

Critical Success Factors of Public-private Partnership (PPP) Projects in the Kingdom of Saudi Arabia

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Abstract

In a world where governments are looking at alternative ways of developing economies, infrastructure development remains a key aspect of these aspirations. For Middle East economies, which have relied on oil proceeds, the growth strategy is not as before as the oil prices have been fluctuating and resulting in low fiscal incomes. Saudi Arabia is one such economy. Thus, in the Kingdom's development strategy outlined in Vision 2030, there has been an emphasis on private players coming into partnering with the government in infrastructure and broader economic development projects. While the concept is easy on paper, running successful Public-Private Partnerships (PPP) projects is a complex endeavor given the conflicting interests of the partners themselves. This research investigated the critical success factors of PPP projects in Saudi Arabia based on the reflections of a quantitative study for infrastructure projects. For descriptive analysis, the entire population of participants (1200 respondents was used), and for the inferential statistics, a sample of 543 respondents was used in a Structured Equation Model tested on Smart PLS was used. The model tested critical success factors mediated by Openness and Communication and a multigroup analysis moderated by job level (representing the level of decision-making classified into strategic formulators - strategic level and above; and strategic implementers-operational managers). The models had an R2 of a stratified sample of 54.5% for the strategic level model and 45.9% for the strategic implementers model. Both models confirmed the importance of Procurement transparency, Risk sharing and allocation, Knowledge management. However, they had differences in the influence of governance, Openness and Communication and efficiency of the financial model. Governance had a significant influence on the success of PPPs only at the operational level while having a fully mediated relationship with Openness and Communication at the operational level. The study then produced two frameworks that are relevant for policymakers and potential private players to understand the

relevant factors to be prioritised at each decision-making level to ensure the successful completion of PPPs in Saudi Arabia.

Keywords

Project Management, Public-private Partnerships, Governance, Risk Allocation, Communication, Knowledge Management.

Introduction

The advent of Public-Private Partnerships (PPP) has also been caught up by the Kingdom of Saudi Arabia (KSA). Since the mid-2000s, the government of Saudi Arabia began focusing on privatisation policies, with a particular focus on Build-Operate-Transfer (BOT) and Build-Operate-Own (BOO) mechanisms (Tahat, 2014). In the beginning, the KSA placed importance on PPP to drive the growth of the water and waste management industry. For this purpose, the DACENTEC Saudi Arabia company was created in 2011 to oversee public and private sector collaborative partnerships in the country. The main activities of DACENTEC are contracting, undertaking, and implementing public and private projects in telecommunication systems. While to date, there have not been many large-scale PPP projects in the country, three specific past projects can be highlighted here, namely five independent power projects (IPPs) in the year 2000 that include the Madinah Airport project in 2012, and the Hajj Terminal at King Abdul-Aziz International Airport (Khan et al., 2013).

The Covid-19 pandemic and decreased levels of oil prices have affected the economy and fiscal position of Saudi Arabia (The World Bank, 2020). Due to the decrease in oil production levels, the GDP growth is expected to contract by 5.4%. New fiscal management policies have become a necessity, and as part of this new direction, the Kingdom of Saudi Arabia (KSA) has endeavored to venture into Public-Private Partnerships (PPP) in order to meet its current energy and infrastructural demands (Norton Rose Fulbright 2016). As reported by The World Bank (2020), “the prospects for successful diversification are complementary to a stable fiscal framework that is well-signaled to the private sector”. Across many nations, PPP projects have become the staple method of financing them continuously but many of the public service projects undertaken throughout the Kingdom of Saudi Arabia as part of the national development plans in the past three decades have met with critical problems such as lengthy delays and cost overrun (Alsuliman, 2019). As of 2004, 70% of isolated private and public projects in KSA were delayed by between 10% to 30% from the promised time, although there is still an enhancement of 19% from overall projects if compared from 1994 (59% time overrun) to

2004 (40% time overrun) (Sepasgozar et al., 2019). While the deployment of PPP has its appeal, there has been contradictory stories on the outcomes of PPP projects in other parts of the world (Duffield, 2017). There are cases of failure, such as the Sydney Cross City Tunnel Project and the Hangzhou Bay Cross-sea Bridge project (Liu et al., 2016).

As it is generally known that the correct environment setting is present for the development of a robust PPP market in the KSA, the government has accordingly showcased heightened commitment to transform Saudi's economy. Additionally, investment opportunities in KSA are abundant and extensive by virtue of it being the leading nation in terms of population and area in the GCC. Moreover, with the advent of Vision 2030, a strategy to drive robust economic growth objectives by hinging on the foundation of enhanced self-reliance and a varied economy. The basis of the plan will revolve around strategies including curtailing of subsidies, possible addition of taxes and reinforcing of the domestic supply chain capacity (Norton Rose Fulbright 2016).

Literature Review

The review of the literature leads to three research problem considerations. First, to date, the existing literature has not examined the nexus between critical success factors and PPP projects in the Kingdom of Saudi Arabia. Most of the current literature is focused on the causes of failure of traditional infrastructure projects in KSA (Ikediashi, Ogunlana, and Alotaibi, 2014). The rise of PPP endeavors in KSA would require a diligent comprehension of what triggers success. This expands the insights to enabling project priority areas important for economies relying on PPPs. Second, from a theoretical perspective, almost all the existing studies have not leveraged the notion of stakeholders in evaluating the success factors for PPPs. As a result, there is a discrepancy between PPP stakeholders' expectations and the project outcome, which decides the projects' success (Wojewnik-Filipkowska, Węgrzyn, 2019).

In a PPP project, the public sector engages with a private consortium to design, build, finance, maintain and operate a given infrastructure. The legitimacy of the private consortium and the public initiator is viewed in terms of both being the focal organisations for the PPP. Both focal organisations will have an interchangeable role of normative and derivative stakeholders. A similar contention is put forward in terms of the power play element. The undertaking of a PPP project entails the transfer of full or partial control over the project from the public initiator to the private consortium. This is, of course, done within the contractual arrangements. Within the premise of the stakeholder theory, such transfer enables the private consortium to augment its power while the public

initiator loses some level of power. In this case, the transfer of power makes the investors become very important to the private consortium, thus making them more responsible for stakeholder management.

Risk allocation and Sharing

Past studies have shown that risk allocation and sharing practices will influence the success of projects (e.g., Forrer et al., 2010; Osei-Kyei, and Chan, 2015). Forrer et al. (2010) highlighted that a key characteristic of the success of PPP projects is the allocation and sharing of risk among parties. With PPP arrangement, the identification of risks is done carefully and allocated the party that has better mitigation techniques for such risks. In the context of Saudi Arabia, over the last few years, several governing bodies have been made to overlook and manage such areas, including addressing risk management in PPP. The new governing body was named the Council of Economic and Development Affairs (CEDA). CEDA has been given the responsibility for the development of privatisation and PPP strategies, some of which concern the proper management of project risks (Jdsupra, 2019). One such means of allocating and managing risk in a proper way is to procure reliable and specialist private partners. In doing so, the risk of failure due to a lack of knowledge in implementing projects is expected to be lowered and mitigated.

H1: Risk allocation and sharing practices have a significant influence on the success of PPP projects in Saudi Arabia.

Transparent Procurement

The transparent procurement process has been observed to be a critical factor in the success of PPPs in different regions. Empirical evidence from Malaysia (Ismail, 2013), the Middle East (Niazi and Painting, 2018) and Australia (Liu et al., 2015). The factor has been noted to affect specific success indicators involving the attainment of value for money in the PPPs (Niazi and Painting, 2018). In other studies, it has also been regarded as having an impact on two stages within the project implementation lifecycle; the initial planning phase and the procurement phase (Liu et al., 2015), all of which, if not carefully implemented, can result in the ruin of the entire PPP. The multiple country application and relevance of the construct (Liu et al., 2015; Niazi and Painting, 2018) given in these mentioned studies provide potential support of the hypothesis that transparency in procurement has a relationship with the success of a PPP project. In the context of Saudi Arabia, the country has a strong and mature legal framework detailing how PPPs should be managed from start to end.

H2: Transparent procurement practices have a significant influence toward the success of PPP projects in Saudi Arabia.

The Efficiency of the Financial Model

The financial efficiency of the project is one of the main criteria for the assessment of project effectiveness that is conducted before establishing the relative advantage of the project (Berezin, Sergi, and Gorodnova, 2018). Financial efficiency means the minimum cost bore by the public sector in the purchasing of infrastructure services and should be one of the main concerns of the government in a PPP infrastructure project contract (Shi, Zhang, Onishi, Kobayashi, and Dai, 2018). The study by Shi et al. (2018) analyzed the contractual efficiency of public-private partnership (PPP) infrastructure projects. The success factor, 'efficient financial market' is also perceived to be identical to the continuing demand for products or services, where private investors are usually attracted by the presence of a mature and stable financial market that furnishes long-term demand for said product and services. (Muhammad and Johar, 2019). The financial efficiency of PPP projects should also be scrutinised to allow the maximisation of VFM and meet the specifications of financial affordability (Zhu, 2020).

H3a: Efficiency of Financial Model for PPP projects is crucial toward the achievement of public-private projects' success in Saudi Arabia.

Openness and Communication

Openness and communication are also crucial in avoiding litigation, and a stronger bond and cooperation were formed between project stakeholders (Osei-Kyei, and Chan, 2017). Openness and transparency to the public are also regarded as important strategies for satisfying external stakeholders in Hong Kong (Osei -Kyei & Chan, 2018). In Ghana, Osei-Kyei and Chan (2017) found that Openness and Communication proved to be one of the CSFs for market development and water infrastructure project. This is considered in view of Saudi Arabia's private sector, which is controlled mainly by powerful families, both resistant and hesitant to conform to the required levels of scrutiny and accountability (Biygautane, Hodge, & Gerber, 2018). Additionally, in the KSA, the absence of genuine coordination and communication between fragmented government parties run by people chosen because of partiality rather than expertise leads to many hidden bureaucratic red tapes that are not visible for public view (Biygautane, Hodge, & Gerber, 2018). In light of these observations, the next hypothesis is developed as follows:

H4: Openness and Communication with all stakeholders are crucial toward the achievement of public-private projects' success in Saudi Arabia.

Governance Practices

Nowadays, public governance is progressively carried out through collaborative models, exemplified by public and private sector cooperation. Governance covers issues pertaining to transparency, accountability, inclusiveness, and participation. Additionally, infrastructure projects are characterised by a sequence of distinct phases involving different participants, resulting in a high degree of "broken agency" that is, parties at one stage of the project can make decisions in their own interest that impose undue costs on counterparties in subsequent phases of project delivery (Henisz et al. 2012). Some of the commonly cited governance-related problems in PPP projects are overestimation of benefits and underestimation of projects (Flyvbjerg 2012); exploitation of planning ambiguities to enhance compensation by contractors (Henisz et al. 2012); maintenance deferments by governments which may result in higher future replacement costs in favor of new infrastructure assets by governments (Bennon et al., 2017). Past studies have revealed that a project success is associated with project governance (Ul Musawir et al., 2017). Project governance is expected to improve the success of projects both directly and through an enhanced benefit management process. Therefore, good governance is expected to overcome the failures arising from governance related aspects. A similar contention is made in the context of Saudi Arabia, where it is hypothesised that:

H5a: Governance has a significant influence toward the success of PPP projects in Saudi Arabia.

Knowledge Management

The asset characteristic of knowledge makes it an important asset that allows for returns. In the context of projects, knowledge management is not only about managing the "assets" but also about managing the processes that act upon the assets (Martelo-Landroguez and Cepeda-Carrion, 2016). The use of knowledge assets as part of a project could be done through project and contract documents (Jennex, 2014), assisting in placing the right priorities within projects (Turner, 2016). A PPP project demands the stakeholders to acquire and exchange adequate knowledge from each other, including the interaction of consultants, end-users, vendors, and government agencies (Boyer, 2019), limiting the knowledge gaps arising from different understanding or absorptive capacity between these players Boyer, 2019; Amovic et al., 2020). Apart from transferring the knowledge, public agencies or departments must have processes to facilitate access to important and relevant

knowledge. Effective management of organisational processes relative to these knowledge activities becomes a conducive platform for successful PPP projects' execution (Amovic et al., 2020). Hence, it is proposed:

H6: Knowledge management practices have a significant influence on the success of PPP projects in Saudi Arabia.

Mediation Effect of Openness and Communication

Openness and communication have been observed to assume a mediation role in other countries (Mwakapala and Sun, 2020), especially in the way that it facilitates efficiency of the Financial Model as well as governance of the stakeholder performance and monitoring aspects of the PPP throughout its implementation period (Xiong et al., 2018). The dynamics of its importance have been regarded but at the expense of the not-so-obvious indirect influences, resulting in more PPPs failures especially in Australia (Xiong et al., 2018). The concern has also been aggravated in circumstances where the projects are of high value and carried out over a long term where uncertainty increases the potential risks associated with leading relationships and processes over longer periods. Past studies have shown the mediating role of openness and communication and it is expected that openness and communication will mediate between the critical success factors and success of PPP projects. Based on these observations, the next hypothesis was established:

Openness and communication mediate the influence of Efficiency of Financial Model (H3b) and Governance ((H5b) toward the achievement of public-private projects' success in Saudi Arabia.

Job Level as a Moderator

The moderator effect emanates from the justification that organisational studies include contextual organisational variables which provide additional insights based on person-environment fit (Marcus and Leiter, 2017). Though this is primarily a psychological phenomenon, it justifies the need for research to create additional analytical dimensions as much as possible, capturing differences associated with subgroups within the represented unit of analysis. Using the same train of argument, the job level moderator provides the subgroup reflections, in this case representing the different decision-making levels inherent in the participating PPPs for any project. These usually perceive successful outcomes differently. From a conceptual framework point of view, the variable will also moderate the entire model as opposed to a link relationship providing a holistic picture of the moderating effect. The model moderator restricts initial assumptions of where the

demographic variable applies, providing the study to determine the moderation effect as opposed to assuming the effect on a particular relationship within the model (Hair et al., 2017). In view of this, the next hypothesis is thus proposed:

H7: Job level moderates the critical success factors of PPPs in Saudi Arabia.

Based on the formulated hypothesis, the summary of the critical success constructs is represented in the conceptual framework is given below.

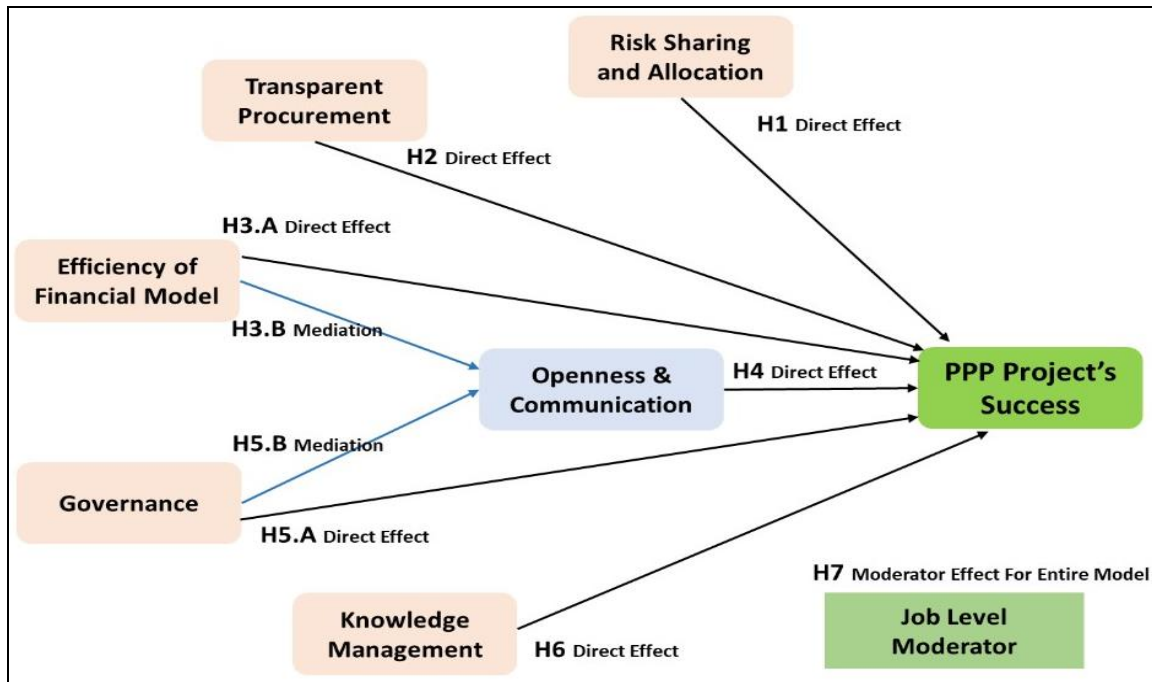


Figure 1 The Conceptual Framework

Source: Drawn by Author

These constructs, therefore, represented the conceptual framework tested in establishing the critical success factors ensuring the PPP success in Saudi Arabia.

Methodology

Research Design

The research employed a quantitative study to test the predetermined factors conceptualised from literature which were to be tested in the Saudi Arabia context. The justification of this approach was centred on the extensive critical study analysis already in existence. Thus, a generalisation of what would be appropriate was carried out using based on a positivist philosophy. The methodological approach utilised a test of the conceptual model, which was hierarchical in nature- incorporating a second-order framework that

modeled the mediator component (Openness and Communication). Based on this hierarchical framework design, SEM was adopted as appropriate to test the model – and the utilised tool was Smart PLS version 2. This was a cross-sectional study.

Sampling and Data Collection

For this study, the target population was all the participants of the three main PPP projects which were successful in Saudi Arabia: First, the study will concentrate on obtaining reflection of two stakeholder groups, that is a public initiator and private consortiums who have been previously involved in three specific PPP projects in Saudi Arabia. The three projects in focus are:

(i) Hajj Terminal at King Abdul-Aziz International Airport mega project, (ii) Independent Water and Power mega project and (iii) Medina Airport mega project.

Data Collection and Data Analysis

A census was carried (1,500 questionnaires) out since most of the participants were available for responding to the research. Out of the responses, a random sample was then used to capture the two critical subgroups – strategic formulators and the strategic implementers. A response rate of 80.53% was attained based on 1,208 responses, and for the inferential statistics, a sample of 543 respondents was used in a Structured Equation Model test.

Multigroup Assessment: The Moderation Test

During the implementation of the multigroup analysis, the two data samples representing the respective decision-making levels were split and analysed for the measurement model and structural model evaluations separately. This strategy allows a complete picture of the moderator effect by noting any significant differences in the model relationships between the models run on the two sub-samples (Hair et al., 2017). The conceptual framework of this study formulated hypotheses with a moderated variable- *Job level*. This is because of the difference of reflections emanating from whether the respondents are strategic decision-makers (strategic formulators) or operational decision-makers (strategic implementers), which have different tasks facilitating a different view of the same aspect. Whatever strategic elements understood by the top management level must still be operationalised by the employees responsible for the day to implementation and enforcement of the related responsibilities.

Mediation Test

The indirect model hypothesised two additional relationships. These relationships were mediated by the Openness and communication variable. In order to test the mediation effect, the bootstrap sampling distribution of the indirect effect was carried out. Such an approach also considers the distributed correlations such that the direct and indirect effects are collectively assessed for overall effect on a single model (Hair et al., 2017; Ramayah et al., 2018). The t-value still has to be based on the two-tailed test cut off value of 1.96 based on a 5% level of significance (Hair et al., 2017) or a stricter t-value of 2.58 at a 1% level of significance, which restricts a generous error allowance in evaluating the model (Ramayah et al., 2018). An additional evaluation is to determine the type of mediation existing in the model. This study undertook to analyse the classification of the mediation process based on a more comprehensive technique (Zhao, Lynch and Chen, 2010) which considered the shortcomings of the early descriptions given in the 1980s.

Results Respondents Profile

The largest number of respondents and representing 34.33% of the total sample, had experience in power projects. An additional 26.67% represented the water project, thus indicating a total of 61% of the respondents having experience in PPPs associated with utility infrastructure projects. The remaining 39% of respondents constituted the individuals who had exposure in the aviation infrastructure PPP projects, which gave a perspective related to different industry transportation. The Director and above job level and senior management (304 responses or 55.99% of the inferential sample) were considered as representing strategic formulators with a holistic understanding of stakeholder (Public & Private stakeholders) relationships in PPPs and the level of involvement. The evidence from this subsample is analysed against the strategic implementers (the operational level employees), which in this case was represented by the manager's subsample (239 responses or 44.01% of the total respondents), of the two totaling 543 responses. The summary of the adopted analysis for the measurement and structural models is provided below (Hair et al., 2017).

Measurement Model Evaluation – Validity and Reliability

For both strategic and operational levels, convergent validity was assessed through Factor Loadings (FL) and Average Variance Extracted (AVE) (Hair et al., 2017). The AVE values were greater than 0.5 and thus convergent validity was confirmed. Discriminant validity shows the degree to which one construct provides unique information in the study

phenomena compared to other latent variables (Hair et al., 2017; Ramayah et al., 2018). As shown in the table below, discriminant validity was confirmed.

Table 1 Measurement model evaluation – Convergent Validity Strategic Level

CONSTRUCT	DIMENSIONS	ITEMS	FL	CR	AVE
Risk sharing	Contractual elements	rx1	0.81	0.86	0.6
	Operational agreement	rx2	0.93		
Procurement transparency	Clear responsibilities	pr5	0.76	0.81	0.68
	Trust in procurement	pr6	0.88		
Efficiency of financial model	Competitive procurement process	pr1	0.9	0.76	0.61
	Project financing efficiency	rx5	0.65		
Openness and communication	Shared knowledge	km8	0.92	0.78	0.65
	Clear knowledge schemes	km9	0.68		
Governance	Monitoring and control	g4	0.77	0.78	0.65
	Public agency organisation	pr3	0.83		
Knowledge management	Content usefulness	km1	0.69	0.8	0.58
	System usability	km6	0.71		
	Knowledge accumulation	km7	0.87		
Success factors	Service delivery efficiency	s3	0.76	0.75	0.6
	Stakeholder satisfaction	s5	0.79		

Table 2 Discriminant Validity at Strategic level

Construct	1	2	3	4	5	6	7
1. Efficiency of financial model	0.78						
2. Governance	0.14	0.81					
3. Knowledge management	0.27	0.25	0.76				
4. Openness and communication	0.04	0.34	0.20	0.81			
5. Procurement Trans	0.26	0.20	0.33	0.15	0.82		
6. Risk sharing	0.18	0.14	0.12	0.04	0.27	0.77	
7. Success factors	0.38	0.27	0.47	0.34	0.61	0.33	0.77

Table 3 Operational model -convergent validity results

CONSTRUCT	DIMENSIONS	ITEMS	FL	CR	AVE
Risk Allocation	Contractual elements	rx1	0.81	0.87	0.77
		rx3	0.94		
Procurement transparency	Clear contracts	pr4	0.84	0.77	0.63
	Trust in procurement	pr6	0.75		
Efficiency of financial model	Competitive procurement process	pr1	0.68	0.77	0.53
	Project financing efficiency	rx5	0.79		
		rx6	0.72		
Openness and communication	Readily available systems	km3	0.72	0.76	0.61
	Clear responsibilities	pr5	0.84		
Governance	Efficient approval processes	g3	0.64	0.77	0.64
	Public agency organisation	pr3	0.93		
Knowledge management	Content usefulness	km1	0.78	0.79	0.66
	System usability	km5	0.84		
Success factors	Quality services and products	s2	0.80	0.82	0.69
	Efficient activities	s3	0.83		

Table 4 Operational model- Discriminant validity results

Construct	1	2	3	4	5	6
1. Efficiency of financial model	0.73					
2. Governance	0.60	0.80				
3. Knowledge management	0.28	0.15	0.81			
4. Openness and Communication	0.15	0.40	0.32	0.78		
5. Procurement Trans	0.34	0.40	0.05	0.21	0.79	
6. Risk Allocation	0.49	0.40	0.29	0.13	0.07	0.86

Structural model evaluation: The latent variables were all below the VIF values of 5 (Hair et al., 2017) or the more stringent as shown in the tables above. As for the hypothesis tests, the summaries are given in Table below together with the outcomes. Lastly, the R² values show that the strategy model (strategy formulators) had an R2 of 54.5%, while the operational model (strategy implementers) scored 45.9%. These showed that both models had moderate strength in explaining the success of PPP projects in Saudi Arabia. Lastly, the effect size which evaluates the impact of change when one independent latent variable is excluded in the model is given in the summary table.

Table 5 Strategy model- Hypothesis testing (Bootstrapping procedure) results

Hypothesis	Path	Success factors (Dependent construct)	T Statistics	Outcome
		Path coefficient (β)	(O/STERR)	
H ₁	Risk sharing -> Success factors	0.149	3.071	Accepted
H ₂	Procurement Trans -> Success factors	0.414	9.722	Accepted
H _{3a}	Efficiency of financial model -> Success factors	0.175	3.425	Accepted
H _{3b}	Efficiency of financial model -> Openness and communication	-0.01	0.074*	Rejected
H ₄	Openness and communication -> Success factors	0.216	6.557	Accepted
H _{5a}	Governance -> Success factors	0.008	0.194*	Rejected
H _{5b}	Governance -> Openness and communication	0.34	7.207	Accepted
H ₆	Knowledge management -> Success factors	0.221	6.463	Accepted

Table 6 Strategy model – Mediation test

	Relationship	Mediation t-value	Direct effect	Indirect effect	Interpretation
H _{3b}	Efficiency of financial model -> Openness and communication	0.074	Significant	Insignificant	Direct only non-mediation
H _{5b}	Governance -> Openness and communication	7.207	Insignificant	Significant	Full mediation

Table 7 Operational model- Hypothesis testing (Bootstrapping procedure) results

	Path	Success factors	T Statistics	Outcome
		(Dependent construct)		
		Path coefficient (β)	(O/STERR)	
H ₁	Risk sharing -> Success factors	0.227	4.8	Accepted
H ₂	Procurement Trans -> Success factors	0.197	3.173	Accepted
H _{3a}	Efficiency of financial model -> Success factors	0.08	0.869*	Rejected
H _{3b}	Efficiency of financial model -> Openness and communication	-0.147	1.97**	Rejected
H ₄	Openness and communication -> Success factors	-0.171	1.9*	Rejected
H _{5a}	Governance -> Success factors	0.19	3.866	Accepted
H _{5b}	Governance -> Openness and communication	0.492	7.133**	Rejected
H ₆	Knowledge management -> Success factors	0.364	7.343	Accepted

Table 8 Mediation analysis (operational level)

	Relationship	Mediation t-value	Direct effect	Indirect effect	Interpretation
H _{3a}	Efficiency of financial model -> Success factors	Not applicable	1.28* (Insig.)		Insignificant relationship
H _{3b}	Efficiency of financial model -> Openness and communication	1.97	Insignificant	Insignificant	No mediation
H _{5b}	Governance -> Openness and communication	7.207	Insignificant	Significant	Direct only non-mediation

Discussion and Finding

Risk Sharing and Allocation practice. The research showed that there is a positive relationship between risk sharing and allocation and the success of PPPs in Saudi Arabia. The positive relationship was observed at both the strategic level and operational level models. These findings, therefore, provide additional support of the relevance of ensuring efficient risk allocation and sharing in driving the success of PPPs. This is consistent with past studies that revealed that risk allocation and sharing practices will influence the success of projects (Forrer et al., 2010; Osei-Kyei, and Chan, 2015) The implication is that there is a sense in which risk allocation and sharing construct significantly influence PPP planning and implementation. The partner strengths and weaknesses have to be known early in the project such that the potential risks identified at the beginning of the PPP are allocated to the stakeholder better positioned to mitigate the risk. If this approach is

carried out appropriately, the project implementation will result in minimised transaction and performance costs facilitating timely completion of projects at the right cost. From a research context point of view, Saudi Arabia seems positioned to be able to improve the performance of the PPPs going forward. The existence of CEDA facilitates this unique position as an additional public agency assuming an advisory role in terms of providing guidelines for project risk management strategies in the PPP implementation (Jdsupra, 2019).

Procurement transparency. The factor had a positive and significant relationship on both the strategic and operational level models on the success of PPPs. It had the most substantial influence on the strategic level model, meaning that it takes the greatest strategic priority in terms of influencing the PPP outcomes in Saudi Arabia. The findings are in line with the findings revealed in past studies (Ismail, 2013; Almarri and Boussabaine, 2017; Niazi and Painting, 2018). This influence reveals that the transparent procurement processes ensure that qualified and competent service providers are considered part of the stakeholders (primarily as subcontractors or vendors). The relevance of this variable also supports that awarding contracts to competent service providers who have undergone the proper vetting and bidding processes reduces mistrust amongst the PPP partners and affects other aspects of operationalising the PPP agreements. Since all PPP players are collectively responsible for the project outcomes, the competent contractors help ensure that the project deliverables are all completed and handed over in the right quality and at the right time. This reduces any project extensions, which can result in cost overruns and unsatisfactory work. Saudi Arabia has a unique position as supported by the PPP laws supporting the implementation of such projects. For example, the "Government Tender and Procurement Law" introduced in July of and the National Government Procurement Electronic System can be seen as related to providing additional evidence of its enforcement and role in ensuring PPP successes.

The efficiency of the financial model. The evidence for support of the efficiency of financial models only at the strategic level. The evidence is backed by strategic makers' exposure to different financial model assessments through investment appraisals that incorporate operational and financial feasibility studies. These studies are composed of financial indicators and various scenarios forecasting both the worst and best scenarios. A project is judged desirable and efficient if it meets the goals and benefits of the participants, sometimes indicated by consequential lowest cost (Kono & Barnes, 2018). Evaluating these metrics thus helps the strategic decision-makers on whether to proceed with a PPP. Given such exposure, strategic decision-makers are better positioned to incorporate the importance of the financial models than the operational level team

members on the success of PPPs. The operational employees are usually unacquainted with how financial costs are related, with their exposure usually limited to what concerns departments in the form of budgeted incomes and expenditure. Thus, the efficiency of the financial model is reasonably supported only at the strategic level model and rejected by the operational level model.

Openness and Communication. The results from this study give sufficient support for a significant positive relationship between Openness and communication and PPP success only at the strategic level. Openness and communication allow decision making processes to be transparent, resulting in enhanced performance monitoring. If during the period of undertaking tasks by any of the PPP participants, certain actions are deviant to the planned tasks, the information is shared with all those whose responsibilities are affected. All the parties determine how their roles will be affected such that corrective action is taken timeously, reducing any potential budget or time overruns. In addition, the rejection of Openness and Communication at the operational level corresponds with the role of PPP relationships being managed at the strategic level. Usually, operational managers are concerned only with internal communication and clarity of issues that affect a single entity. However, as far as interparty communication is concerned, this can be considered as external communication, and a functional unit (usually the Marketing and Corporate communications function) performs the communication on behalf of all the other departments.

Governance practices. These have a moderately positive and significant relationship only at the operational level and are fully mediated by Openness and Communication at the operational level. The findings from this study reveal the importance of governance as critical to the success of the PPPs in Saudi Arabia by the operational level employees. This is in line with the results of past studies that revealed a positive association between project governance practices and project success (Ul Musawir et al., 2017). Effective project governance practices will lead to success of projects that include developing the project scope and project business case (Ul Musawir et al., 2017). Though operational employees are not exposed to the high-level understanding of the complex relationships of the PPP stakeholders, the participation of the lower-level employees ensures the actual value creation intended in the PPP arrangement. These value creation activities are established and delivered under subjection to operations management procedures. Such operations management is synonymous with operational governance mechanisms (Maire and Bouchard, 2015) observed in affecting firm value (Mitra and Karathanasopoulos, 2019), encompassing clarity of policies and procedure, occasions for communication and an appropriate rewarding system, all which enable lower-level employees to be involved

in the overall project implementation. Governance’s direct relationship was rejected at the strategic level potentially for a number of reasons. The first reason could be that on its own is broad and difficult to conceptualise.

Knowledge management practice. The knowledge management practice was considered as having a moderately positive and significant relationship at both decision-making levels. The results support the importance of knowledge as an asset and the requirement for its methodical generation, storage, and transfer to where it is required the most to enable better decision making. The importance of this factor is more deeply appreciated at the operational level, where the planning horizon is much shorter. At this level, knowledge management has the greatest positive influence on the success of PPPs in Saudi Arabia. The short planning horizon also implies that decisions are frequently made, with actors having no luxury of ample time to gather information should it be scattered everywhere.

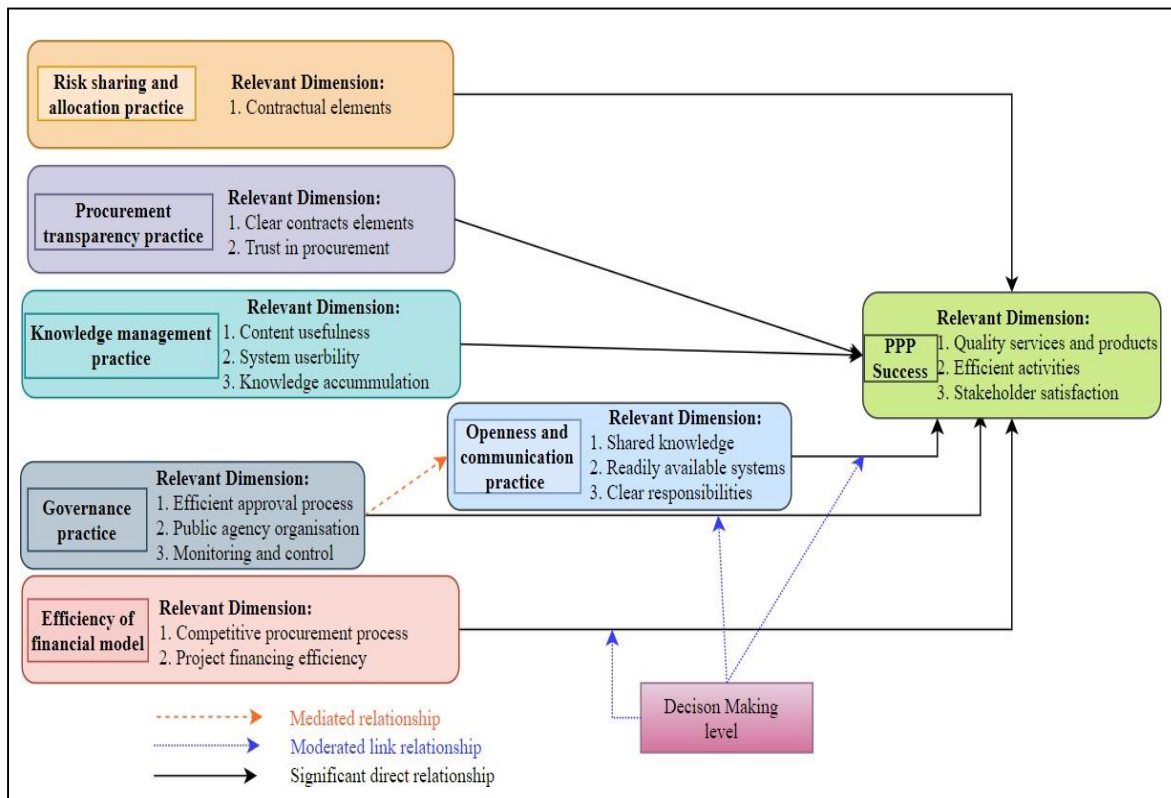


Figure 2 The resulting framework

Source: Drawn by the author

The final theoretical framework shows that three factors (1) *Risk sharing and allocation practice*, (2) *Procurement transparency practice*, (3) *Knowledge management practice*, have a significant direct influence on the success of Private-Public Partnership projects at both the strategic and operational levels. Though the strength of the individual factors was

different depending on the decision-making level, the moderator effect, when applied in a less restricted sense as used in this model, considers significant relationships. The result, therefore, is the consideration of three decision level or job position moderated relationships in the final theoretical framework. These affect the relationships involving (1) *Governance practice*, (2) *Efficiency of the financial model*, and (3) *Openness and communication practice*. For these three relationships, the research showed that the influence depends on whether the model pertains to the strategic level decision makers (senior management decision-makers and strategy formulators) or the operational level decision makers (lower-level management positions and strategy implementers). This summarises the findings of the study.

Limitations and Scope for Future Research

The research utilised a cross-sectional analysis, investigating the relationships through a representative subset at a specific point in time. There is scope for employing a longitudinal study focusing on each type of infrastructure project with data collected at different points in time over a short or long period. For example, for PPPs being carried out under Build Transfer and Operate arrangements, data can be collected by observations intended to understand the critical success factors at these different points. Such an analysis helps enhance the understanding of PPPs over different time periods allowing additional insights. Given that the Kingdom of Saudi Arabia has set its sights on PPPs as steering the development of infrastructure projects, there is a case for further enhancing the understanding of this phenomenon to ensure more progress and policy interventions that support this arrangement for desired outcomes to be attained.

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