA were also established based on the existing literature. According to the framework developed by Yang and Shen (2014), “SE profile” stage affects the “evaluating the stakeholder satisfaction with the SE activities” stage. The “evaluating the stakeholder satisfaction with the SE activities” is directly associated with SMO and it can be hypothesised that there is a relationship between SE and SMO. As discussed above the six steps framework introduced by Karlson (2002) the “communicate” activity affects “act” activity. As explained above “communicate” activity can be interpreted as SE and “act” activity as SMA. Therefore, a relationship was created between SE and SMA. Further, Yang and Shen (2014) “SE profile” stage is followed by “implementing strategies” which confirmed the link between SE and SMA.

H8: SE has a significant influence on SMO.

H9: SE has a significant influence on SMA.

Yang and Shen (2014), in their developed framework a direct link has been created between “implementing strategies” with two different levels of evaluation activities as “evaluating the effects of SM” and “evaluating the stakeholder satisfaction with the SE activities”. These two levels of evaluation activities clear meet the definitions for SMO and therefore a direct relationship was added between SMA and SMO.

H10: SMA has a significant influence on SMO.

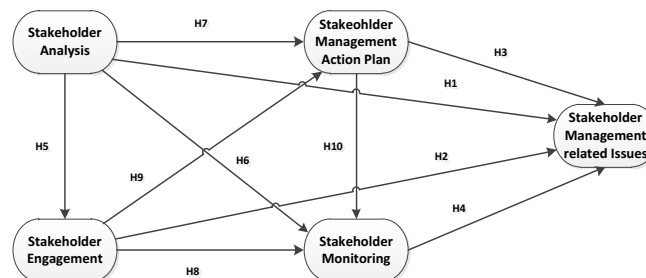


Figure 1: Hypothetical model for the relationship between SM process and SM related issues

Based on the literature review, a comprehensive list of attributes that clearly represent the five constructs in the model was developed. After a thorough review of strategies for successful SM and exploratory factor analysis, SM related issues, SA, SE, SMA and SMO constructs were further classified under several second factors as shown in Table 1.

3 Research Design and Methodology

The survey method was adopted to test the hypotheses proposed in this study. A questionnaire survey was designed with a Likert scale of five for respondents to assess the criticality of the SM related issues and the importance of the SM related best practices for successful PPP projects. The questions were phrased to ask the respondents an affirmative response on the relevant strategy influencing the SM related issues in PPP projects. The sample was selected from the managers who were registered in the Australian Institute of Project Management (AIPM), the Australian Institute of Building (AIB) and LinkedIn business networking website (by using the key word search such as

PPPs, Public Private Partnerships and Australia). The sample was selected based on their professional role and the experience in a variety of PPP projects. 357 responses were received of which 341 were valid and used for further analysis. The Table 2 shows the profile of respondents.

SEM has become a widely used analytical approach in social and behavioural sciences to explore and test casual relationships in the social sciences over the past three decades (Hair et al. 2009). SEM can be considered as a combination of factor analysis, multiple correlation, regression and path analysis.

Latent variables	Second order factor	Abbr.	Attributes
Stakeholder analysis	Identification of stakeholders' expectations (SA1)	SA_1	Map stakeholders with the project time line
		SA_2	Classify stakeholders into categories
		SA_4	Identify relationships among stakeholder issues
		SA_5	Rank stakeholders according to their importance
		SA_6	Identify relationships between stakeholders
	Formalised stakeholder assessment procedure (SA2)	SA_11	An in-depth analysis of the opposite & aligned views within stakeholder groups
		SA_10	An in-depth analysis of the political expectations in the public sector
		SA_8	Maintain a register of all commitments made to stakeholders before bidding
	Consolidation of stakeholder commitments (SA3)	SA_9	Share the register of all commitments with the private consortium
Stakeholder engagement	Communication in stakeholder engagement (SE1)	SE_6	Identify the most suitable strategy to engage the stakeholders
		SE_5	Establish community advisory groups
		SE_11	Govt. develops a clear charter on how community advisory groups work
	Formalised stakeholder engagement procedure (SE2)	SE_2	Clear and timely information distribution to general community
		SE_1	Honest communication with general community
		SE_16	Early communication with stakeholders on their concerns
		SE_8	Govt. agency engages with general community when developing the project brief and design
	Transparency in stakeholder engagement (SE3)	SE_9	Public participation mechanisms in shaping bids assessment criteria (by the Govt. agency)
		SE_10	Govt. agency engages an independent party to review the bids
		SE_12	Govt. agency makes the independent reviewer's opinion available to general community
		SE_4	Easy channels (e.g gov. website) for general public to understand the potential social impacts on them
		SE_14	Early involvement of the financial institutions to understand the potential economic risks
	Stakeholder management action plan	SE_15	Project value evaluation through stakeholder engagement
SMA_4		Training for the people who work in community consultation	
SMA_5		Training for the people who manage the operations	
SMA_6		Increase project director's awareness on SM	
SMA_8		Embed SM into business case, procurement and contract manuals	
Stakeholder monitoring	On-going stakeholder analysis and engagement (SM1)	SM_6	Continuous communication throughout the PPP process
		SM_7	Ongoing stakeholder meetings between service provider and Govt. during operations
		SM_8	On-going engagement meetings with the operational people
		SM_9	Monitor relationships of stakeholders
	Execution of SM performance evaluation (SM2)	SM_3	Appoint an independent party to monitor the stakeholder matters during initial stage
		SM_4	Appoint an independent party to monitor stakeholder matters during operations
	On-going stakeholder issues identification and monitoring (SM3)	SM_1	Develop Key Performance Indicators (KPIs) to measure SM performance
		SM_2	Measure the performance of KPIs via stakeholder surveys
SM related issues	Issues related to both the sectors (Issue1)	Issu_e_10	A lack of consideration to stakeholders in longer-term performance monitoring
		Issu_e_1	The difficulty in assessing the expectations of each stakeholder
		Issu_e_2	Lack of early consultation with all stakeholders (by the Govt. agency)
		Issu_e_11	A lack of staff capability in the PPP project delivery
		Issu_e_11	Non-disclosure of the history behind PPP project to the private
		Issu_e_11	

Issues related to the PPP project decision (Issue2)	e_3	consortium
	Issu	A lack of information dissemination to the public
	e_8	
	Issu	The political agenda towards PPP project decisions
	e_6	
Issues directly related to the Government sector (Issue3)	Issu	A lack of attention to the general public interests
	e_9	
	Issu	Financiers' nervousness due to changes in the Govt.
	e_7	
	Issu	A non-efficient conflict management system
	e_12	
	Issu	A lack of public engagement sessions when developing the bidding documents
	e_5	
	Issu	Overlapping responsibilities among different Govt. agencies
	e_4	

	Characteristic	Frequency	Percentage (%)
PPP experience	Less than 5 years	107	31.4
	6-10 years	108	31.7
	11-15 years	63	18.5
	16-20 years	37	10.9
	Over 20 years	26	7.6
Professional role	Stakeholder/relationship communication specialist	51	15

Table 1 : Constructs and measurement of SEM

Sector	(Commercial, legal, technical)		
	Financier	23	6.7
	Independent reviewer	11	3.2
	Government	122	35.8
	Private	210	61.6
	Others	9	2.6

Table 2: Sample Characteristics

4 Results and Analysis

As the initial hypothesized model given in Figure 1 is based on the theoretical expectations and past empirical findings, it was found to be premature without meeting the standard model fit indices (Molenaar et al. 2000). Recently with the development of SEM in research a variety of goodness of fit criteria have been developed for this purpose (Washington et al. 2010). Generally absolute fit, incremental fit and parsimonious fit are used to judge the fitness of the measurement and structural components (Ong and Musa 2012). A good fitting model should be selected based on the recommended Goodness-Of-Fit (GOF) measures. As such, GOF measures were used to refine the model to improve the fit as shown in Table 3.

Four trials of SEM analysis were undertaken which resulted in eliminating some of the attributes across five constructs. The fifth model was able to achieve the recommended model fit indices. Eleven items were deleted due to their low correlations with the variables in the final SEM. Among

these variables three were from the SA (SA_2, SA_5, and SA_6); four from the SE (SE_11, SE_16, SE_10 and SE_14); two from the SMO (SM_7 and SM_6); one from the SMA plan (SMA_4) and two from the SM related issues (Issue_4 and Issue_7). This elimination was done incrementally as discussed by Molenaar et al. (2000). Based on the final model fit indices the final model is well fitting for the SM related best practices and the SM related issues. The ratio of X2/degree of freedom is 1.542, which indicates that it is acceptable to the data. The root mean square error of approximation (RMSEA) value of 0.043 at p value of 0.05 indicates that the final model cannot be rejected at a high level of confidence. Furthermore, all other essential indices namely Comparative Fit Index (CFI) and Tucker–Lewis index (TLI) values are above 0.90 which provide a strong evidence that the fit between the measurement model and the data is acceptable (Molenaar et al. 2000, Jin et al. 2007).

GOF measure	Recommended level of GOF measure	Initial SEM	Final SEM
X2/degree of freedom	<5.0	1.543	1.542
Absolute fit			
RMSEA	<0.08	0.047	0.043
SRMR	<0.05	.0759	0.070
Incremental fit			
CFI	>0.9	0.874	0.912
TLI	>0.9	0.862	0.902
Parsimonious fit			
PNFI	>0.5	0.676	0.703
PGFI	>0.5	0.725	0.730

After achievement of the suggested model fit the most parsimonious model was developed using the nested models (Cheng 2001). Accordingly, if a structural model has some non-significant paths new relationships which can theatrically justified should be proposed. In addition, at the same time the non-significant relationships should be deleted. These structural models should be developed one by one where later model must be stemmed from previous models. The best fitting structural model should achieve the goodness of fit indices and all almost of the hypothesized paths should be statistically significant (Cheng 2001). The following Table 4 summarises the final significant paths (CR>1.96) (Byrne 1994).

Hypothesis	Standardised estimate	Estimate	S.E.	C.R.	Decision
H1: SA has a significant influence on SM related issues					Not supported
H2: SE has a significant influence on SM related issues	-0.45	-1.452	0.449	-3.233	Supported
H3: SMA Plan has a significant influence on SM related issues					Not supported
H4: SMO has a significant influence on SM related issues	0.38	1.202	0.606	1.983	Supported
H5: SA has a significant influence on SE	0.78	1.101	0.257	4.288	Supported
H6: SA has a significant influence on SMO	0.97	1.111	0.295	3.761	Supported
H7: SA has a significant influence on SMA Plan	0.60	1.421	0.501	2.837	Supported
H8: SE has a significant influence on SMO.					Not supported
H9: SE has a significant influence on SMA Plan	0.29	0.502	0.249	2.011	Supported
H10: SMA plan has a significant influence on SMO					Not supported

Table 4: Hypothesis testing

5 Discussion

The final SEM model with the significant paths is shown in Figure 2. Accordingly SE has the highest negative correlation (with a standardized coefficient= -0.45) with the SM related issues. SE is used as a generic, inclusive term to describe the broad range of interactions between decision-makers and other stakeholders in megaprojects. It can include a variety of approaches, such as one-way communication or information delivery, consultation, involvement, collaboration in decision-making, and empowered action in informal groups or formal partnerships (Department of Sustainability and Environment, 2005). Olander and Landin (2008) confirm this point in general construction projects in relation to external SM and accordingly stakeholder communication to be open; trustworthy; cooperative; respectful; and informative. Tang and Shen (2013)'s study on the factors affecting effectiveness and efficiency during the briefing stage of PPP projects also found that "open and effective communication" is the paramount important factor. According to Zou et al. (2014), most of the practitioners are looking at relationship management as a process of communication. Their results indicated that relationship management is perceived mainly about communicating with clients and stakeholders and maintaining strong relationship with clients. Therefore, it is clear that SE can be considered as the critical process in solving the emerging SM related issues in PPP projects. Interestingly SMO and SM related issues has a positive significant relationship. Due to the long term and dynamic nature of these projects it is very important to monitor the stakeholder matters throughout the PPP project life cycle on regular basis. However, more the SMO might lead to more issues based on the model results. The correlation of SA and SMA plan with the SM related issues were not significant in the structural model. Therefore, H1 and H3 hypothesis were not supported with the results.

The relationships between the SM stages ie. SA, SE, SMO and SMA plan were also established. The relationships between the SA and the SMO is the most significant relationship (with a standardized coefficient= 0.97). Secondly, the relationship between SA and SE was significant (with a standardized coefficient= 0.78). Thirdly the relationship between SA has a significant influence on SMA plan was significant (with a standardized coefficient= 0.60). Accordingly, it highlights that the SA is the key in the SM process although it is not significantly lesser the SM related issues in PPP projects. Robinson (2005) confirmed that SA will help to obtain a full picture of stakeholders' concerns, and effectively manage antagonism, prejudice and conflicts between stakeholders. Therefore, it is clear that SA is at the core for successful SM. Finally SE has a significant influence on SMA plan hypothesis was confirmed (with a standardized coefficient= 0.29). The following Figure 2 shows the final model with the emphasized standardized estimates.

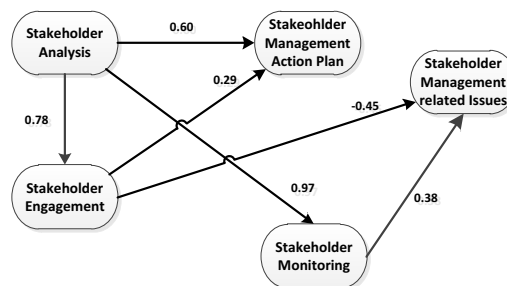


Figure 2: Final model for the relationship between SM process and SM related issues

6 Conclusions

The Government encounters a considerable challenge in relation to budgetary arrangements and capacity for providing quality services due to the increasing demands for public infrastructure. In such situations, PPPs provide a viable alternative to traditional procurement by bringing complementary resources and expertise from both the public and the private sectors. However, the inefficiencies related to SM system in PPPs have been reported as one of the main reasons for PPP project failure in many instances. This research therefore aims to explore a set of strategies, which can aim at solving the current emerging SM related issues in PPP projects. This research developed a SM model for PPP projects, which shows the relationships between the SM stages and the SM related issues. Our results indicated that effective strategies for successful SE is a key to lesser the SM related issues in PPP projects. Therefore, it is vital to adopt an effective SE practice to manage the most critical issues in the PPP projects. Interestingly, our results indicated that more SMO would lead to more issues in PPP projects. However, it is recommended in theory that the stakeholders and their needs should be monitored throughout the PPP life cycle due the long the term nature of these projects. As there is a contradiction with the theory and the results of the model, it is an area for the further research to explore the relationships between SMO and SM related issues. Considering the stages in SM, SA acts as the key and it is the core element in SM although SA is not significantly influencing the SM related issues in PPPs. These proposed relationships will help the decision makers in their choice of SM related strategies to lesser the prevailing SM related issues and to establish a formalized SM framework for PPP projects.

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